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Math Genius!

Teacher's Resource Manual



ORANGE

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PREFACE

The Teacher's Resource Manual is specially developed for teachers using **Orange Education's Math Genius!** Coursebooks. The manual has been designed to provide the teacher with additional materials and support that they may require to effectively teach the coursebook. Each **Teacher's Resource Manual** is completely mapped with its coursebook. The method of teaching/learning suggested in the book is completely based on the Learning-by-doing method which supports guidelines and aids of classroom teaching as per the New Education Policy 2020. The classroom teaching/learning activity helps to allay the fear of Mathematics from the minds of the learners and develops an inherent link for the subject.

Each **Teacher's Resource Manual** has two segments—Chapter-wise detailed **Lesson Plans based on 6E model** and **Practice Materials** in the form of **Worksheets**.

Features of the Teacher's Resource Manual:

Detailed Lesson Plan: It contains Topics to be covered in the chapter, Suggested Allocation of Periods, Teaching Objectives, Learning Objectives and Suggested Teaching Aids.

- **Each lesson plan is based on 6E's:** The 6E lesson plan is based on an instructional model that consists of six phases or steps: Engage, Explore, Explain, Elaborate, Evaluate and Enhance.
- **ENGAGE:** It enhances students' curiosity, interest, and engagement and help them access prior knowledge. .
- **Explore:** It provides students with opportunities to construct learning experience through activities.
- **Explain:** students acquire opportunities to explain their learning experiences with the current learning and to conceptualise the topic's main ideas.
- **Elaborate:** Students apply their knowledge to real-world applications.
- **Evaluate:** it allows teachers and students to recognize the learning effect and review and assess what they have learned and how they have learned it.
- **Enhance:** Provides students time to think, plan, investigate, and organize collected information.

Worksheets: This segment has worksheets for each chapter which can be used for practice and evaluation of learners' understanding of the concepts taught. At the end, answers to each worksheet have been given.

A teacher has to use his/her experience and expertise in teaching the subject. This **Teacher's Resource Manual** provides some methodology in this regard but in no way does it limit the scope of the teaching. As per the interest, experience and proficiency of the teaching, you are advised to make suitable additions and modifications to the methodology being discussed.

Suggestions for the improvement of the book will be gratefully acknowledged by the teacher's community.

—Publisher



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Large Numbers

Learning Objectives

After studying this chapter, students will be able to...

- read and write large numbers in Indian place value system.
- find the face value and the place value of the digits in a number.
- compare and order the large numbers.
- form numbers by using given digits without and with repetition of digits.
- read and write large numbers in international place value system.
- round off the numbers to the nearest tens, hundreds and thousands.
- read and write numbers in Roman numerals.

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, pens, pencils, chalks/marker, notebook, paper chits/number cards/flash cards, Newspapers, an empty box, etc.

Keywords: Crores, Millions, Predecessor, Successor, Roman numerals, etc.

Pre-requisite knowledge: Students must be familiar with numbers up to lakhs, their number names, the smallest and greatest 6-digit numbers, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	**Topic: Knowing large numbers; Place value system; Face value and Place value; Expanded form; Predecessor and successor**	**Suggested extra teaching aids: Blackboard or whiteboard, chalks/marker, dice/number cards/flash cards, an empty box, etc.** **Math Genius! 5 pages: 8–14**

ENGAGE

Choose a student in the class and ask him 'What is the pin code of your area?'. Accept the response and instruct another student to come on the board and read aloud the number and write its number name on the board. E.g., if the area pin code is 243601, then the other student will read and write 'Two lakh forty-three thousand six hundred one'. Repeat the same activity with other students.

Revise the learners previous knowledge by using Let's Recall section given in the book.

Now, instruct the students to write their date of birth in the DDMMYY format in their notebook and read aloud the number formed. Also write the number name. Accept the responses.

Ask 'How many digits are in the number formed by writing the date of birth in DDYYMM format?', 'Are these numbers 6-digit numbers?', 'What are the smallest and the greatest 6-digit numbers?', What will you get after adding 1 to the greatest 6-digit number?', etc. Accept the responses and then introduce 7-digit numbers to the class. **[Experiential Learning]**

EXPLORE

Divide the class into groups of 7 students. Give a dice and instruct them to make a 7-digit number by throwing the dice (a student can throw dice and note down the number come on the top face of the dice to build a 7-digit number). Instruct one student of that group to come on the board and write the number built. Choose any student randomly from other group to write the number name of that one. If he/she writes the correct number name of that number, then the related group will get one point. If he/she is unable to write the correct name, give the chance to other group. Repeat this activity till time permit. **[Collaborative Learning]**

EXPLAIN

Explain to the class that if we add 1 to the largest 6-digit number, we will get the smallest 7-digit number.

	9	9	9	9	9	9	◄--- Largest 6-digit number
						1	
+	1	0	0	0	0	0	◄--- Smallest 7-digit number

Take the reference to the textbook pages 8 to 10 for explaining more about 7-digit numbers and then extend their learning to the 8-digit numbers. Hence explain them how to read and write 7- and 8-digit numbers in Indian place value system.

Also, take the reference of the **Examples 1 and 2** given on page 10 for more explanation about the numbers up to 8 digits.

ELABORATE

Divide the class into pairs and make a place value table up to crores places on the board. Spread some flash cards on the table having 7- or 8-digit numbers written on them. Instruct the pairs to choose any card from them and represent the number written on it in the place value table on the board. Ask the questions related to place value or face value to them as, 'Which digit is at Hundreds/lakhs/ten lakhs/crores place?'; 'What is the place value and the face value of the digits at tens/thousands/ten lakhs/…, places?', etc.

Repeat this activity with other pairs till time permit.

Also, take the reference of the Examples 1 to 3 on pages 11, 12 for more explanation about the place value and the face value of a numbers.

Again ask the class how can we express the numbers in their expanded form? Accept the responses. Take the reference of pages 13 to 14 to elaborate expanded form of a number as well as successor and predecessor of a number. **[Experiential Learning]**

EVALUATE

Classwork: Ask to to solve Q3 and 4 of Practice Time 1A and Q2, 4 and 6 of Practice Time 1B.

Homework: Ask to solve the remaining questions of Practice Time 1A and 1B.

ENHANCE

- Encourage the students to solve the question(s) given in 'Think and Answer' section on page 11.
- Ask students to watch the following videos related to the topics taught in the periods:

https://www.youtube.com/watch?v=ziVMro-BbnU

https://www.youtube.com/watch?v=2ocKY_TUXFM **[Tech Connect]**

Periods: 4–6	Topic: Comparing and ordering numbers, Forming numbers (without and with repetition of digits)	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, cutouts of newspaper ads of home, pamphlet, number cards etc. Math Genius! 5 pages 14–17

ENGAGE

Show different newspaper ads or pamphlet of buy homes on board and ask students to compare and order prices of houses to decide which is better to buy. Then move to comparing and ordering of large numbers.

EXPLORE

Divide the class into 4 or 5 groups. Give each student of groups a number card. Instruct each group, to make different numbers on board by using the digits written on number cards, like: largest 5-digit number with smallest digit at tens place, smallest 6-digit number with largest digit at thousand place, etc. The group who forms the number correctly as per instruction will be appreciated. **[Experiential Learning]**

EXPLAIN

Explain on board that:

- If two numbers have different number of digits, the number with less digits is smaller than the number with more digits.
- If two numbers have the same number of digits, then compare the corresponding digits starting from the left most digit of numbers. Continue till get different digits at the corresponding places. The number with greater digit at such place will be greater.

Next, explain forming of numbers without repetition and repetition of digits. To form the smallest number without repeating the digits, write the smallest digit other than zero (0) at the leftmost place and then write zero (0) if given, otherwise write other digits in their ascending order. To form the largest number using the given digits, write the greatest digit at the left-most place and then write other digits in their descending order. When repetition of digits is allowed, then to form the smallest number, repeat the smallest digit and to form the greatest number, repeat the greatest digit at higher places.

ELABORATE

Demonstrate the steps of comparing and ordering of numbers on board by taking the reference of Examples 1, 2, 3, 4 and 5 given on page 15, 16.

Further, demonstrate formation of numbers without repetition of digits by taking the reference of Examples 1 and 2 and with repetition of digits using the Examples 3 and 4 given on page 17.

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q2, 4 and 6 of Practice Time 1C.

Homework: Ask to solve Q1, 3 and 5 of Practice Time 1C.

ENHANCE

Encourage the students of the class to solve the 'Think and Answer' section given on page 16. Also, ask students to watch the following videos related to the topics taught in the periods:
(1335) Ordering The Numbers | Mathematics Grade 5 | Periwinkle - YouTube
(1335) Comparison Of Numbers | Mathematics Grade 5 | Periwinkle - YouTube

Periods: 7–8	Topic: International place value system, Rounding off numbers	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, medicine box with small compartments, 7 to 10 dice, etc. Math Genius! 5 pages 18–22

ENGAGE

After introduction, write some eight-digit numbers on the board, and ask the students to write the numbers in place value chart. Also ask to write the numbers to their nearest tens or hundreds. Accept the answers. If any students have any confusion, rectify it. Next introduce International place value system.

[Conceptual Learning]

EXPLORE

Divide the class into groups. Draw a table on the board with a column for each group. Take some medicine boxes with small compartments and put a die in every compartment of boxes. Distribute these boxes to each group. Ask to shake the box to reveal the numbers on the dice. Ask to read the number on the dice accordingly and write the numbers on the board in their column as per in Indian place value system. Help them to write the same number in International place value system. The group who makes the highest number by rolling the dice will be the winner of the game.

[Experiential Learning]

EXPLAIN

Explain to the class that as Indian place value system, the International place value system is also used to read and write numbers. This place value system is used globally. In this system, every period has three places: ones, tens and hundreds. In this number system, we put commas after every third digit from the right of the number to separate the periods. Also explain the difference between the periods of Indian and International systems.

Next, revise the rounding off the numbers to nearest 10, nearest 100 by writing some numbers on board and telling their rounded off. Explain the rule of rounding off to the nearest 1000. **[Conceptual Learning]**

ELABORATE

Demonstrate International place value chart on board by writing a number 65423198 in this chart and by taking the reference given on page 18 in the book. Also, demonstrate that each period of International system has three places, Demonstrate the example 1 given on page 19 in details on board. Also show the relationship between the places of Indian as well as International place value system by using the reference given on page 19.

Further, discuss the rounding off to the nearest 1000, by using the steps given on page 21. Also talk about the examples: 1, 2 and 3 as explained on page 21. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1 and 4 of Practice Time 1D and Q4 of Practice Time 1E.
Homework: Ask to solve the remaining questions of Practice Time 1D and 1E.

ENHANCE

- Discuss ‘Think and answer’ given on page 19.
- Ask to watch the video: https://www.youtube.com/watch?v=PryGQXOwRsI.

[Tech Connect]

Periods: 9–10	Topic: Roman Numerals	Suggested extra teaching aids: Flash cards for Roman numerals and Hindu-Arabic numerals, etc. Math Genius! 5 pages 22–23

ENGAGE

Talk about Roman Numerals what they have already learnt in previous class. After the introduction, write some Hindu-Arabic numerals on the board and ask the students randomly to write their corresponding Roman numerals on the board. Accept their responses. Introduce the reading and writing the higher Roman numerals. **[Conceptual Learning]**

EXPLORE

Distribute flash cards of Roman numerals and their corresponding Hindu-Arabic numerals in the class. Ask the class to read the Roman numerals and find the partner who have their corresponding Hindu-Arabic number. When they find their partner, students should seat together. Ask each pair to write first 10 multiples of their Hindu-Arabic number and their corresponding Roman numeral on a sheet of paper and submit to teacher. Teacher will appreciate the pairs who form the Roman numerals correctly. **[Collaborative Learning]**

EXPLAIN

Recall the Roman numeral symbols and their corresponding Hindu-Arabic values. Explain the rules for writing the Roman numerals.

ELABORATE

Demonstrate on board in details, the rules for writing the Roman numerals by taking the reference given on pages 22–23. **[Conceptual Learning]**

EVALUATE

Classwork: Instruct to solve Q3 and 5 of Practice Time 1F.
Homework: Ask to solve rest of the questions of Practice Time 1F.

ENHANCE

- Discuss and motivate to solve the 'Maths Fun' given on page 25. **[Logical thinking]**
- Ask the students to prepare a beautiful chart on Roman numerals up to 100 by using matchsticks. **[Art Integration]**

Periods: 11–12	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 24–27

ENGAGE

Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.

EXPLORE

Divide the students into small groups and guide them to do the activity given in 'Learning by Doing' section on page 27.

EXPLAIN

Start the revision of the exercise, by using Encapsulate, Mental Maths, Maths Connect and Chapter Assessment.

ELABORATE

Discuss questions 1 to 5 of the Chapter Assessment and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve Mental Maths.

EVALUATE

Classwork: Discuss the questions 1 to 5 of chapter assessment in classroom.
Homework: Ask to solve Q6 to 10 of Chapter Assessment given on page 26.

ENHANCE

Motivate the class to solve 'Maths Connect' given on page 25.

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ASSIGNMENT–1

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. The successor of the greatest 5-digit number is:
   (*a*) 99999 (*b*) 10000 (*c*) 100000 (*d*) 9999
2. How many 2-digit numbers are there?
   (*a*) 99 (*b*) 90 (*c*) 100 (*d*) 89
3. How many 5-digit numbers are there?
   (*a*) 99999 (*b*) 9000 (*c*) 10000 (*d*) 90000
4. The smallest 5-digit number formed using the digits 4, 6, 8, 9, 0 is
   (*a*) 46890 (*b*) 04689 (*c*) 98640 (*d*) 40689
5. Out of the following numbers, which number has the place value of 8 as 8000?
   (*a*) 35832 (*b*) 43248 (*c*) 54682 (*d*) 48054
6. 48 in Roman Numerals is
   (*a*) LVIII (*b*) LXVIII (*c*) XLVIII (*d*) XVIIIL
7. If a number has to be rounded off to the nearest ten thousand then digit at which place will be taken?
   (*a*) Tens (*b*) Hundreds (*c*) Thousands (*d*) Ten Thousands
8. With which place does a 7-digit number start in the Indian place value system?
   (*a*) Lakh (*b*) Ten thousands (*c*) Ten lakhs (*d*) Crores
9. Identify the place with which an 8-digit number starts in the International place value system.
   (*a*) Millions (*b*) Ten millions (*c*) Hundred thousands (*d*) Lakhs
10. Find the place of 0 in 36,04,85,298.
    (*a*) Ten lakhs (*b*) Lakhs (*c*) Zero (*d*) 6 crores
11. Which of the following numbers has the greatest value for digit 5?
    (*a*) 80503 (*b*) 5098 (*c*) 146857 (*d*) 7653231
12. Which of the following is greater than the smallest 7-digit number?
    (*a*) 90002 (*b*) 901993 (*c*) 1000111 (*d*) 0111210
13. How many crores are equal to 10 millions?
    (*a*) 10 (*b*) 1 (*c*) 10 (*d*) 100
14. How many zeroes follow 1 in the numeral for 10 millions?
    (*a*) 8 (*b*) 7 (*c*) 6 (*d*) 9
15. Identify the number name for 123,080,603.
    (*a*) One two three eighty thousand six hundre three.
    (*b*) One hundred twenty-three million eight thousand six hundred three.
    (*c*) One hundred twenty-three million eighty thousand six hundred three.
    (*d*) One twenty three million eighty thousand six hundred.

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ASSIGNMENT–2

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. The smallest natural number is ..... .
2. The smallest whole number is ..... .
3. ..... is the predecessor of 390099.
4. 60000 is the successor of ..... .
5. ..... is the smallest 6-digit number formed with different digits.

B. Label True or False.

1. The predecessor of a two-digit number is never a single-digit number. .....
2. The greatest 7-digit even number is 9898988. .....
3. The successor of an eight-digit number is always an eight-digit number. .....
4. 3999 can be written in Roman numeral is MMMCMCXIX. .....
5. 569879 rounded off to the nearest thousand is 570000. .....

C. Match the following.

Column I	Column II
1. The smallest whole number	(*a*) CM
2. Predecessor of 1080	(*b*) XI
3. The Successor of 2539	(*c*) MMDXL
4. The number of 3-digit numbers	(*d*) MLXXIX
5. The number of zeros used to write numbers from 1 to 100	(*e*) Cannot be expressed in Roman numerals

D. Utilise Your Brain.

Form a 7-digit number (without repetition) whose sum of digits is 38.



Operations on Large Numbers

Learning Objectives

After studying this chapter, students will be able to...

- perform all four mathematical operations (addition, subtraction, multiplication and division) on large numbers.
- estimate the sum, difference, product and quotient.
- find the average of numbers.

LESSON PLAN

Suggested number of periods: 15

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, pens, pencils, chalks/ marker, notebook, paper chits /number cards/Flash cards, New papers, an empty box, etc.

Keywords: Addition, Addend, Successor, Predecessor, Difference, Subtrahend, Minuend, Multiplicand, Multiplier, Product, Quotient, Divisor, Dividend, Remainder, Estimation, Round up, Round down, DMAS, ODMAS, BODMAS, Average.

Pre-requisite knowledge: Students must be familiar with addition, subtraction, multiplication, division and rounding off a number up to desired place values.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–2	Topic: Addition of large numbers, Properties of addition	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/ marker, notebook, paper chits Math Genius! 5 pages 29–31

ENGAGE

Introduce the topic in the classroom with some interesting activities, like asking questions on previously learned topics and then link to addition. Like: What is the sum of the largest 7-digit number and the smallest 8-digit number? Use the "Get Ready" and "Let's Recall" given on page 28 and 29 of the book for this purpose. Next, introduce the topic "Addition of Large Numbers".

EXPLORE

Divide the class into groups of 2-3 students. Put some number chits, on which 5, 6 or 7-digit numbers are written, on a box. Invite the groups to choose 2-3 number chits.

First member will write down the numbers in his/her notebook. Then he/she will shuffle the chits and give it to the second member. He/she will also note down the numbers and pass them to the third member. The third one also note down the numbers in the notebook. Now, all the members will add the numbers individually without looking the others calculation. After completing the task they will tally their answers and find whether it is same or not.

If any student makes any error, then the teacher will help and correct it. Repeat this activity till time permit.

[Collaborative Learning]

EXPLAIN

Explain that addition of larger numbers is same as addition of smaller number. First, we write the addends as per their place values. Then add the numbers of each column. Use regrouping if required. Also explain the real-life situations, where the application of addition is required.

Further, explain the order property, zero property and grouping property of addition.

ELABORATE

Demonstrate on board the addition of larger numbers of 6, 7 and 8 digits by taking the references given on page 29. Also demonstrate the use of addition in the real-life situations by discussing the examples 2 and 3 given on page 30.

Further, discuss properties of addition by using the references given on page 30. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 3 and 5(*a*), (*b*) of Practice Time 2A and 'Think and Answer' given on pg 29

Homework: Ask to solve Q2, 4 and 5(*c*), (*d*), (*e*) of Practice Time 2A.

ENHANCE

Visit the web portal to download assignments from www.fullmarksonline.com and provide the students to solve.

Periods: 3–4	Topic: Subtraction of large numbers, Properties of subtraction, Addition and subtraction together	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, deck of cards, paper sheet etc. Math Genius! 5 pages 32–35

ENGAGE

Introduce the topic in the classroom with some interesting activities, like asking the question:

(*a*) Which is the greatest 6-digit number?

(*b*) Which is the smallest 7-digit number?

(*c*) What is the difference between the greatest 6-digit and smallest 7-digit numbers?

Accept the answers, if any queries or any wrong answers then solve them on board.

EXPLORE

Digit-sum method: Using this activity, students will learn to check their answer quickly.

Divide the class into 4 or 5 groups, each group has 5 or 6 students. Distribute a paper sheet to each group. Ask each student of the group to pull 2 cards, flip them and make two numbers by using numbers of the cards and write them on their paper sheet. Instruct them to subtract the smaller number from the bigger number.

Now, the teacher will explain the "digit-sum method" to the class, so that each group will check the accuracy of their answer.

For example: If 9872541 – 143256 = 9729285

- Add the digits of the minuend: 9 + 8 + 7 + 2 + 5 + 4 + 1 $\Rightarrow$ 36 = 3 + 6 = 9
- Add the digits of the subtrahend: 1 + 4 + 3 + 2 + 5 + 6 $\Rightarrow$ 21 = 2 + 1 = 3
- Add the digits of the difference: 9 + 7 + 2 + 9 + 2 + 8 + 5 $\Rightarrow$ 42 = 4 + 2 = 6

Here, 9 – 3 = 6

Thus, the calculation is correct.

Now, each group will check their calculation. The teacher will help, if they have any confusion.

[Collaborative Learning]

EXPLAIN

Explain to the class that subtraction of larger numbers is same as subtraction of smaller numbers. First write the minuend and subtrahend in columns as per their place values. Start subtraction from ones column. Regroup the digits if needed, then move to the tens column, and so on. Also explain the real-life situations, where the application of subtraction is required.

Further, explain the properties of subtraction and method of simplification where addition and subtraction both are required.

ELABORATE

Demonstrate on board the subtraction of larger numbers by taking the references and examples given on pages 32 and 33.

Further, discuss properties of subtraction by using the references given on page 33. Demonstrate how to do addition and subtraction operations together.

Next, discuss the real-life situations where we use addition and subtraction together. Refer page 34 for examples and explanation. Encourage students to solve questions given in 'Think and Answer' sections on pages 32 and 33.

EVALUATE

Classwork: Ask to solve Q1(a) – (e), 3(a) – (c), 5 and 6(a) – (c) of Practice Time 2B.

Homework: Ask to solve the remaining questions of Practice Time 2B.

ENHANCE

Ask students to think any five real-life situations where they need to add or subtract the larger numbers for getting the solution.

Periods: 5–6	Topic: Multiplication of numbers, Properties of multiplication	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Math Genius! 5 pages 36–38

ENGAGE

After introduction, write 1 or 2-digit numbers on the board, and instruct students to multiply the numbers by 10 one by one. Ask to observe the patterns in their products. Next introduce multiplication by 100 and 1000 and multiplication of large numbers.

EXPLORE

The teacher will describe a method called base method of multiplication from Vedic math to help in certain cases where traditional multiplication takes a long time to calculate the product.

Find the product of 99994 by 885 by using the following steps:

Step 1: Find the base, if the numbers have different base make them equal as follows:

Since, 99994 is closer to 100000 and 885 is closer to 1000.

Multiply 885 by 100 to make it closer to 100000

So, 885 × 100 = 88500

Step 2: Find the difference of both numbers with base.

The difference of 99994 and 100000 is 6.

And, 88500 and 100000 is 11500.

Step 3: Separate the product in two parts LHS and RHS with a straight line as follows:

99994	– 6
88500	– 11500
LHS	RHS

Step 4: Multiply the difference and write it in RHS of product.

99994	– 6
88500	– 11500
LHS	69000

Step 5: Subtract 6 from the second number *i.e.*, 88500 and put it in the LHS of product.

99994	– 6
88500	– 11500
88494	69000

Step 6: Now the complete product is 8849469000.

Step 7: Divide the product 8849469000 by 100 as we have multiplied 885 by 100.

So, the final product is 88494690. **[Vedic Math Learning]**

EXPLAIN

Explain in the classroom, the short method of multiplication by 10, 100 or 1000, …, and multiplication of large numbers. Further explain properties of multiplication.

ELABORATE

Demonstrate on board when we multiply any number with 10, 100, 1000, or any number whose first digit is 1 and others are 0, then the product is the number itself with number of zeros in the multiplier. Take the reference of examples of multiplication by 10, 100, or 1000, … given on page 36.

Further, demonstrate multiplication of large numbers by using the examples and explanation given on pages 37 and 38 in details on board.

Next, discuss properties of multiplication:

- Numbers can be multiplied in any order.
- When a number is multiplied by 1, the product is the number itself.

- When a number is multiplied by 0, the product is always 0.
- The product of three numbers does not change when the grouping of numbers is changed.
- If a sum or a difference of two numbers is multiplied by another number, they can be multiplied separately and then added or subtracted.

Explain these properties with examples by taking the references given on page 38. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1(*a*) – (*d*), 4, 6(*a*) – (*d*) of Practice Time 2C.

Homework: Ask to solve the remaining questions of Practice Time 2C.

ENHANCE

Download the worksheet of multiplication from the site and practice it:

https://math-drills.com/multiplication2/multiplication_long_no_tseparator_0805_001.php **[Tech Connect]**

Periods: 7–8	Topic: Division of numbers, Properties of division	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, packets of pencils, etc. Math Genius! 5 pages 40–44

ENGAGE

Invite six students who got rank 1 to 6 in class test in the front of the classroom, and announce that I have a packet of 30 pencils which I want to distribute equally among these students. Tell me what I have to do and how many pencils each of them will get. Accept the response. Recall that, for this, we need the process of division. Motivate the class towards lesson of division.

EXPLORE

We can also divide the numbers by using "Paravartya Method of division". The Vedic sutra 'Paravartya Yojayet' means transpose and apply. In this method we divide the dividend into two parts. The RHS will contain as many digits as the number of zeros in the base. The final answer obtained on the LHS is the quotient and on RHS is the remainder.

Base

Divisor

Difference

Dividend

Quotient | Remainder

For example, Divide 3955 by 125.

In this method, we divide by using the following steps:

Step 1: The divisor is related to the base 100 and therefore we split the dividend in such a way that the RHS has two digits.

LHS		RHS	
3	9	5	5

Step 2: Find the difference of base and the divisor. The base is 100 and the difference is –25 (negative).

100
–125
–25

Step 3: Write down the first digit 3 of the dividend as it is.

- Multiply 3 with the difference –25 and write the product as –7 and –5 below the second and third digits of the dividend.

Step 4: Go to the second column of the dividend. Bring down 9 minus 7 is 2.

- Multiply –25 with 2 and write the answer as –5 and –0 below the last two digits of the dividend. Add or subtract the digits of RHS.

Step 5: In the LHS, we have 32 and in the RHS we have –55.

- We cannot have a negative remainder in the final answer. Hence, we reduce the quotient by 1 and subtract the remainder from the divisor.
- Expand –5 5 as per their place values as –50 + 5 = –45
- Subtract –45 from divisor 125: 125 – 45 = 80
- Thus, final quotient is 32 – 1 = 31 and final remainder is 80.

100
–125
–25

3	9	5	5
	–7	–5	
		–5	–0
3	2	–5	+5

[Vedic Maths Learning/India Connects]

EXPLAIN

Explain the short method of division by 10, 100 or 1000, …, and division of large numbers. Further explain the properties of division.

ELABORATE

Demonstrate on board that when we divide any number by 10, 100, 1000, then the remainders are ones; ones and tens; ones, tens and hundreds digits respectively of the dividend.

Further, demonstrate in detail the division of large numbers on board by taking the references and examples given on pages 40 to 43.

Next, discuss properties of division:

- When a number is divided by itself, the quotient is 1.
- When a number is divided by 1, the quotient is the number itself.
- When 0 is divided by a non-zero number, the quotient is zero.
- Division by 0 is meaningless. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1(*c*) – (*f*), 4 and 5(*c*), (*d*) of Practice Time 2D.

Homework: Ask to solve the remaining questions of Practice Time 2D.

ENHANCE

- Ask to solve the 'Think and Answer' given on page 43. **[Critical Thinking]**
- Ask students to search the method of "Lattice Division" on internet and discuss it with classmates and teacher. **[Tech Connect]**

Periods: 9-12	Topic: Estimation in operations, Simplification of numerical expressions, Average	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Math Genius! 5 pages 44–52

ENGAGE

After the introduction, write some addition, subtraction, multiplication and division problems of numbers up to 4-digits on board. Ask students to solve it. Accept the answers. Introduce estimation in operations by using the same sum.

EXPLORE

Divide the class into small groups. Ask the groups to write the heights/weights of group members. Find the total height/weight and divide it by the number of members. Ask about their result and introduce it as their average height/weight.

EXPLAIN

Recall the rounding off a number to its highest place. Then introduce estimation of addition, subtraction, multiplication and division.

Next, explain simplification of numerical expressions by using the rule of DMAS, ODMAS and BODMAS.

Thereafter, explain average of observation or quantities.

ELABORATE

Demonstrate on board to find the estimated sum, difference, product, or quotient by rounding off the numbers to the nearest tens, hundreds and thousands using the explanation given on page 45.

Next demonstrate that when we have to solve an expression which contains more than one operation, it is very important that we should follow a certain order of operation to solve such a problem correctly.

There are three rules for the order of operation to solve a mathematical expression;

- DMAS
- ODMAS
- BODMAS

Explain the DMAS, ODMAS and BODMAS rule with examples on board by taking reference from pages 47–50.

Further, demonstrate "Average" by taking the reference and examples given on pages 50–51.

EVALUATE

Classwork: Ask to solve Q1 and 4 of Practice Time 2E, Q9–12 of Practice Time 2F, Q1–5 of Practice Time 2G and Q1, 5, 8 of Practice Time 2H.

Homework: Ask to solve the remaining questions of Practice Time 2E, 2F, 2G and 2H.

ENHANCE

- Motivate the class to solve 'Think and Answer' given on pages 46, 50 and 52.
- Ask to watch the video on simplification on "www.fullmarksonline.com".

Periods: 13–15	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 53–57

ENGAGE

Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.

EXPLORE

Guide the students to do the activity given in 'Learning by Doing' section on page 57.

EXPLAIN

Start the revision of the exercise, by using Encapsulate and Chapter Assessment.

ELABORATE

Discuss questions 1, 11, 14 and 15 of the Chapter Assessment and accept students' answer. If they have any confusion or do any error then explain and correct it. Discuss Brain Sizzlers and motivate students to solve Mental Maths.

EVALUATE

Classwork: Discuss the questions 1 to 5, 11, 14 and 15 of Chapter Assessment in classroom.

Homework: Ask to practice rest of the questions of Chapter Assessment given on pages 55 and 56.

ENHANCE

Motivate the class to solve 'Maths Connect', 'Brain Sizzlers' and 'Maths Fun'.

ORANGE

ASSIGNMENT–3

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. Which of the following property of multiplication is shown in the statement given below?

   $3 \times 6 = 6 \times 3$

   (*a*) Associative (*b*) Distributive (*c*) Identity (*d*) Commutative

2. The correct order to apply operations is

   (*a*) Addition - Multiplication - Division - Subtraction

   (*b*) Division - Multiplication - Subtraction - Addition

   (*c*) Division - Multiplication - Addition - Subtraction

   (*d*) Subtraction - Addition - Multiplication - Division

3. The sum of the greatest 8-digit number and smallest 9-digit number is

   (*a*) 1,99,99,999 (*b*) 19,99,99,999 (*c*) 99,99,99,999 (*d*) 1,00,00,999

4. What is the difference of the greatest 7-digit number and the smallest 5-digit number?

   (*a*) 9,98,999 (*b*) 99,89,999 (*c*) 99,899 (*d*) 9,98,099

5. By how many times do the place values of the digits increase from right to left in a number?

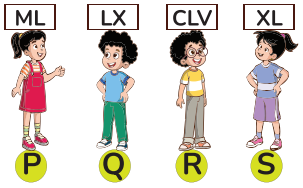
   (*a*) 100 (*b*) 1000 (*c*) 10 (*d*) 0

6. Which of the following is equal to 75×100?

   (*a*) $75 \times 20 \times 5$ (*b*) $70 + 5 \times 100$ (*c*) $75 \times 10 + 90$ (*d*) $(75 \times 20) + (75 \times 5)$

7. For how many hundreds does the digit 9 stand in the product of 255 and 37?

   (*a*) 9000 (*b*) 90 (*c*) 90000 (*d*) 9

8. Observe the given figure. 

who has the largest number?

   (*a*) R (*b*) Q (*c*) P (*d*) S

9. How many hundreds must be added to 30 thousands to get 1 million?

   (*a*) 97 (*b*) 9700 (*c*) 97000 (*d*) 970000

10. What is the sum of the values of the digit '8' in 438498?

    (*a*) 16 (*b*) 88 (*c*) 808 (*d*) 8008

ORANGE

ASSIGNMENT–4

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. The digit at ones place in the product of 473 and 867 is _____.
2. 1,00,000 + 5,00,000 + 75,00,000 = _____.
3. 42956 × 11787 = 11787 × 42956 × _____.
4. The sum of smallest 4-digit number and greatest 5-digit number is _____.
5. Digit at the hundreds place in the difference of 200,326 and 186,418 is _____.
6. 1 more than the predecessor of smallest 8-digit number is _____.

B. Label True or False.

1. The estimated quotient for 34546 ÷ 53, when the numbers are rounded off to the nearest 10 is 575. .....
2. One bike costs ₹65,673. The estimated cost of 156 such bikes is ₹1,02,44,988 when the numbers are rounded to the nearest 100. .....
3. When we divide 17,708 by 579, we get quotient as 30 and remainder as 0. .....
4. In a library, one book stand can hold 129 books. Therefore, 366 book stands are required for keeping 47,214 books. .....
5. Cost of one armchair is ₹10,556. Therefore, cost of 3000 such armchairs is ₹31,66,800 .....

C. Match the following.

Column I	Column II
1. 999999 ÷ 999	(*a*) 100004999
2. 1000 times 7,12,286	(*b*) 360000000
3. 5,60,000 ÷ 14,000	(*c*) 71,22,86,000
4. 5000 more than the greatest 8-digit number	(*d*) 40
5. 600 × 3000 × 200	(*e*) 1001

D. Utilise Your Brain.

Arti says, 'The product of 1 and 97,87,810 is equal to the product of 45,670 and 2143'.

Siya says, 'The product of 1 and 97,870,810 is equal to the product of 45,670 and 2143'.

Who is right?



Factors and Multiples

Learning Objectives

After studying this chapter, students will be able to...

- find the factors and multiples of numbers.
- identify the numbers divisible by 2, 3, 4, 5, 6, 8, 9, 10, and 11 without dividing them.
- identify prime and composite numbers.
- find the prime factors of a number using factor tree and prime factorisation method.
- find the common factors and HCF of numbers.
- find the common multiples and LCM of numbers.
- understand the properties of HCF and LCM.

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, pens, pencils, chalks/marker, notebook, paper chits /number cards/flash cards.

Keywords: Factors, Multiples, Divisibility rule, Prime number, Composite number, Co-primes, Twin primes, Factor tree, Highest common factor, Lowest common multiple.

Pre-requisite knowledge: Students must be familiar with factors and multiples of numbers, process of division, divisibility rule of 2, 3, 4, 5, 6, 9 and 10, prime and composite numbers.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topic: Factors, Multiples, Test of divisibility	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, notebook, dice, 4 charts with number grids from 1 to 50. Math Genius! 5 pages 59–64

ENGAGE

Introduce the topic in the classroom with some interesting activities, like asking questions based on factors and multiples. Suppose you and your friend have to buy toys of ₹140 each, and you have notes of denomination ₹10 and your friend have notes of denomination ₹20 only. How many notes will you pay to the shopkeeper?

Accept the responses. Introduce factors and multiples.

Use the 'Get Ready' and 'Let's Recall' sections to revise the previous knowledge.

EXPLORE

Divide the class into pairs and distribute each group a dice and the number chart with numbers up to 50. Ask one player of each group to choose a number less than 50, and note down it as his/her score. The second player will circle all its factors on the chart by red colour and note down them as his/her score. Now the second player will choose the number and the first one encircle the factors and both of them will note down their scores.

Next, each player will find his/her 1st number by rolling the dice and mark all its multiples on the chart paper using any colour pencil. The sum of the multiples will be their scores.

The player scores more will be the winner. **[Collaborative Learning]**

EXPLAIN

Explain that as ₹140 = 14 × ₹10 and 7 × ₹20; So, 7, 10, 14 and 20 are factors of 140. Inversely, 140 is a multiple of numbers 7, 10, 14 and 20. Also, explain that 140 = 1 × 140, 2 × 70, 4 × 35, 5 × 25; so 1, 4, 5, 28, 35, 70 and 140 are also the factors of 140.

To calculate the factors of large numbers, divide the numbers with the least prime number, i.e., 2. If the number is not divisible by 2, move to the next prime numbers, i.e., 3 and so on. If the number is divisible by any of the prime number, then also check the divisibility by the multiple of that prime number until factors are repeated.

Similarly, multiple of a number is obtained by multiplying it with a natural number (except zero).

Further explain the properties of factors and multiples.

ELABORATE

Demonstrate on board, the method of finding the factors of any number using the explanation and examples given on page 59, and properties of factors given on page 60.

Further, explain multiples by demonstrating the examples 1, 2 and 3 on board by referring page 61 and properties of multiples given on pages 61–62.

Further, recall the rules of divisibility of a number by 2, 3, 4, 5 and 10 and extend the divisibility of numbers by 6, 9 and 11 by using the explanation and examples given on page 63. Also, demonstrate rule of divisibility by 7 by using the example given in subject enrichment on page 63. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 4 of Practice Time 3A, Q1 and 4 of Practice Time 3B, and Q1 of Practice Time 3C.

Homework: Ask to solve the remaining questions of Practice Time 3A, 3B and 3C.

ENHANCE

Discuss ‘Think and Answer’ and ‘Quick Check’ given on pages 61–63. If the students get stuck at any point, the teacher will help them.

Periods: 4–5	Topic: Prime and composite numbers, Co-prime numbers, Twin prime numbers; Prime factorization	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, multiple index card with prime number 2 to 19, index card with composite numbers Math Genius! 5 pages 64–68

ENGAGE

Start the class with some interesting activities. Call out one number at a time. If it is prime, students stand. If it is a composite number, they sit. Give a few seconds each time for students to figure it out. If any student make any error in recognizing a number, teacher will correct it.

EXPLORE

Teach the prime factorisation of a number, using the following activity.

- Divide the class into groups of five or six.
- Distribute the prime number cards (2 to 19) on the teacher's table.
- Ask 1st group to stand behind the teacher's table facing the class.
- Distribute a composite number card to each student of the group.
- After instruction to start, group will send one member to collect all cards that are prime factors of his/her composite number, and show it to the class. If any error in selecting the prime factor, other group member can correct it.
- The next member of the group start, when the previous member has finished.

The group whose all members select their prime factors correctly will be appreciated. **[Collaborative Learning]**

EXPLAIN

Explain to the class that the number of factors of a number decides whether it is a prime or composite.

Numbers which have only two factors, 1 and the number itself are called prime numbers, and the numbers which have more than two factors are called composite numbers. Use the references given on pages 64 and 65.

Discuss 'Think and Answer' given on page 65.

ELABORATE

After demonstrating the prime and composite numbers and its factors, explain co-prime numbers and twin prime numbers by using the explanation given on page 66.

Further, explain that the process of expressing a number as a product of its prime factors only is called the prime factorization.

Demonstrate the two methods of prime factorization on board:

(*a*) Factor tree method

(*b*) Division method by using the examples and explanation given on page 67 of the book.

EVALUATE

Classwork: Ask to solve Q1 and 4(*a*) – (*f*) of Practice Time 3D.

Homework: Ask to solve remaining questions of Practice Time 3D.

ENHANCE

- Discuss the activity of finding the prime numbers from 1 to 100 given on page 65.
- Further, ask to take a chart paper and draw a grid of 1 to 200, and find all the prime numbers lying between 1 and 200, by taking help of Internet.

Periods: 6–8	Topic: Highest common factor(HCF), Lowest common multiple (LCM), Relationship between HCF and LCM	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, A4 paper sheets, two colour beads/ two types of pulses/ rajma up to 50 Math Genius! 5 pages 68–76

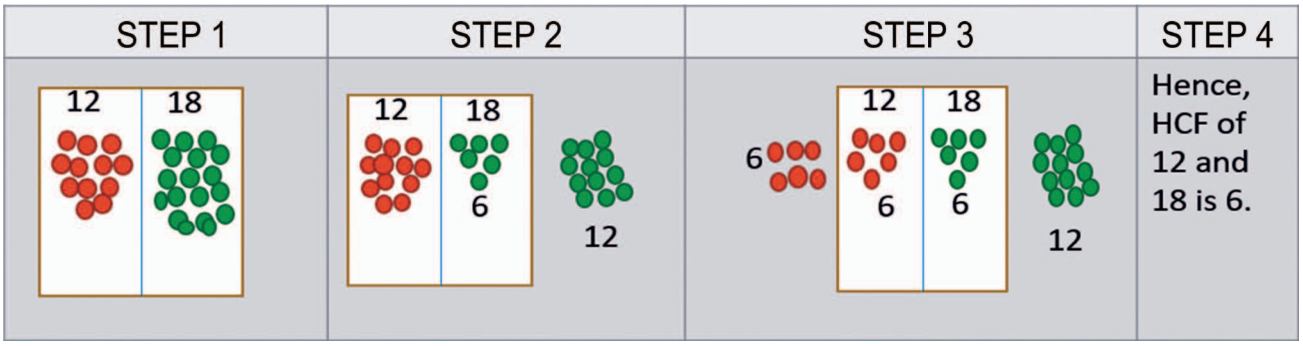
ENGAGE

After the introduction, write two numbers on board, and ask about its factors from the class one by one. Then motivate the class towards HCF and LCM.

EXPLORE

The teacher will teach the class to find the HCF of two numbers by using the following activity:

- Instruct to divide paper sheet into 2 parts using ruler and pencil. And write two numbers on board whose HCF is to be found.
- Ask to arrange colour beads/ pulses/ rajma on the top of sheet as per the numbers.
- Ask to eliminate the smaller number from the larger number.
- Continue the process till both sides have same number.
- The same number of beads on both sides is the HCF of two numbers.



[Art Integration]

EXPLAIN

Explain that the highest common factor(HCF) of two or more numbers is the greatest number that divides each given number exactly. HCF can be found by any of the three methods:

(*i*) Common factors method

(*ii*) Prime factorisation method

(*iii*) Long division method

In further periods, explain the methods of finding the LCM by using the three above mentioned methods.

Also explain the relationship between HCF and LCM.

ELABORATE

Using example 1, first demonstrate on board to find the HCF of two numbers by common factor method. Further explain and demonstrate to find the HCF of two or more numbers using prime factorisation method by taking the example 2 given on pages 69 and 70.

Then demonstrate the method of finding the HCF by division method using the reference and examples given on page 70 of the textbook.

Also demonstrate example 4 to understand the real-life application of HCF.

In next period, discuss lowest common multiple (LCM) and the three different methods: common multiples method, prime factorization method and division method to calculate it, by taking the references and examples given on pages 72 to 74.

Further, demonstrates the relationship between HCF and LCM by taking references and examples given on page 75. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 5 and 6 of Practice Time 3E, Q1, 5 and 7 of Practice Time 3F, Q1 of Practice Time 3G.

Homework: Ask to solve remaining questions of Practice Time 3E, 3F and 3G.

ENHANCE

Watch the video given on link https://www.youtube.com/watch?v=Gc4CblnY5zE to enhance the knowledge of LCM and HCF. **[Tech Connect]**

Periods: 9–10	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Math Genius! 5 pages 76–80

ENGAGE

Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or quaries and start the revision of the exercise.

EXPLORE

Involve the students to do the activity given in 'Learning by Doing' section on page 80.

EXPLAIN

Start the revision of the exercise, by using Encapsulate, Mental Maths and Chapter Assessment.

ELABORATE

Discuss questions 1, 2, 11 and 12 in the chapter assessment and accept students answer. If they have any confusion or do any error then explain and correct it. Discuss Brain Sizzlers given on page 79 and ask students to solve Mental Math given on page 76.

EVALUATE

Classwork: Ask to solve Q1 to 5, 11 and 12 of Chapter Assessment.

Homework: Ask to solve rest of the questions of Chapter Assessment.

ENHANCE

Motivate the class to solve 'Brain Sizzlers'.

ORANGE

ASSIGNMENT–5

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. Every number is the ..... factor of itself.
   (*a*) greatest (*b*) smallest (*c*) equal to (*d*) less than equal to
2. The factors of any number are ..... the number.
   (*a*) equal to or less than (*b*) equal to or greater than
   (*c*) equal to (*d*) less than
3. We can find factors by ..... .
   (*a*) Multiplication (*b*) Division
   (*c*) Multiplication & division (*d*) Addition
4. Which of the following shows only multiples of 12?
   (*a*) 24, 36, 48, 60, 72 (*b*) 12, 18, 24, 30, 36 (*c*) 1, 2, 3, 4, 6, 12 (*d*) 12, 25, 36, 90
5. Which equation shows that 8 is a factor of 32?
   (*a*) 32 = 8 + 24 (*b*) 32 = 40 – 8 (*c*) 32 = 256 ÷ 8 (*d*) 32 = 8 × 4
6. A ..... is a number that is product of a given number and some other number.
   (*a*) multiple (*b*) factor (*c*) product (*d*) factor tree
7. A multiple is basically a ..... .
   (*a*) times table (*b*) factor tree (*c*) quotient (*d*) product
8. We can find the ..... of a number by multiplying it by 1, 2, 3, 4 and so on.
   (*a*) factors (*b*) multiples (*c*) products (*d*) sum
9. Every multiple of a number is ..... the number itself.
   (*a*) greater than or equal to (*b*) less than or equal to
   (*c*) greater than (*d*) less than
10. There is no end of the ....., you can get of a particular number.
    (*a*) multiples (*b*) factors (*c*) products (*d*) sum
11. When we divide one number by another and there is no remainder, the divisor and the quotient are the ..... of the first number.
    (*a*) factors (*b*) multiples (*c*) product (*d*) answer
12. Pick the odd one out.
    (*a*) 2 (*b*) 4 (*c*) 6 (*d*) 7
13. Every number except 1 has at least ..... factors.
    (*a*) 2 (*b*) 3 (*c*) 4 (*d*) 5

ORANGE

ASSIGNMENT–6

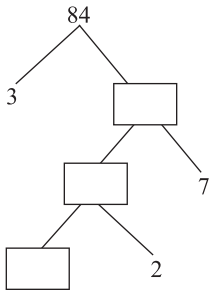
Marks Obtained: _____

Student's Name: _____ Section: _____

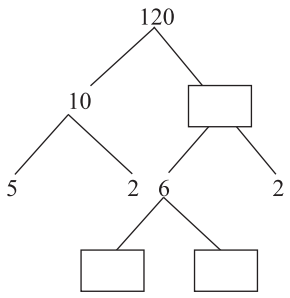
Roll Number: _____ Date: _____

A. Fill in the blanks.

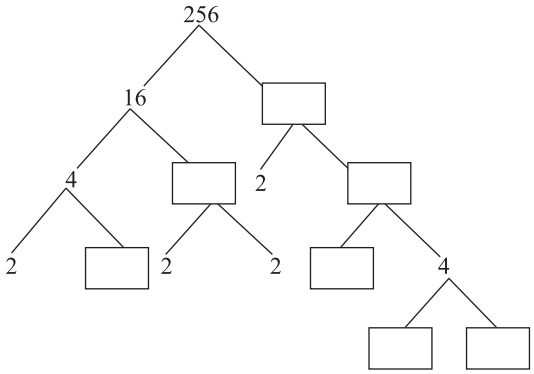
(*a*)



(*b*)



(*c*)



B. Label True or False.

1. 2357 is divisible by 9. .....
2. 16 and 25 is a pair of coprimes. .....
3. The HCF of 35 and 63 is 7. .....
4. The LCM of 5, 7 and 45 is 315. .....
5. $2 \times 3 \times 5 \times 6$ is the prime factorisation of 180. .....

C. Match the following.

Column I	Column II
1. Factors of 6	(*a*) 1, 3, 9
2. Factors of 9	(*b*) 5, 10, 15, 20, ...
3. Multiples of 5	(*c*) 3, 6, 9, 12, ...
4. Multiples of 3	(*d*) 2, 3, 5, 7, 11, ...
5. Prime numbers	(*e*) 1, 2, 3, 6

D. Utilise Your Brain.

Find the number pairs whose LCM is 360 and HCF is 45. How many number pairs can you write?



Fractions

Learning Objectives

After studying this chapter, students will be able to...

- explain fractions and differentiate between different kinds of fractions.
- convert mixed fractions into improper fractions and its converse.
- find the equivalent fractions of a given fraction.
- reduce the given fractions into their lowest form.
- compare and order the given fractions.
- add and subtract like and unlike fractions.
- multiply and divide fractions.

LESSON PLAN

Suggested number of periods: 14

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, pens, pencils, chalks/marker, notebook, etc.

Keywords: Fraction, Equivalent fractions, Like fractions, Unlike fractions, Proper fractions, Improper fractions, Mixed fraction, Multiplicative inverse, Reciprocal, etc.

Pre-requisite knowledge: Students must be familiar with fractions, comparison of fractions, ordering of fractions, addition and subtraction of like fractions.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topic: Fractions, Equivalent fractions, Reducing fraction to its lowest terms	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, notebook, equivalent fraction cards, etc. Math Genius! 5 pages 82–86

ENGAGE

Introduce the topic with a discussion about their previous knowledge of fractions. For this, ask some questions, such as:

- What is fraction?
- What is numerator and denominator?
- What is the difference between like and unlike fractions?
- What are equivalent fractions?

Accept the responses.

Also, use the "Let's Recall" and ''Get Ready'' sections to introduce the chapter.

EXPLORE

Teacher can revise the concept of equivalent fractions using the following activity.

- Distribute fraction cards to each student of the class.
- Ask 4–5 students of the class to come in front of class and show their fraction cards to the class.
- Next, teacher will instruct the class, to check their own fraction cards and come forward to stand with the student who have equivalent fraction card. For example, the boy standing in front having fraction card of $\frac{1}{4}$, then the students who have $\frac{3}{12}$, $\frac{2}{8}$, $\frac{4}{16}$, $\frac{5}{20}$ stands with that student and form a group.
- If any student has any confusion teacher will rectify and explain. **[Collaborative Learning]**

EXPLAIN

Revise in the classroom that a fraction represents a part of a whole such as $\frac{1}{5}$, $\frac{3}{4}$, $\frac{7}{9}$, etc. The number above the bar is called numerator and the number below the bar is called the denominator.

Also explain that, when numerator is less than denominator, it is proper fraction, when numerator is greater than or equal to the denominator, it is improper fraction. Fractions having numerator as 1 are called unit fractions. If the fractions having same denominator, they are called like fractions and if they have different denominators, they are unlike fractions.

And the fractions with a combination of a whole number and a proper fraction are called mixed fractions.

ELABORATE

Demonstrate the process of converting an improper fraction to mixed fraction and viceversa by using the concepts given on pages 83–84. Further, discuss the equivalent fractions and methods of finding the equivalent fractions by taking the examples 1 and 2 given on pages 84–85. Next, discuss how to reduce a fraction to its lowest term using the example given on page 85. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 6, 8 and 10 of Practice Time 4A.
Homework: Ask to solve Q2–5, 7 and 9 of Practice Time 4B.

ENHANCE

Discuss and ask to solve 'Think and Answer' given on page 85. If the students get stuck at any point, the teacher will help them.

Periods: 4–6	Topic: Comparing and ordering fractions	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, dice, etc. Math Genius! 5 pages 87–89

ENGAGE

Start the class with an interaction based on revision of some previous learnt topics.

Write some fractions on board: $\frac{1}{5}$, $\frac{3}{15}$, $\frac{11}{7}$, $2\frac{1}{5}$, etc., and ask to identify:

- Unit fraction
- Proper fraction
- Mixed fraction
- Improper fraction
- Like fraction
- Unlike fraction

Also, tell them to give an example of each of these fractions. Accept the responses.

EXPLORE

Introduce comparison of fractions through an activity: Draw a line on board with heading smaller fraction and greater fraction. Call students in pair and give each of them a pair of dice. Pair will roll their dice and make fractions by taking the smaller number as numerator and greater number as the denominator. Partners then determine which fraction is larger and write the fractions in respective columns on board. If any error occurs, the teacher will explain and rectify. In case of unlike fractions, teacher can hint to use the cross multiplication: $\frac{a}{b} \times \frac{c}{d}$

Student 1 Student 2





Smaller Fraction	Greater Fraction
$\frac{2}{4}$	$\frac{5}{6}$

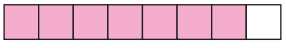
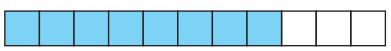
[Collaborative Learning]

EXPLAIN

Explain that in case of like fractions, the fraction with greater numerator is greater. And in case of unlike fractions with same numerator the fractions with smaller denominator is greater. For fractions having different numerators and denominators, first change the fractions into their respective equivalent fractions with the same denominator by finding the LCM of the denominators of the given fractions, then compare them as like fractions. Also, explain the method of cross-multiplication.

ELABORATE

Demonstrate the comparison of like fractions and unlike fractions on board by making the bar model as follows:

Like Fractions	Unlike Fractions
 $\frac{7}{8}$  $\frac{5}{8}$	 $\frac{8}{9}$  $\frac{8}{11}$
$\frac{7}{8} > \frac{5}{8}$	$\frac{8}{9} > \frac{8}{11}$

Refer textbook pages 87–88 for explanation and examples.

Further, explain the method of arranging the given fractions in ascending and descending order by using the examples 4 and 5 given on page 89.

Also, discuss the comparison of fractions by using the method of cross multiplication. In this method cross-multiply the numerator of 1st fraction to denominator of 2nd fraction and denominator of 1st fraction to numerator of 2nd fraction as shown alongside.

$\frac{1}{2} \times \frac{3}{4}$

$\boxed{4} < \boxed{6}$

$\therefore \frac{1}{2} < \frac{3}{4}$

EVALUATE

Classwork: Ask to solve Q1 and 3 of Practice Time 4B.

Homework: Ask to solve Q2 and 4 of Practice Time 4B.

ENHANCE

- Discuss 'Think and Answer' given on page 87.
- Ask to watch the video on fraction on "www.fullmarksonline.com".

Periods: 7–9	Topic: Addition and subtraction of fractions	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, two colour beads/ two types of pulses/ rajma up to 50, etc. Math Genius! 5 pages 90–92

ENGAGE

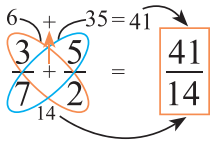
Start the class by discussing a real-life situation. Suppose Riya has 10 candies and she gives 2 candies to each of her two friends Soha and Rohan. Now, answer the following questions:

- What fraction of candies is with Riya in starting?

- What fraction of candies does Riya give to Soha?
- What fraction of candies does Riya give to Rohan?
- What fraction of candies has she distributed?
- What fraction of candies are left with her?

EXPLORE

The teacher will demonstrate a very interesting and useful method to quickly add and subtract fractions known as butterfly method on board and the students will copy the steps in their notebook.



- Draw the butterfly wings to imply which two numbers are to be multiplied together.
- Write the result in the respective antenna.
- The denominators are multiplied and the result is written below the abdomen.
- At the end add/subtract the antenna and write it over the number written in abdomen to get the result.

Note: in case of subtraction write the larger fraction on the left side and instead of adding the product of antenna, subtract them. **[Art Integration]**

EXPLAIN

Explain that to add or subtract like fractions, add the numerators of given fractions and write this numerator in the place of numerator of the resultant fraction and keep the denominator same. And to add or subtract unlike fractions, first convert them into like fractions and then add or subtract as like fractions. Also explain some real-life situations where addition and subtraction of like or unlike fractions are required.

ELABORATE

First revise on board addition and subtraction of like fractions by considring example 1 given on page 90 and then demonstrate the examples 2 and 3 based on real-life situation given on pages 90–91.

Further, explain the problem based on addition and subtraction of unlike fractions.

Add: $\frac{1}{2}+\frac{1}{8}$

LCM of denominator 2 and 8 is 8,

So, $\frac{1\times4}{2\times4}=\frac{4}{8}$ and $\frac{1\times1}{8\times1}=\frac{1}{8}$

So, $\frac{4}{8}+\frac{1}{8}=\frac{4+1}{8}=\frac{5}{8}$

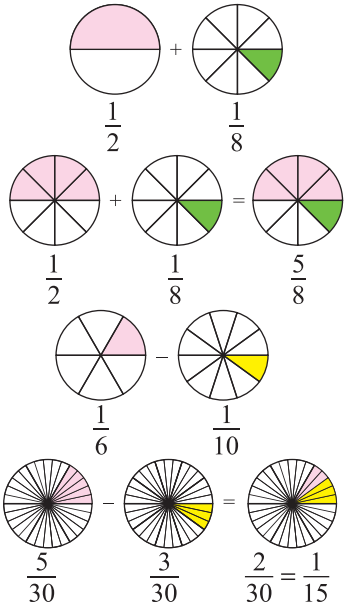
Subtract: $\frac{1}{6}-\frac{1}{10}$

LCM of 6 and 10 is 30

So, $\frac{1\times5}{6\times5}=\frac{5}{30}$ and $\frac{1\times3}{10\times3}=\frac{3}{30}$

So, $\frac{5}{30}-\frac{3}{30}=\frac{2}{30}=\frac{1}{15}$

Refer pages 91–92 for more explanation and examples.



[Conceptual Learning]

EVALUATE

Classwork: Ask to solve Q1(*a*) – (*f*), 2(*a*) – (*d*), 6 and of Practice Time 4C.

Homework: Ask to solve the remaining questions of Practice Time 4C.

ENHANCE

Watch the video given on link https://www.youtube.com/watch?v=sVGlyjl71vg and prepare a working model to represent the addition of mixed fractions. **[Tech Connect]**

Periods: 10–12	Topic: Multiplication of fractions, Use of operator 'OF' in fractions, Multiplicative Inverse (Reciprocal), Division of fractions	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, square grid paper, colour pencils, etc. Math Genius! 5 pages 93–98

ENGAGE

Start the class with an interaction based on multiplication and division of fractions.

Ask: If you have to prepare 4 glasses of lemonade for your parents and grandparents, and you have the recipe for 1 glass of lemonade as follows:

Water: 1 glass

Lemon juice: $\frac{1}{2}$ tablespoon

Sugar: $1\frac{1}{2}$ tablespoon

Then, how much lemon and sugar would you require for 4 glasses?

Accept the answers. Solve if any query raised. Introduce multiplication of fraction in detail.

EXPLORE

The teacher will motivate the class to do the activity given in "Learning by Doing" section on page 101 of textbook. **[Experimental Learning]**

EXPLAIN

First explain that to multiply a fraction by a whole number, multiply the numerator of the fraction by the whole number and keep the denominator same. To multiply two or more fractions, multiply their numerators and the and denominators separately, to get the numerator and denominator of the product. Show that the "OF" operator is same as multiplication.

The multiplicative inverse of a fraction is the reciprocal of the fraction.

Further, to divide a fraction by a whole number, multiply the fraction by the reciprocal of the whole number.

And to divide a whole number by a fraction, multiply the whole number by the reciprocal of the fraction.

Next, to divide a fraction by another fraction, multiply the first fraction with the reciprocal of the second fraction.

ELABORATE

Demonstrate some examples of multiplication on board, by solving questions from exercise/examples given on pages 93–94.

Further, demonstrate use of operator "OF" in fractions by taking the references and example given on page 95.

Next, demonstrate that the multiplicative inverse or the reciprocal of any fraction say $\frac{2}{5}$ is $\frac{5}{2}$, *i.e.*, the numerator of the fraction is the denominator in its reciprocal and the denominator is the numerator in its reciprocal.

At last demonstrate and explain the division of fractions on board:

- Division of a fraction by a whole number as $\frac{2}{5} \div 5 = \frac{2}{5} \times \frac{1}{5} = \frac{2}{25}$

- Division of a whole number by a fraction as $5 \div \frac{2}{5} = 5 \times \frac{5}{2} = \frac{25}{2} = 12\frac{1}{2}$
- Division of a fraction by another fraction as $\frac{1}{5} \div \frac{2}{5} = \frac{1}{\cancel{5}} \times \frac{\cancel{5}}{2} = \frac{1}{2}$

Also, discuss the examples 1–5 based on division of fractions and its real-life applications given pages 96 to 98 of textbook on board.

EVALUATE

Classwork: Ask to solve Q2, 3 and 7 of Practice Time 4D and Q2, 4 and 5 of Practice Time 4E.

Homework: Ask to solve the remaining questions of Practice Time 4D and 4E.

ENHANCE

- Ask to watch the video on fractions on "www.fullmarksonline.com".

Periods: 13–14	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Math Genius! 5 pages 98–101

ENGAGE

Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.

EXPLAIN

Start the revision of the exercise by using Encapsulate, Mental Maths and Chapter Assessment.

ELABORATE

Ask to solve Mental Maths given on page 98 and questions 1, 2, 7, 12 and 13 of the Chapter Assessment. If they have any confusion or do any error then explain and correct it.

EVALUATE

Classwork: Discuss the questions 1, 2, 7, 12 and 13 of Chapter Assessment and 'Brain Sizzlers' given on page 99.

Homework: Ask to solve rest of questions of Chapter Assessment.

ENHANCE

Ask to solve "Maths Fun" given on page 101 of the textbook.

Ask to prepare a working model on fractions to represent addition, subtraction, multiplication and division by using internet. **[Tech Connect]**

ORANGE

ASSIGNMENT–7

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

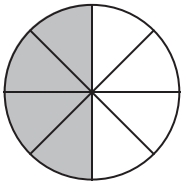
1. If numerator is more than denominator, the fraction is called

(*a*) Like fraction (*b*) Improper fraction (*c*) Proper fraction (*d*) Unit fraction

2. If all the fractions have same denominator, these are called

(*a*) Like fractions (*b*) Unlike fractions (*c*) Similar fractions (*d*) Simple fractions

3. Which of the following is wrong about following figure?



(*a*) $\frac{4}{8}$ (*b*) $\frac{1}{2}$ (*c*) $\frac{2}{4}$ (*d*) $\frac{1}{3}$

4. Which of the following are equivalent fractions?

(*a*) $\frac{2}{3},\frac{4}{6},\frac{6}{9},\frac{8}{12}$ (*b*) $\frac{1}{2},\frac{1}{3},\frac{1}{4},\frac{1}{5}$ (*c*) $1\frac{1}{2},1\frac{1}{3},1\frac{1}{4},1\frac{1}{5}$ (*d*) $\frac{8}{7},\frac{8}{6},\frac{8}{5},\frac{8}{4}$

5. Which of the following is not equivalent fraction of $\frac{3}{5}$.

(*a*) $\frac{6}{10}$ (*b*) $\frac{9}{15}$ (*c*) $\frac{12}{20}$ (*d*) $\frac{15}{30}$

6. If 1 is added to the numerator of a fraction, the fraction becomes 1. If 1 is added to denominator, the fraction becomes $\frac{1}{2}$. The fraction is:

(*a*) $\frac{2}{3}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{3}{4}$ (*d*) $\frac{1}{2}$

7. $\frac{2}{5}$ of a set of notebooks are sold on the first day. $\frac{3}{4}$ of the remaining got sold on the second day. If 75 notebooks still remains, how many notebooks were kept for sale?

(*a*) 250 (*b*) 1000 (*c*) 750 (*d*) 500

8. What is the correct ascending order of the fractions $\frac{5}{8},\frac{4}{9},\frac{1}{4},\frac{11}{18}$?

(*a*) $\frac{4}{9}<\frac{1}{4}<\frac{11}{18}<\frac{5}{8}$ (*b*) $\frac{1}{4}<\frac{4}{9}<\frac{5}{8}<\frac{11}{18}$ (*c*) $\frac{1}{4}<\frac{11}{18}<\frac{4}{9}<\frac{5}{8}$ (*d*) $\frac{1}{4}<\frac{4}{9}<\frac{11}{18}<\frac{5}{8}$

ORANGE

ASSIGNMENT–8

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. $\frac{2}{3}, \frac{12}{18}, \frac{60}{90}$ are _____ fractions.
2. $3\frac{2}{16}$ is equal to improper fraction _____.
3. $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}=$ _____.
4. $\frac{1}{2}\times\frac{1}{3}=1\div$ _____.

B. Label True or False.

1. $1+\frac{1}{2}+\frac{1}{3}=2-\frac{1}{6}$ .....
2. The unit fraction has denominator 1. .....
3. There are 16 quarters in 4. .....
4. $\frac{3}{5}\div 1\frac{2}{3}=1$ .....

C. Match the following.

Column I	Column II
1. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5} \Rightarrow$	(*a*) Like fractions
2. $\frac{3}{4}, \frac{5}{6}, \frac{7}{8} \Rightarrow$	(*b*) Unit fractions
3. $8\frac{3}{4}, 7\frac{8}{9}, 6\frac{2}{3} \Rightarrow$	(*c*) Proper fractions
4. $\frac{8}{5}, \frac{9}{5}, \frac{10}{5}, \frac{11}{5} \Rightarrow$	(*d*) Mixed fractions

D. Utilise Your Brain.

Find the fraction whose numerator is the HCF of 64 and 120 and denominator is the LCM of 5, 15 and 25.



5 Decimals

Learning Objectives

After studying this chapter, students will be able to...

- understand the concept of tenths, hundredths and thousandths.
- read and write decimal numbers.
- find the place value of digits and the expanded form of the given decimal number.
- convert fractions into decimals and decimals into fractions.
- identify the like and unlike decimals and convert unlike decimals into like decimals.
- compare and order the decimals.
- perform four operations (addition, subtraction, multiplication and division) on decimal numbers.

LESSON PLAN

Suggested number of periods: 14

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, pens, pencils, chalks/marker, notebook, paper chits, etc.

Keywords: Decimals, Tenths, Hundredths, Thousands, Decimal Place Value and Expanded Form, Decimal Fractions, Like decimals, Unlike decimals, Equivalent decimals, etc.

Pre-requisite knowledge: Students must be familiar with decimal fraction and decimal numbers and addition, subtraction, multiplication and division of whole number up to desired place values.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	**Topic: Decimals, Place value system of decimal numbers**	**Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, notebook, dice, square grid paper sheets, a glass bowl, some chits with marking $\frac{1}{10}$, $\frac{1}{100}$, $\frac{1}{1000}$, colour pencils, crayon, etc.** **Math Genius! 5 pages 102–108**

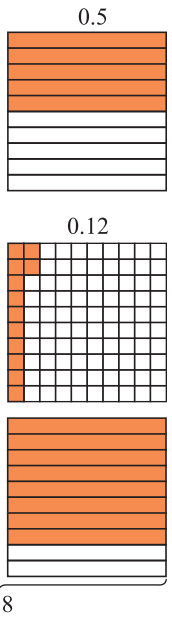
ENGAGE

Introduce the topic in the classroom with some interesting activities, like: Ask to measure the maths book with a ruler, and write the measure on the board. For example, if the length is 22.5 cm, then ask what is name of the dot. What is whole part and so on. Use the "Get Ready" and "Let's Recall" given on pages 102 and 103 of the book for this purpose. Start topic 'decimals'.

EXPLORE

This activity allows students to develop an understanding of decimals and how they connect to fractions. It also enables them to make comparisons between decimals.

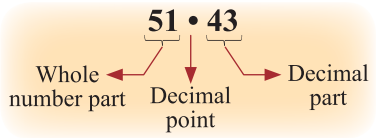
- Divide the class into 4 or 5 groups. Distribute square papers divided into 10 and 100 equal part to each group.
- Keep a pair of dice and some paper chits with numbers $\frac{1}{10}$ or $\frac{1}{100}$ written on them in a bowl.
- Invite the groups one by one to perform the activity.
- Ask one member of any group to roll two dice together, and other member to choose a chit from the bowl.
- Now, ask them to shade the square paper according to chit picked up and the product of the two numbers displayed on dice.
- For example, if player A has rolled 5 and 1 and player B has selected chit of $\frac{1}{10}$, then they shade and write $\frac{5}{10} = 0.5$ and read aloud their decimal number.
- Similarly, if another player rolls 6 and 2, and his/her partner selects $\frac{1}{100}$, then they will shade and write it as $\frac{12}{100} = 0.12$. Also, they will read aloud their decimal number.
- For rolling the numbers 3 and 6, and picking up the chit $\frac{1}{10}$, the group will represent the number $\frac{18}{10} = 1.8$ as
- Continue the game, till the time permits.



[Collaborative and Experiential Learning]

EXPLAIN

By referring textbook pages 103 and 104, recall the concept of decimals. Explain that the decimal point split a number into two parts — Whole number part (left side of the point) and decimal part (right side of the point).



After explaining what a decimal is, deal the decimal fractions with denominators 10, 100 and 1000 i.e., tenths, hundredths and thousandths. Next, explain the method of conversion of decimal fractions to decimals and viceversa.

Further, explain the place value system of decimal numbers by making a place value chart on the board. Tell that when we move from right to left in the place value chart, the value of the respective places increases by 10 times. That is, in a whole number, the place value of a digit increases by 10 times as we move from right to left by one place. Conversely, the place value of a digit decreases by $\frac{1}{10}$ times when we move one place from left to right.

So, we need to extend our place value chart after ones place by introducing the places for tenths $\left(\frac{1}{10}\right)$, hundredths $\left(\frac{1}{100}\right)$, thousandths $\left(\frac{1}{1000}\right)$ and so on.

Decimal Place Value Chart

Hundreds (100)	Tens (10)	Ones (1)	Decimal point	Tenths $\left(\frac{1}{10}\right)$	Hundredths $\left(\frac{1}{100}\right)$	Thousandths $\left(\frac{1}{1000}\right)$	Decimal Number

Write some numbers and demonstrate how to read and write number name using table. Next, explain about the place value and expanded form of decimal numbers. Refer textbook pages 105 to 107 for more explanation and examples.

ELABORATE

Demonstrate on board the conversion of decimal fraction into decimal and decimal to fraction.

$\frac{7}{10} = 0.7$; $\frac{8}{100} = 0.08$; $12\frac{21}{100} = 12.21$; $87\frac{4}{1000} = 87.004$; and

$0.24 = \frac{24}{100} = \frac{6}{25}$; $2.725 = \frac{2725}{1000} = \frac{2725 \div 5}{1000 \div 5} = \frac{545 \div 5}{200 \div 5} = \frac{109}{40} = 2\frac{29}{40}$

Next, consider few decimal numbers and demonstrate how to find its place value and express it in expanded form.

Places	Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths
Value of the Place	10	1	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
Number 1	3	8	.	9	5	
Place value of each digit	3 tens = 3 × 10 = 30	8 ones = 8 × 1 = 8		9 tenths $= \frac{9}{10} = 0.9$	5 hundredths $= \frac{5}{100} = 0.5$	
Expanded form	38.9 = 3 tens + 8 ones + 9 tenths + 5 thousandths $= 3 \times 10 + 8 \times 1 + \frac{9}{10} + \frac{5}{100} = 30 + 8 + 0.9 + 0.05$					
Number 2		5	.	7	4	6
Place value of each digit		5 ones = 5 × 1 = 5		7 tenths $= \frac{7}{10} = 0.7$	4 hundredths $= \frac{4}{100} = 0.04$	6 thousandths $= \frac{6}{1000} = 0.006$
Expanded form	5.746 = 5 ones + 7 tenths + 4 hundredths + 6 thousandths $= 5 \times 1 + \frac{7}{10} + \frac{4}{100} + \frac{6}{1000} = 5 + 0.7 + 0.04 + 0.006$					

Also use the references and examples given on pages 104 – 107 for detailed elaboration of the topics.

[Conceptual Learning]

EVALUATE

Classwork: Ask to solve Q1, 3, 6 and 8 of Practice Time 5A.
Homework: Ask to solve Q2, 4, 5 and 7 of Practice Time 5A.

ENHANCE

- Discuss 'Maths Fun' given on page 106. **[Logical Thinking]**
- Ask to solve 'Think and Answer' given on page 107. **[Critical Thinking]**

Periods: 4–6	Topic: Like and unlike decimals, Comparing and ordering decimals	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, 4 carton box or bowls, etc. Math Genius! 5 pages 109–112

ENGAGE

Start the class by asking some questions based on previous topics. Like:

- Do 0.5 and $\frac{1}{2}$ represent the same number?
- Do 0.2 and 0.20 represent the same decimal?

- Do 0.4 and .04 represent the same decimal?

Accept the responses. Start the topic 'Like and unlike decimals'.

EXPLORE

Magical Dice

In this magical dice activity, students interact with their Interactive Place Value Chart based on the instructions provided by their magical dice, which have the power to change numbers.

To begin, create rules for your die/dice. For each of the numbers on the die, create a rule. Since we are specifically working on decimal place values, here are some examples of rules you could use.

- Change the value of digit at the tenths place
- Make the hundredths place bigger
- Make the number smaller
- Subtract 2 from the hundredths position
- Increase/Decrease the number of decimal places
- Interchange the position of the any 2 digits to make it a greater number

Write any number on the Board. Divide the class into small groups and have the students roll the dice and then perform the action using the rules and number written on the board.

Ask the students to roll the dice 5 times and document the progression of their number over 5 rolls of the dice.

For example, Number in consideration is 32.18

Rolling the dice	Number faced up on Dice	Action performed
1	2	32.19
2	5	32.190
3	1	32.590
4	6	92.530

EXPLAIN

Decimals having the same number of decimal places are like decimals. For example, 0.9, 8.6, 11.5, 354.7 etc. Decimals having different number of decimal places are called unlike decimals. For example, 0.64, 26.8, 124.568, etc.

We can convert unlike decimals to like decimals by adding zeros at the extreme right of the decimal part to make the equal number of digits in the decimal part. Decimal numbers having the same value are called equivalent decimals. Further, explain the method of comparing and ordering decimals by taking the references and examples given on pages 111 and 112.

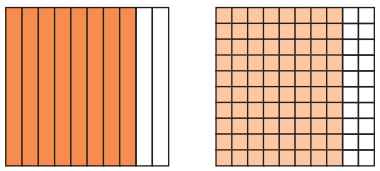
ELABORATE

Demonstrate on board the conversion of unlike decimals to like decimals by adding the required number of zeros.

Unlike decimals :	0.246	46.8	5.96	3.042
	↓	↓	↓	↓
Like decimals :	0.246	46.800	5.960	3.042

The decimal numbers having the same value are equivalent decimals.

Like: 0.8 (8 tenths) and 0.80 (80 hundredths).



EVALUATE

Classwork: Ask to solve Q1 and 4 of Practice Time 5B, Q1, 3 and 5 of Practice Time 5C.
Homework: Ask to solve the remaining questions of Practice Time 5B and 5C.

ENHANCE

- Ask to solve 'Brain Sizzlers' given on page 120 and 'Maths Fun' given on page 122 of the textbook.

Periods: 7–9	Topic: Addition and subtraction of decimal numbers	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Math Genius! 5 pages 113–114

ENGAGE

Start the class by showing a note and a coin to the class and ask anyone to write the amount on board by using decimals. Then display another note and coin and tell another student to write it on the board. Further ask the class to add the amounts and find the difference of the amounts. Introduce addition and subtraction of decimals.

EXPLORE

Use the activity given in 'Learning by Doing' section on page 124 to teach them the concept of addition and subtraction of decimal numbers. **[Experiential Learning]**

EXPLAIN

Addition or subtraction of decimal numbers is similar to addition or subtraction of whole numbers. If the decimals are unlike, just write the decimal numbers one below the other so that the decimal points are in the same column. And then add or subtract the decimal numbers as we do for the whole numbers. Finally, place the decimal point in the answer exactly below the decimal points in the given numbers.

ELABORATE

Demonstrate on board the addition and subtraction of decimal numbers by taking the references and examples.

Focus on the use of addition and subtraction of decimal numbers in the real-life situations by taking the examples 4, 5, 6 and 7 given on pages 113 and 114. Encourage students to solve 'Think and Answer' given on page 114.

EVALUATE

Classwork: Ask to solve Q1, 4, 7, 9 and 11 of Practice Time 5D.

Homework: Ask to solve the remaining questions of Practice Time 5D.

ENHANCE

- Ask to download some add or subtract decimal maze from the internet and try to solve it correctly in minimum possible time. **[Tech Connect]**

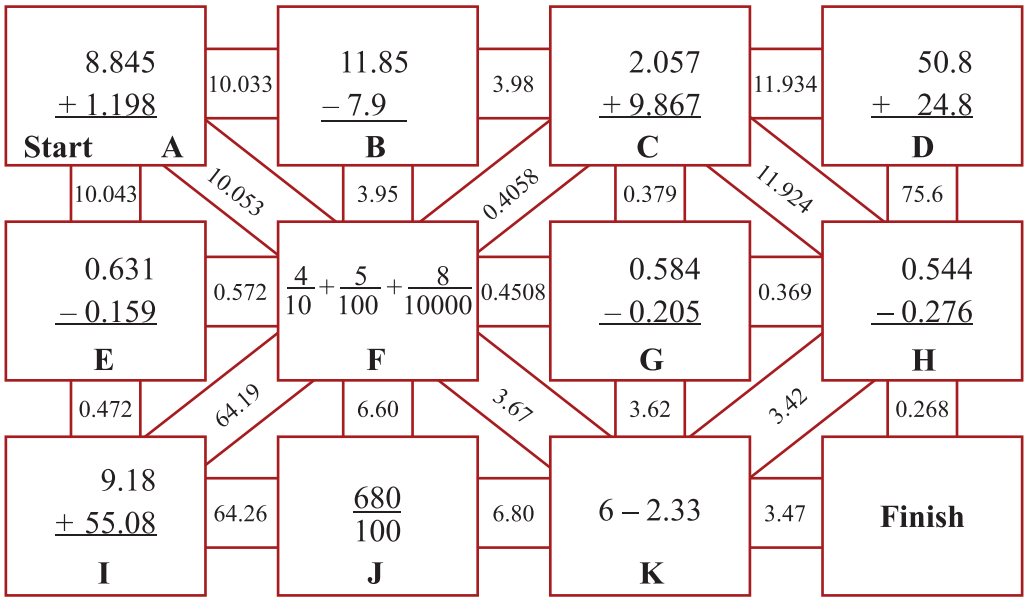
Periods: 10–12	Topic: Multiplication of decimal numbers, Division of decimals	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, copies of decimal maze, etc. Math Genius! 5 pages 115–120

ENGAGE

Start the class by recalling the multiplication of numbers by writing two whole numbers on board. Call any one of the class to solve it on board. Then link it to the multiplication of decimal numbers, by changing the whole numbers to decimal numbers.

EXPLORE

Divide the class into 4–5 groups. Distribute a decimal maze to each group. Instruct them to solve them with the help of each other. The group that completes the maze in the least amount of time will win.



[Collaborative Learning]

EXPLAIN

Explain in the classroom, multiplication of a decimal number by a whole number, method of multiplication by 10, 100 or 1000, …, and multiplication of a decimal by a decimal. Further explain division of decimal by 10, 100 and 1000, by a whole number and by another decimal number.

ELABORATE

Demonstrate on board when we multiply any decimal number by any whole number, first find the product by ignoring the decimal point.

When we multiply decimals by 10, 100, 1000, the decimal point in the product moves towards the right by one place, two places and three places respectively.

$$\begin{array}{r} 6353 \\ \times \quad 5 \\ \hline 31765 \end{array} \longrightarrow \begin{array}{r} 63.53 \\ \times \quad 5 \\ \hline 317.65 \end{array}$$

Two decimal places

$58.623 \times 10 = 586.23$ $\qquad$ $65.432 \times 100 = 6543.2$ $\qquad$ $21.108 \times 1000 = 21108.0 = 21108$

Further, demonstrate multiplication of a decimal by another decimal by using the steps given on page 116.

24.36 × 4.2 = 102.312

2 decimal places | 1 decimal place | 3 decimal places

For detailed explanation for multiplication use the references and example given on pages 115 and 116 of the textbook.

Next, demonstrate on board the division of decimals by 10, 100 and 1000 , that when we divide a decimal number by 10, 100 or 1000, the decimal points shift to the left by one place, two places and three places respectively.

$47.8 \div 10 = 4.78$ $\qquad$ $863.2 \div 100 = 8.632$ $\qquad$ $628.0 \div 1000 = 0.628$

Further, demonstrate the division of decimal number by a whole number and by another decimal number by taking the references and examples given on pages 118 to 120 of the textbook.

[Conceptual Learning]

EVALUATE

Classwork: Ask to students to solve Q1, 2(*a*)-(*f*), 3(*a*)-(*d*) and 5 of Practice Time 5E, Q2 and 4 of Practice Time 5F.

Homework: Ask the students to solve the remaining questions of Practice Time 5E and 5F.

ENHANCE

- Ask to solve 'Think and Answer' given on page 119.
- Ask to download the different decimal maze from the internet and solve it in minimum time.

[Tech Connect]

Periods: 13–14	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Math Genius! 5 pages 121–124

ENGAGE

Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.

EXPLAIN

Start the revision of the exercise, by using Encapsulate, Mental Maths puzzle and Chapter Assessment.

ELABORATE

Discuss questions of 'Mental Maths' and accept students' answers. If they have any confusion or they make any error then explain and correct them. Ask to solve 'Puzzle' given on page 122. Further, discuss and ask to solve Q1, 2 and 3 of Chapter Assessment.

EVALUATE

Classwork: Discuss the questions 1 to 3, of Chapter Assessment in classroom.

Homework: Ask to solve rest of the questions of Chapter Assessment.

ENHANCE

Motivate the class to download and solve at least 10 decimal mazes.

ORANGE

ASSIGNMENT–9



Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. If 48 out of 100 students in class V are boys, then write a decimal for the part of class that consists of boys.

(*a*) 0.50 (*b*) 0.48 (*c*) 4.8 (*d*) 0.52

2. $502\frac{12}{1000}$ if expressed as decimals can be written as

(*a*) 502.012 (*b*) 502.12 (*c*) 50.212 (*d*) 5021.2

3. 92.95 ÷ 100 is equal to

(*a*) 92.95 (*b*) 929.5 (*c*) 929.05 (*d*) 0.9295

4. 5.005 ×.....= 5005

(*a*) 10 (*b*) 100 (*c*) 1000 (*d*) 10000

5. A baker buys 5 kg of flour and 3.5 kg of sugar for the cake and uses 2.25 kg of flour and 0.75 kg of sugar in the cake. What are the amounts of flour and sugar left with him?

(*a*) 2.75 kg, 0.75 kg (*b*) 2.25 kg, 1.75 kg (*c*) 2.25 kg, 0.75 kg (*d*) 2.75 kg, 2.75 kg

6. The rainfall in a city for the first 5 days of a month was 1.27 cm, 3.25 cm, 2.78 cm, 2.57 cm and 1.38 cm. How much did it rain altogether?

(*a*) 11.25 cm (*b*) 9.98 cm (*c*) 11.00 cm (*d*) 11.89 cm

7. A tailor takes 2.5 m of cloth for making one curtain. He received an order to make 30 curtains from Mrs. Radha Puri. How much cloth will he require to fulfill the order?

(*a*) 62.50 m (*b*) 75 m (*c*) 57.5 m (*d*) 750 m

8. $18 \times \frac{9}{100} =$

(a) 18.09 (*b*) 16.2 (*c*) 18.62 (*d*) none of these

9. In 7.867, the place value of the digit 6 is

(*a*) 60 (*b*) 600 (*c*) 0.06 (*d*) 0.006

10. The difference of 325.312 and 253.175 is

(*a*) 72.003 (*b*) 72.137 (*c*) 72.130 (*d*) 72.107

11. The number of decimal places in the product of 6.25 and 1.28 is

(*a*) 4 (*b*) 3 (*c*) 1 (*d*) none of these

12. The quotient for 145.208 divided by 0.25 is

(*a*) 580.832 (*b*) 58.0832 (*c*) 5808.32 (*d*) 588.32

ORANGE

ASSIGNMENT–10

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. In 5.809, the digit 9 is in the ..... place.
2. 0.05 expressed as a fraction is .....
3. $400 + 20 + 5 + \frac{3}{10} + \frac{7}{1000}$ is the expanded form of .....
4. The decimal form of the fraction $\frac{41}{50}$ is .....
5. 12 flowers are sold for ₹24.48. So, the cost of 1 flower is .....

B. Label True or False.

1. 0.23, 0.230, 0.023 and 23.0 are equivalent decimals. .....
2. The decimal 7.875 is equivalent to the fraction $7\frac{7}{8}$. .....
3. 2 – 0.002 is less than 1.45 + 0.2. .....
4. 3 tenths added to itself 100 times is same as 300 tens. .....
5. Eight thousandths is written as $\frac{8}{1000}$. .....

C. Match the following.

Column I	Column II
1. $\frac{17}{100}$ + 5 tens	(*a*) Three thousand eight hundred ten
2. 7 tenths + 35 thousandths	(*b*) Fifty point one seven
3. $\frac{3}{10}+\frac{7}{100}+\frac{1}{1000}$	(*c*) One point four seven
4. 3.81 × 1000	(*d*) Zero point three seven one
5. $\frac{21}{10}\times\frac{7}{10}$	(*e*) Zero point seven three five

D. Utilise Your Brain



1. Farmer Sukesh lives 0.35 km away from the farm. His co-worker Hardev lives $\frac{39}{100}$ km away from the same farm. Whose house is farther from the farm? By what distance?
2. The owner of the farm has 5.6 acres of land planted with wheat, 4.35 acres of land for tomato plants, and the rest is still unoccupied. If he owns a total of 14.56 acres of land, how large is the unoccupied piece of land he has?
3. Baldev was paid ₹56 for a job he did on the farm for 1 hour. At the same rate, how much would he be paid if he did the same job for 4.5 hours?



6 Geometry

Learning Objectives

After studying this chapter, students will be able to...

- understand the basic geometric shapes (Plane, Point, Line segment, Ray)
- differentiate between intersecting, parallel and perpendicular lines
- explore more about the angles and differentiate between different types of angles
- measure and draw angles using a protractor
- categories the different types of triangle
- understand the different parts of a circle and draw a circle of given radius using a pair of compasses

LESSON PLAN

Suggested number of periods: 20

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, some real-life objects like: coin, bangles, CD, etc.

Keywords: Point, Line, Ray, Horizontal line, Vertical line, Slanting line, Line segment, Triangle, Rectangle, Square, Quadrilateral, Pentagon, Hexagon, Heptagon, Octagon, Nonagon, Decagon, Circle, Centre, Side, Vertex, Chord, Circumference, etc.

Pre-requisite knowledge: Students must be familiar with plane shapes rectangle, square, triangle, circle, oval, straight line, curved line, drawing a straight line, circle, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topic: Basic geometrical shapes	Suggested extra teaching aids: Ruler, pencil, some A4 chart paper, dot papers, crayon or colour pencils etc. Math Genius! 5 pages 126–130

ENGAGE

Take a sharpened lead pencil and mark a dot on a sheet of paper. Ask the class, "Which geometrical shape does it represent?". Accept their responses. Next, instruct the students to mark any two dots on a paper and join them with the help of a ruler. Then ask them to recognise the shape so formed. Accept their responses. Introduce simple geometrical shapes, such as point, line, line segment, ray, etc. Discuss the concepts given in 'Get Ready' and 'Let's Recall' sections on pages 125 and 126.

EXPLORE

Divide the class into four/five groups. Distribute dot papers to each group. Ask groups to construct the following figures with help of each other.

- A kite using straight (slanting, vertical and horizontal lines) and curved lines and colour it sky blue.
- A leaf using slanting, vertical and curved lines and colour it green.
- A flower using curves and colour it red.
- A boat using slanting, vertical and horizontal lines and colour it brown.

The group who will construct all the shapes correctly will be appreciated.

[Art Integration and Collaborative Learning]

EXPLAIN

A smooth flat surface which extends endlessly in all the directions is called a plane. A plane has no boundary. The surface of a wall, top of a table are some examples of part of planes.

A point is represented by a tiny dot (.). To distinguish points, we give them names using capitals letters, such as A, B, C, ... these points are read as point A, point B, point C and so on.

The straight line which joins the two points is called line segment. The line segment has two end points (say, A and B). The line segment is the shortest distance between the two points.

If a line segment goes endlessly in one direction, it is called a ray.

If a line segment is extended endlessly in both directions, it is called a line.

If two lines meet at a point or tend to meet if extended, they are called intersecting lines.

The lines which lie in the same plane and never intersect are called parallel lines.

The lines which intersect each other making a right angle at the point of intersection are called perpendicular lines.

ELABORATE

Demonstrate a plane paper and ask what they are observing, explain that it is a part of a plane, in which they can draw figures like, triangle, rectangle, circle, etc.

Show that the board is also an example of a plane.

Demonstrate that a point shows an exact position and it is said to have no length, width or thickness.

Draw five or six points on the board. Name these points using capital letters.

Draw a straight line which joins the two points called line segment. The line segment has two end points (say, A and B).



Further demonstrate the 'ray', 'line', 'intersecting lines', 'parallel lines' and 'perpendicular lines' on board by taking references and examples given on pages 127 and 128 of the textbook. **[Conceptual Learning]**

EVALUATE

Classwork: Discuss Q1, 2, 4 and 6 of Practice Time 6A in the classroom.

Homework: Ask to solve the remaining questions of Practice Time 6A.

ENHANCE

- Ask to solve 'Think and Answer' given on pages 127 and 128 of the textbook.
- Ask to write 5 real-life examples where we observe parallel lines and intersecting lines.

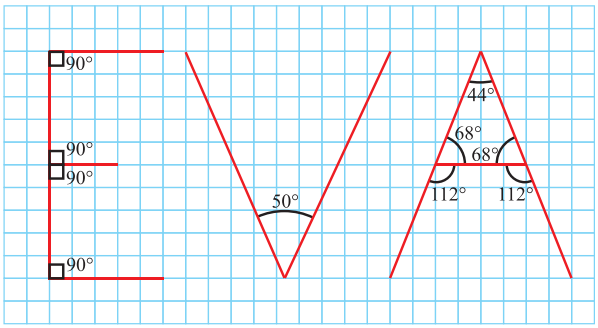
Periods: 4–7	Topic: Angle, Measuring an angle, Drawing an angle with protractor, Types of Angles	Suggested extra teaching aids: Ruler, pencils, marker or chalk, protractor, square grid paper, some origami paper, ice-cream sticks, wall clock or table clock, etc. Math Genius! 5 pages 130–136

ENGAGE

Start the class by calling one student and tell him to write his/her name on the board in capital letter and in big size. Ask the class to find angles within the letters in the name one by one. Accept the responses. Introduce the topic 'Angles'.

EXPLORE

Distribute square grid paper in the classroom. Instruct the students to write their name with pencil and ruler on the grid paper in capital letters and in big size. Instruct and help them to write each letter squared without any curved edges. Demonstrate by writing his/her own name on board, and measure the angles using a protractor within the letters. Instruct students to follow the teacher to mark angles within the letters of their name. As an extension, teacher can also discuss about the type of angles.



[Collaborative Learning]

EXPLAIN

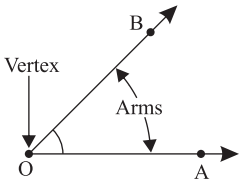
Explain that two rays having a common end point form an angle, and the rays are called the arms of the angle and the common end point is the vertex of the angle. Further, explain the method of naming an angle, interior and exterior of an angle.

Extend the concept of measuring the angles by protractor using the references given on pages 132, 133 of the textbook.

Further, explain the method of drawing an angle with protractor and then discuss about the types of angles.

ELABORATE

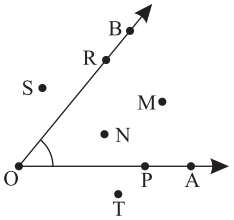
Draw the adjoining figure and demonstrate that the rays $\overrightarrow{OA}$ and $\overrightarrow{OB}$ form an angle at point O. $\overrightarrow{OA}$ and $\overrightarrow{OB}$ are the arms and O is the vertex of this angle.



Further, demonstrate that three letters are used to show an angle, the letter showing the vertex is always written in the middle like ∠AOB.

The points lying inside the angle form the interior of the angle, like points M and N.

And the points lying outside the angle form an exterior of the angle, like points S and T. Also use the references and examples given on page 130.



Demonstrate the protactor and the method of measuring an angle by using it.

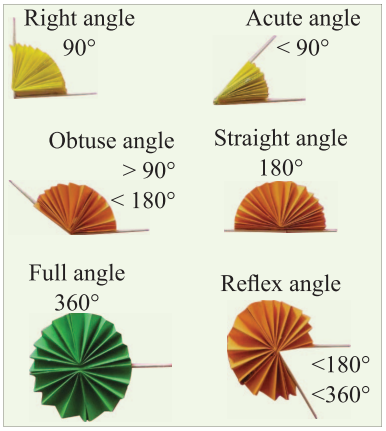
Further, show drawing an angle with protractor by using the methods given on page 133 of the textbook.

Also, demonstrate and explain the types of angle by using an activity as follows:

- Take two colour origami paper and fold them as a paper fan. Paste two ice-cream sticks to the fan.
- Then show different types of angles by using this.

The teacher will also take the reference of 'types of angles' given on page 135 of textbook.

[Conceptual and Art Integrated Learning]



EVALUATE

Classwork: Discuss Q1, 2, 3 of Practice Time 6B, Q1 and 2 of Practice Time 6C and Q1 and 3 of Practice Time 6D in the classroom. If students make any error, teacher will correct them and explain.

Homework: Ask to solve the remaining questions of Practice Time 6B, 6C and 6D.

ENHANCE

- Discuss 'Think and Answer', 'Note' and 'Quick Check' given at some places on pages 130–136 respectively.

[Creative and Logical Thinking]

Periods: 8–11	Topic: Polygon, Triangle	Suggested extra teaching aids: Papers, pens, pencils, chalk or marker, duster, geoboard, some rubber bands or threads. Math Genius! 5 pages 137–139

ENGAGE

Start the class by calling any one student of the class and ask him/her to draw a close shape using only the straight lines with the chalk/marker without lifting it. Appreciate him/her for their effort and introduce the topic 'Polygon'.

EXPLORE

Divide the class into four groups. Distribute a geoboard, some rubber bands or threads to each group. Ask groups to construct these shapes with help of each other

- A square joining only 16 nails.
- A rectangle joining only 20 nails.
- A triangle joining only 18 nails.
- A quadrilateral using 16 nails.
- A pentagon using 15 nails.

The group who constructs all the shapes correctly on the geoboard will be appreciated.

[Experimental Learning]

EXPLAIN

Explain that a closed figure made up of 3 or more line segments that do not cross each other is called a polygon. Polygons are given special names depending on the number of sides they have. Further explain the types of triangles on the basis of sides and angles.

ELABORATE

Draw some closed figure on board by using 3 or more line segments without crossing over.

And let them know that the name of polygons is based on the number of sides by taking the reference given on page 137 of textbook.

Further, demonstrate the triangles and its types:

Based on sides:

- A triangle whose all three sides are of equal length is called an equilateral triangle.
- A triangle whose two sides are of equal length is called an isosceles triangle.
- A triangle whose all three sides are of different lengths is called a scalene triangle.

Based on angles:

- A triangle is called an acute-angled triangle, if all its angles are less than 90°, i.e., acute angles.
- A triangle is called an obtuse-angled triangle, if it has one obtuse angle, i.e., greater than 90°.
- A triangle is called a right-angled triangle, if it has one right angle, i.e., 90°.

Also discuss the properties of a triangle, such that:

- The sum of all three angles of a triangle is 180°.
- The sum of measures of any two sides of a triangle is always greater than the measure of the third side.

For detailed elaboration also use the references given on pages 137, 138 and 139 of the textbook.

[Conceptual Learning]

EVALUATE

Classwork: Encourage students to solve Q1, 2 of Practice Time 6E. If any student makes any error, the teacher will correct and explain.

Homework: Ask to solve remaining questions as a homework assignment.

ENHANCE

- Discuss 'Remember' given on page 138, ask to solve 'Think and Answer' given on page 139.

[Logical Thinking]

Periods: 12–17	Topic: Circle, Drawing a circle using compass, Measuring the circumference of a circle with thread	Suggested extra teaching aids: Pen, pencils, chalk/ marker, duster, some real-life circular objects, geometry box, threads, some paper sheets, etc. Math Genius! 5 pages 140–143

ENGAGE

Recall the concept of polygons by asking some questions, such as:

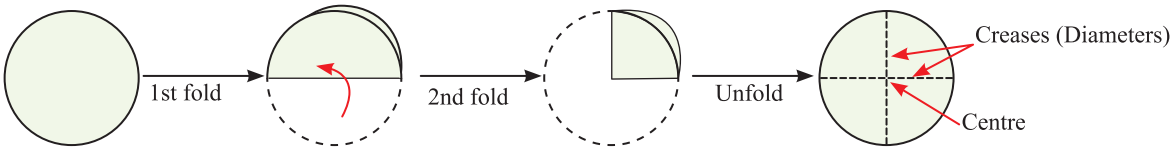
- I am a closed plane figure. I have 3 sides only. Who am I?
- I am a closed plane figure. I have 4 equal sides. Who am I?
- I am a closed plane figure. I have 5 equal sides. Who am I?
- I am a closed plane figure. I have 7 equal sides. Who am I?
- I am a closed plane figure. I have 10 equal sides. Who am I?

Accept their responses, and acknowledge the correct answers. Introduce circle. **[Critical Thinking]**

EXPLORE

Students are aware about circular objects. They can trace the circle on a sheet of paper using any circular objects, such as bangle, bottle top, plate, can etc. and cut the circle using a pair of scissors.

Tell the students in advance to bring cut-outs of circles. Instruct the students to take a circle and fold it into halves. Fold it once more into halves and press to make creases. Now unfold the paper and mark the point where two creases intersect as centre 'O'. Introduce the crease passing through the centre as the diameter of the circle, and the distance from the centre of the circle to the boundary of the circle, i.e., half of the crease as a radius of the circle. Refer activity discused in 'Learning by Doing' section on page 146.



Also show that any other creases that does not passes through the centre represent a chord.

[Experiential Learning]

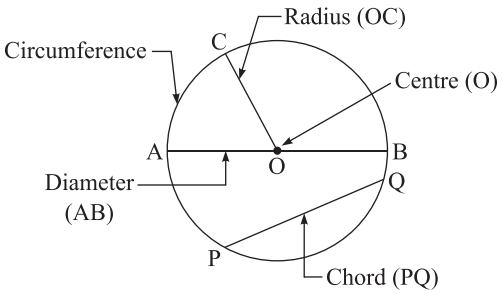
EXPLAIN

Show some circular objects like: coin, bangle or CD and with their help, make a sketch on the board, then explain the circle and its parts. Demonstrate how to draw a circle of given radius/diameters using a ruler and a compass. Discuss the relation between a diameter and a radius of a circle. Also demonstrate the method of measuring the circumference of these circle using thread.

ELABORATE

Demonstrate on board that a circle is a simple closed figure made up of a curved line, whose each point is equidistant from a fixed point in it.

Alternatively, a circle is the collection of all those points in a plane which are at an equal distance from a fixed point called centre. Also represents its part in detail using the references given on page 141 of the textbook.



Further, discuss that diameter of a circle is twice of its radius or radius is half the diameter.

Thereafter, demonstrate the construction of a circle of exact radius using the compass by taking the reference given on page 142.

At the end draw a circle on board and demonstrate how to measure the boundary with help of a thread. Measure the length of thread with ruler, and describe that this measurement is the circumference of the drawn circle. Teacher can take the reference given on page 142 of the textbook.

EVALUATE

Classwork: Discuss Q1 and 2 of Practice Time 6F in the classroom. If any student makes any error, the teacher will correct and explain.

Homework: Ask to do Q. 3, 4 and 5 of Practice Time 6F as homework assignment.

ENHANCE

- Ask to draw different polygons, inside a circle on a chart paper by taking help of internet.

[Tech Connect]

Periods: 18–20	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Chart paper Math Genius! 5 pages 143–146

ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.

EXPLAIN

Start the revision of the exercise by using, 'Maths Connect', 'Encapsulate', 'Mental Maths', 'Brain Sizzlers' and 'Chapter Assessment'.

ELABORATE

Discuss questions 1, 2 and 6 of the Chapter Assessment and accept students' answers. If they have any confusion or they make any error then explain and correct them. Motivate students to solve 'Mental Maths' given on page 144 and Maths Fun given on page 146.

EVALUATE

Classwork: Ask to solve Q1, 2 and 6 the Chapter Assessment in the classroom.

Homework: Ask to do the rest of the questions of the Chapter Assessment as homework assignment.

ENHANCE

Ask students to solve the 'Brain Sizzlers' given on page 144.

ORANGE

ASSIGNMENT–11

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. Triangle : Scalene : : Angle : _____

(*a*) Isosceles (*b*) Obtuse (*c*) Square (*d*) Ray

2. Which of the following road symbols has a right angle?

(*a*)  (*b*)  (*c*)  (*d*) 

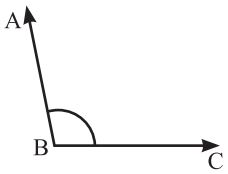
3. Which holds true for the given angle?

(*a*) ∠ABC is an obtuse angle and is greater than 90°.

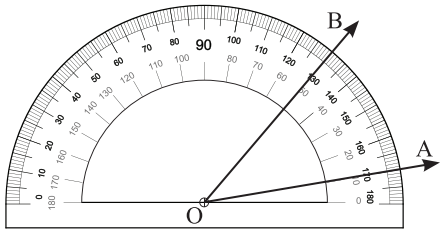
(*b*) ∠ABC is a right angle and is equal to 90°.

(*c*) ∠ABC is an obtuse angle and is less than 90°.

(*d*) ∠ABC is an acute angle and is less than 90°.



4. What is the measure of ∠AOB shown below?



(*a*) 50° (*b*) 40° (*c*) 130° (*d*) 140°

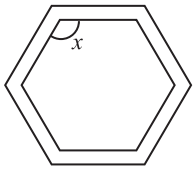
5. Rachna buys a table that is a regular hexagon in shape. What type of angle is *x*?

(*a*) Acute angle

(*b*) Obtuse angle

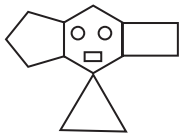
(*c*) Right angle

(*d*) None of these



6. Ashish made a design using plane shapes, as shown here.

Which of the following shapes is not used in this design?



(*a*) Rectangle (*b*) Circle (*c*) Octogon (*d*) Pentagon

7. A triangle has sides that measure 5 cm, 12 cm and 13 cm. Identify the type of triangle.

(*a*) Equilateral triangle (*b*) Isosceles triangle (*c*) Obtuse angled triangle (*d*) Scalene triangle

8. A nanogon has _____ sides.

(*a*) 7 (*b*) 9 (*c*) 8 (*d*) 10

9. The longest chord of a circle is _____.

(*a*) diameter (*b*) circumference (*c*) radius (*d*) none of these

ORANGE

ASSIGNMENT–12

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. A quadrilateral has ..... diagonals.
2. A line segment has ..... end point (s).
3. An octagon has ..... sides.
4. Half of circle is called .....
5. A triangle having its three side equal is called a/an .....

B. Label True or False.

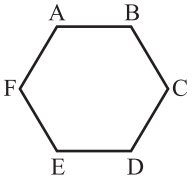
1. Interesting lines are always, perpendicular. .....
2. A triangle can have at most two right angles. .....
3. From a given point, infinite number of rays can be drawn. .....
4. An angle of 180° is called straight angle. .....
5. Every square is a rectangle. .....

C. Complete the table below:

	Shape	Number of acute angles	Number of right angles	Number of obtuse angles
1.				
2.				
3.				
4.				
5.				

D. Utilise Your Brain.

1. Identify the polygon shown here. Also, name its sides, angles and vertices.
2. Draw a pair of parallel line segments joining the vertices of the given polygon. Identify the shapes into which you have divided.
3. Can you make an equilateral triangle in the given polygon? How?





Symmetry and Patterns

Learning Objectives

After studying this chapter, students will be able to...

- recognise the line(s) of symmetry in the objects around us and in various geometrical figures.
- understand the concept of reflection symmetry and recognise the mirror image of objects.
- recognise the slide, flip, turns of an object and rotational symmetry of geometric shapes.
- understand the concept of tessellation.
- make patterns by moving shapes.
- make different number patterns (square and triangular numbers).

LESSON PLAN

Suggested number of periods: 8

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, some pictures of real-life objects or cut-outs like: monuments, human faces, etc.

Keywords: Symmetry, Line of symmetry, Slide, Flip, Turn, Rotational Symmetry, Patterns, Triangular Number, Square Number, Tessellation, etc.

Pre-requisite knowledge: Students must be familiar with symmetry, line of symmetry, patterns in shapes, numbers, and letters.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	**Topic: Symmetry all around us, Line of symmetry**	**Suggested extra teaching aids: Ruler, pencil, chalk/ marker, duster, some cut-outs of monuments, human faces, etc. some A4 chart paper, crayon or colour pencils, a plane mirror, etc.** **Math Genius! 5 pages 150–152**

ENGAGE

Distribute some cut-outs of monuments, human faces, or other objects. Instruct: Fold the cut-outs into two identical equal halves and open them. Ask: Does the crease formed on the cut-out divide the shape into two identical equal halves? Accept the responses. Explain which shape is symmetrical and which is asymmetrical. Use the section of 'Get Ready' and 'Let's Recall' for recalling the concept of symmetry and patterns.

EXPLORE

Distribute A4 chart paper in the class and instruct to make some closed shapes on it. Ask to draw a crease line on the shapes wherever they want to divide the shape into two identical equal halves and ask to observe the shapes about its symmetry.

Ask: Which shapes are divided into two identical equal halves by the crease line? If the crease line divides the shapes into two identical equal halves, then what is the line called? If the shape cannot be divided into two identical halves, then what is it called? Accept the responses.

[Art Integration and Collaborative Learning]

EXPLAIN

When a figure or shape can be divided into two equal halves by drawing a line, then they are called symmetrical figures or shapes. The line which divides the figure into two equal halves is called the line of symmetry.



Further, explain that some figures have more than one line of symmetry.

Also, discuss about mirror image and reflection symmetry. Teacher can also use the activity given on page 152.

[Experiential Learning]

ELABORATE

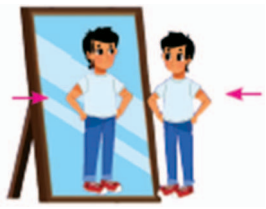
Draw some shapes on board and ask to identify which may have more than one creased line or line of symmetry. Accept the class responses.

Again, draw some alphabets or some numbers on the board and draw lines of symmetry on them.

Ask: Which alphabets or numbers have one line of symmetry? Which alphabets or numbers have more than one line of symmetry?



Also, refer textbook page 151 for more explanation and examples of line of symmetry.



Further, demonstrate the formation of mirror image by bringing a plane mirror or any plane surface that reflect the image. Call the students randomly in front of the mirror, tell them to observe the difference in their images. Further, draw only half of a figure and show how it looks complete by placing the mirror alongside.

Next, demonstrate the reflection symmetry by using the mirror. Take the references and examples given on pages 151 and 152 of the textbook. **[Experimental and Conceptual Learning]**

EVALUATE

Classwork: Discuss Q1 and 2 of Practice Time 7A in the classroom .

Homework: Ask to solve the remaining questions of Practice Time 7A as their homework assignment.

ENHANCE

- Ask to solve 'Think and Answer' given on page 151 of the textbook.

Periods: 4–5	Topic: Slides, Flips and Turns	Suggested extra teaching aids: Ruler, pencils, marker or chalk, any real life object, etc. Math Genius! 5 pages 153–157

ENGAGE

Start the class by taking any object and show its movement by sliding, flipping and turning the object in front of class. Ask the students to observe the differences.

EXPLORE

Divide the class into groups and give each student a pattern blocks or alphabet magnets.

Ask each student to select a shape or letter and trace it on a piece of paper.

Instruct them to trace a slide, turn, and flip for their objects and label each one.

Ask other group members to compare their drawings.

Ask one student from each group to choose an object and ask the other group members to draw a corresponding slide, turn, or flip.

Afterward, the first student or the teacher can move the object and trace it to show the correct answer and check the group's work.

Encourage students to help each other. **[Collaborative Learning]**

EXPLAIN

Discuss that a shape or a figure can move in various ways: sliding, flipping and turning.

When a shape simply moves from one place to another in one direction, it slides.

When a shape is turned over a straight line to form a mirror image, we call it has flipped. It can be horizontally or vertically.

When a shape is rotated clockwise or anti-clockwise through an angle, it turns.

A turn can be a quarter turn, a half turn, a three-quarter turn and a full turn.

Rotational symmetry of a figure occurs if it appears the same two or more times during a complete rotation of 360° about a fixed point.

ELABORATE

Ask the students to collect in the ground or the teacher can use the physical education period to teach the topic 'slides, flip and turn' of maths.

Divide students into groups.

Ask students to sit or stand in a circle. And one group to lay down at the centre.

Ask them to slide left or right. If there is any confusion, teacher will help them.

Ask another group to flip on the ground, i.e., the students move from their back to their stomach, their stomach to their back, or feet to head. Suggest that they flip on their left side, flip on their right side or both.

Next discuss about the turns, help the student to turn quarter $\left(\frac{1}{4} \text{ or } 90°\right)$, half $\left(\frac{1}{2} \text{ or } 180°\right)$, three-quarters - $\left(\frac{3}{4} \text{ or } 270°\right)$ and a full turn (360°).

The teacher can also take help of references and examples given on pages 153–155 of the textbook.

Further demonstrate the rotational symmetry of an object or a shape by taking the references and example given on page 155 of the textbook.

Also demonstrate the shapes that possess rotational symmetry but no line symmetry. **[Holistic Learning]**

EVALUATE

Classwork: Discuss Q1, 2, 3 and 8 of Practice Time 7B in the classroom and encourage students to solve them. If students make any error, teacher will correct them and explain.

Homework: Ask to solve the remaining questions of Practice Time 7B as homework assignment.

ENHANCE

- Discuss 'Think and Answer' given on page 155 of the textbook.
- Ask to explore two or more figure or shapes that have rotational symmetry but no line symmetry.

[Creative and Logical Thinking]

Periods: 6–7	Topic: Patterns, Tessellations	Suggested extra teaching aids: Papers, pens, pencils, chalk or marker, duster, A4 paper sheets. Math Genius! 5 pages 157–160

ENGAGE

Start the class by Instructing to pay attention. Draw some object patterns on the board with some blank spaces. Ask: Tell the name of next two shapes or objects to complete the pattern drawn on the board. Accept the responses. Introduce the concept of different kinds of pattern.

EXPLORE

Divide the class into $\frac{4}{5}$ groups. Distribute each of them an A4 sheet. Tell them to choose any shape/design and colour as per their choices. Draw their figures in order to make a pattern. Create at least three different patterns. Walk around the class and interact with students during activity.

The teacher can also write some number pattern on board and ask students to complete the pattern.

10, 20, 30, 40, ..., ..., ..., ...,

3, 5, 8, 12, 17, ..., ..., ..., ...,

10, 20, 35, 55, 80, ..., ..., ..., ...,

2, 2, 3, 3, 3, 4, 4, 4, 4, ..., ..., ..., ...,

1, 3, 6, 8, 11, 13, 16, ..., ..., ..., ... **[Creative Thinking and Art integration]**

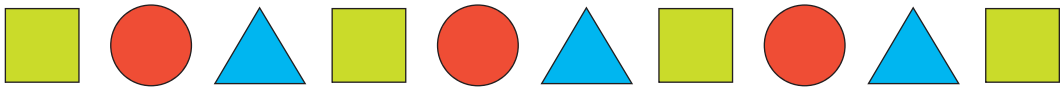
EXPLAIN

The pattern is formed when different shapes are drawn repeatedly. Different colours can be used to create different patterns with the same shapes. Patterns can also create by moving shapes. Discuss the pattern in numbers like triangular numbers, square numbers, Pascal triangles.

Also discuss about the tiling pattern, tessellations.

ELABORATE

Demonstrate the shape pattern on board or in prepared chart paper.

Shape patterns: 

Number patterns: 4 8 16 32 64 128 256 512

Letter patterns: A Z C Y E X G W

Demonstrate that pattern can also be made by moving shapes as follows:



Further, demonstrate the triangular numbers that can be arranged using dots in the shape of a triangle, square numbers can be arranged using dots in the shape of a square, the Pascal's triangle where the numbers are arranged in the shape of a triangle and some more number patterns by taking the references and examples given on pages 157, 158, 159.

To explain tessellations, show some different pictures of tilling or rangoli patterns to the class. And ask them to draw similar patterns in their notebooks such that repeating arrangement of a particular shape to cover a plane without leaving any gaps or overlapping. **[Conceptual Learning]**

EVALUATE

Classwork: Discuss Q1, 2 and 4 of Practice Time 7C and encourage students to solve them. If any student makes any error, the teacher will correct and explain.

Homework: Ask to solve remaining questions of Practice Time 7C as a homework assignment.

ENHANCE

- Ask to find the next numbers asking in 'Quick Check' given on page 158.
- Discuss the activity given on page 157 of the book and tell them to perform it in the classroom.
- Discuss 'Think and Answer' given on page 160 of the book. **[Critical and Logical Thinking]**

Period: 8	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Pen, pencils, chalk /marker, duster, etc. Math Genius! 5 pages 161–165

ENGAGE

Make students comfortable, so they can ask any question on any previously learnt topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.

EXPLORE

Guide the students to do the activity as suggested in 'Learning by Doing' section given on page 165.

EXPLAIN

Start the revision of the exercise by using, 'Encapsulate', 'Mental Maths' and Chapter Assessment.

ELABORATE

Discuss questions 1, 2 and 6 of the Chapter Assessment and accept students' answers, if they have any confusion or they make any error then explain and correct them. Discuss and motivate students to solve 'Mental Maths' and 'Maths Fun'.

EVALUATE

Classwork: Discuss questions 1, 2 and 6 the Chapter Assessment in the classroom. Ask to do the 'Project Work' given on page 162 and 'Brain Sizzlers' given on page 165.

Homework: Ask to do the rest of the questions of Chapter Assessment as homework assignment.

ENHANCE

Teacher can enhance the skills of students using the following activity.

Step 1: Think of any number

Step 2: If the number is odd, triple it and add 1, if the number is even, halve it.

Step 3: Continue step 2, based on the resulting number in step 2 and continue the steps.

Step 4: Write the pattern generated, e.g.,

Step 1: 20

Step 2: $\frac{20}{2} = 10$

Step 3: $\frac{10}{2} = 5$

Step 4: $3 \times 5 + 1 = 16$

Step 5: $\frac{16}{2} = 8$

Step 6: $\frac{8}{2} = 4$

Step 7: $\frac{4}{2} = 2$

Step 8: $\frac{2}{2} = 1$

Step 9: $3 \times 1 + 1 = 4$

Step 10: $\frac{4}{2} = 2$

Step 11: $\frac{2}{2} = 1$…….

Resulting pattern is 20, 10, 5, 16, 8, 4, 2, 1, 4, 2, 1, 4, 2, 1, …….

Ask the students to play it in pairs let one child give the number, the other one develops the pattern and viceversa.

Discuss all the patterns they developed and ask them to find out the reason for the pattern which is named as hailstone numbers.

ORANGE

ASSIGNMENT–13

Marks Obtained: _____

Student's Name: _____ Section: _____

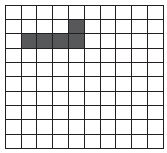
Roll Number: _____ Date: _____

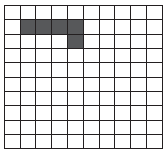
Identify the correct answer.

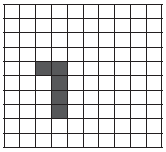
1. Polygon : Square :: Symmetry: .....

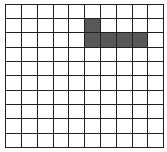
(*a*) Rotational (*b*) Shape (*c*) Angle (*d*) Line

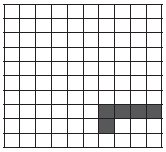
2. Which shows reflection for the figure given below?



(*a*) 

(*b*) 

(*c*) 

(*d*) 

3. How many lines of symmetry does the figure A have?

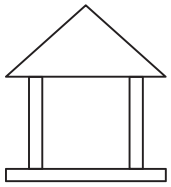


Figure A

(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4

4. How many pictures does not have symmetry?

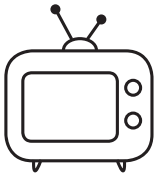


Figure A



Figure B



Figure C

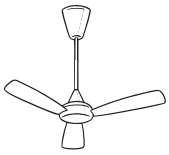
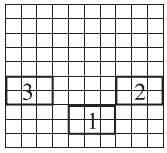


Figure D

(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 0

5. What combination of transformation is shown below?



(*a*) Reflection and then rotation (*b*) Rotation and then reflection

(*c*) Reflection and then reflection (*d*) Rotation followed by rotation

ORANGE

ASSIGNMENT–14

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

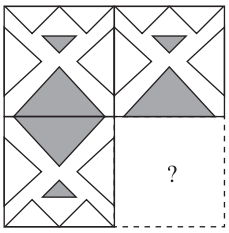
A. Fill in the blanks.

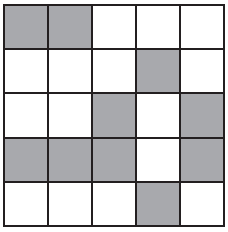
1. In BINGO, ... letters have at least one line of symmetry.
2. There are ..... letters in the English alphabet which look same after half a turn.
3. 2025, 2100, 2525, 2600, ...
4. A square has ..... lines of symmetry.
5. An equilateral triangle can be rotated through ..... or ..... angle to look the same.

B. Label True or False.

1. The word BOOK has horizontal line of symmetry. .....
2. The figures that possess rotational symmetry do not necessarily possess line symmetry. .....
3. A figure with 2 lines of symmetry must have rotational symmetry. .....
4. A circular shaped tile can tessellate without leaving any gap. .....
5. 1, 2, 3, 6, 10, ... are triangular numbers. .....

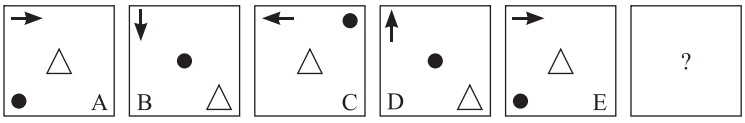
C. Complete the design so that it could have 2 lines of symmetry.

1. 

2. 

D. Utilise Your Brain

Observe the patterns and fill in the blank boxes.

1. 

2.

1	3	2	?	5	15	14	42	?	123



8 Measurements

Learning Objectives

After studying this chapter, students will be able to...

- convert bigger units to smaller units of metric measures.
- convert smaller units to bigger units of metric measures.
- add and subtract metric measures (length, weight and capacity).
- multiply and divide metric measures (length, weight and capacity).

LESSON PLAN

Suggested number of periods: 16

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, some chits on which different measurement are written, bowl, etc.

Keywords: Kilometre, Hectometre, Decametre, Metre, Decimetre, Centimetre, Millimetre, Kilogram, Hectogram, Decagram, Gram, Decigram, Centigram, Milligram, Kilolitre, Hectolitre, Decalitre, Litre, Decilitre, Centilitre, Millilitre, etc.

Pre-requisite knowledge: Students must be familiar with units of measurement, conversion, addition, subtraction, multiplication and division of numbers.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–5	Topic: Metric Measures (conversion)	Suggested extra teaching aids: Some paper chits, glass bowl, etc. Math Genius! 5 pages 167–172

ENGAGE

Write two metric measurements for length, weight or capacity in two different metric units on the board.

Instruct: Convert both measurements in same metric units. Accept the responses. Introduce: Conversion of metric units. The teacher can use 'Get Ready' and 'Let's Recall' sections to revise the previous concepts.

EXPLORE

Write some measurements in cm, m, and km on the board such as: 200 cm, 5 m, 3 km, 5000 m, etc. Take a bowl and put some chits having units metres, centimetres, or kilometres written on them. Invite a pair of students randomly.

Instruct: Read aloud the measurement written on the board, pick out a chit, and convert the measurement into the units written on the chit. Accept the responses. Repeat this activity with more pair of students till time permits. **[Experimental Learning]**

EXPLAIN

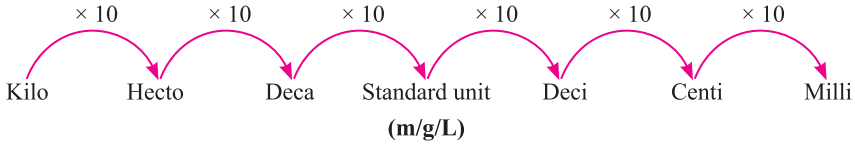
There are some standard units of metric measures (metre, gram and litre) use to measure smaller lengths, masses and capacities as well as to measure larger lengths, weights and capacities.

We add different prefixes 'deca', 'kilo' and 'hecto' for higher units and 'deci', 'centi' and 'milli' for lower units with standard units of metric measures. There is a relationship among the various units of metric measures. For converting the bigger units to smaller units multiply by 10 for every step as we move towards the right. Also explain the method of writing the combination of units in decimals. Similarly, for converting the smaller units to bigger units divide by 10 for every step as we move towards the left.

ELABORATE

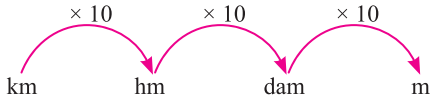
Demonstrate the relationship among the various units of metric measures by showing the table given on page 167 of the book.

Further, demonstrate that we have to multiply by 10 at each step for the conversion of bigger metric units to smaller units on the board.



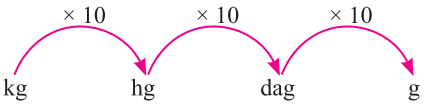
For length: 28 km to m

$$28 \text{ km} = 28 \times 1000 \text{ m}$$
$$= 28000 \text{ m}$$



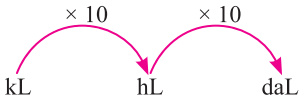
For weight: 37 kg into g

$$37 \text{ kg} = 37 \times 1000 \text{ kg}$$
$$= 37000 \text{ kg}$$



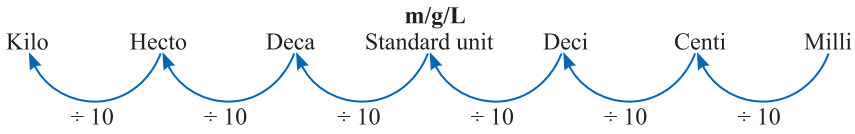
For Capacity: 7 kL into daL

$$7 \text{ kL} = 7 \times 100 \text{ daL}$$
$$= 700 \text{ daL}$$



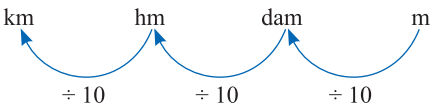
Also use the references and examples given on pages 168, 169, and 170 of book.

Similarly, demonstrate that for the conversion of smaller units to bigger units we have to divide by 10 at each step as follows:



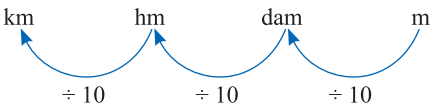
For length: 5432 m into km

$$5432 \text{ m} = (5432 \div 1000) \text{ km} = \frac{5432}{1000} \text{ km}$$
$$= 5.432 \text{ km}$$



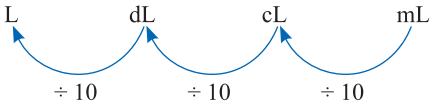
For weight: 2323 mg to g

$$2323 \text{ mg} = (2323 \div 1000) \text{ g} = \frac{2323}{1000} \text{ g}$$
$$= 2.323 \text{ g}$$



For capacity: 245 mL into L

$$245 \text{ mL} = (245 \div 1000) \text{ L} = \frac{245}{1000} \text{ L}$$
$$= 0.245 \text{ L}$$



Also explain the method of writing units in decimals as follows:

For example: For capacity

Capacity

kL	hL	daL	L	dL	cL	mL		
2	3	4	5	0	2	1	=	2.345021 kL
			1	7	7	1	=	1.771 L

Also use the references and examples given on pages 170 and 171. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1 and 2 of Practice Time 8A. If any student makes any error, the teacher will correct it and explain.

Homework: Ask to solve the remaining questions of Practice Time 8A as their homework assignment.

ENHANCE

- Discuss the 'Knowledge Desk' given on page 168.
- Ask to note and learn the 'Facts' given on page 170.
- Ask to do the task assigned in 'Think and Answer' section given on page 171.

Periods: 6–10	Topic: Operations on metric measures	Suggested extra teaching aids: Chalk/marker, duster, etc. Math Genius! 5 pages 172–175

ENGAGE

Write some measurements in different standard units on the board.

Instruct: Convert them into m and cm, km and m, g and kg, L and mL.

Ask to add any two measurements written on the board. Accept the responses.

EXPLORE

Divide the class into pairs. Write few metric measurements for length, weight or capacity on a board. Put some well-shuffled number chits up to 25 in a bowl.

Call one pair and instruct: pick out any number chit from the bowl, read aloud the numbers and multiply and divide the metric measures written on the board by the number written on the chit.

Ask: What is product and quotient? Accept the response. Repeat this activity with other pairs till time permits.

[Experimental Learning]

EXPLAIN

Explain that we can perform fundamental operations, addition, subtraction, multiplication and division on metric measures of the same units. Before performing any operation first convert given metric measures into the same units. Units of measurement are added or subtracted in the same way as we add or subtract whole or decimal numbers. Similarly, for multiplication and division we use the same method as multiplication and division of decimal numbers.

ELABORATE

Demonstrate on board the different operations, using the examples given in book.

For addition: 24 m 24 cm and 7 m 12 mm

Step 1: Convert the given measurement into same units or arrange the units as per their places.

Step 2: Add them as decimal or simply add the numbers as per their places.

By conversing into same units: 24 m 24 cm,

Since, 100 cm = 1

So, $24 \text{ cm} = \frac{1}{100} \times 24 = \frac{24}{100} = 0.24 \text{ m}$

So, 24 m 24 cm = 24.24 m

Similarly, 7 m and 12 mm,

Since, 1000 mm = 1 m

So, $12 \text{ mm} = \frac{1}{1000} \times 12 = \frac{12}{1000} = 0.012 \text{ m}$

So, 7 m 12 mm = 7.012 m

Thus, 24 m 24 cm + 7 m 12 mm =

$$\begin{array}{r} 24.240 \text{ m} \\ +\ 7.012 \text{ m} \\ \hline 31.252 \text{ m} \end{array}$$

By arranging the units as per their places:

We can write 24 m 24 cm as 2 dam 4 m 2 dm 4 cm.

Similarly, 7 m 12 mm as 7 m 0 dm 1 cm 2 mm.

Now, add them as:

	dam	m	dm	cm	mm
	2	4	2	4	0
+		7	0	1	2
	3	1	2	5	2

Thus, the sum is 3 dam 1 m 2 dm 5 cm 2 mm.

Similarly, for subtraction use the same method by taking the reference and examples given on pages 173 and 174.

For multiplication and division: Demonstrate the multiplication and division of metric measure on the blackboard by taking few examples, as

Multiply 6 kg 1 hg 4 dag 3 g by 13

Convert 6 kg 1 hg 4 dag 3 g it into kg.

6 kg 1 hg 4 dag 3 g = 6.143 kg

Multiply 6.143 by 13 as multiplication of a decimal number by a whole number and append kg with the product.

so, 6.143 kg × 13 = 79.859 kg

$$\begin{array}{r} 6.143 \\ \times 13 \\ \hline 18429 \\ +\ 61430 \\ \hline 79.859 \end{array}$$

Divide 705 km 6 m by 12

Convert it into km

705 km 6 m = 705.006 km

Divide 705.006 by 12 as you do the division of decimal numbers.

So, 705.006 km ÷ 12 = 58.7505 km

$$\begin{array}{r} 58.7505 \\ 12\overline{)705.006} \\ -\ 60 \\ \hline 105 \\ -\ 96 \\ \hline 90 \\ -\ 84 \\ \hline 60 \\ -\ 60 \\ \hline 06 \\ -\ 0 \\ \hline 60 \\ -\ 60 \\ \hline 0 \end{array}$$

Also, demonstrate on board the examples given on pages 174 and 175.

Encourage students to practice the questions given in the book.

[Conceptual Learning]

EVALUATE

Classwork: Ask to solve Q1 – 4 of Practice Time 8B

Homework: Ask to solve Q5, 6, 7 and 8 of Practice Time 8B.

ENHANCE

- Watch the video on the measurement on "www.fullmarksonline.com". **[Tech Connect]**

Periods: 11–13	Topic: Speed, distance and time	Suggested extra teaching aids: Chalk/marker, duster, etc. Math Genius! 5 pages 176–177

ENGAGE

After introduction, ask some introductory questions in the classroom. For example,

- Where do the students live?
- Where do their grandparents live?
- If they go to their grandparents' house by bicycle or car, or any other means of transport, by which vehicle will they reach earlier? What is the reason behind it? Accept the answer. Introduce the topic speed, distance and time.

EXPLORE

Take the students of the class to the playground, and divide them into groups. Mark two points as starting and finishing position. Assign one student the role of captain and give him/her a stopwatch. Ask one group to reach from starting point to finishing point by hopping and ask the captain to record the time taken by the group to touch the finishing point.

Again instruct the 2nd group and 3rd group to reach from starting point to finishing point by walking and running respectively and the captain to record the timings.

Further, show the three times on the board and ask why the times taken are different.

Introduce the relation between speed and the time.

EXPLAIN

Speed tells us how fast an object or a person travels. It is the rate of covering a distance in one unit of time. Speed is calculated by dividing the distance travelled by the total time taken to travel that distance.

Thus, $\text{Speed} = \text{Distance} \div \text{Time}$.

Or, $\text{Distance} = \text{Speed} \times \text{Time}$

Or, $\text{Time} = \frac{\text{Distance}}{\text{Time}}$

Further, explain the unit of speed as km/h.

ELABORATE

Demonstrate on board that a speed of 50 km per hour means that a distance of 50 km will be covered in one hour. If a man walks 4 km in 1 hour, his walking speed is 4 km per hour.

Explain on board the example based on finding the speed of the car, given on page 177 of the book.

EVALUATE

Ask to solve the questions given in section 'Think and Answer' in classwork or homework.

ENHANCE

- Discuss about the information given in 'Knowledge Desk' on page 177.
- Help the students to solve the question given in 'Brain Sizzlers' on page 179.

Periods: 14–16	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 177–179

ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.

EXPLORE

- Guide the students to perform the activity given in 'Learning by Doing' on page 179.

[Experimental Learning]

EXPLAIN

Start the revision of the exercise by using 'Encapsulate', 'Mental Maths' and 'Chapter Assessment'.

ELABORATE

Discuss Mental Maths in the classroom, Q1 to 4 of the Chapter Assessment and accept students' answers. If they have any confusion or they make any error, then explain and correct them.

EVALUATE

Classwork: Discuss questions 1 to 4 of the Chapter Assessment in the classroom.

Homework: Ask to solve Q5 to 8 of the Chapter Assessment as homework assignment.

ORANGE

ASSIGNMENT–15

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. For converting bigger units into smaller units, multiply by ..... for every step as we move towards the right.
   (*a*) $\frac{1}{10}$ (*b*) 10 (*c*) 100 (*d*) 1000
2. Which of the following is incorrect?
   (*a*) 6 inches = 1 foot (*b*) 100 kg = 1 quintal (*c*) 1760 yards = 1 mile (*d*) 1 gallon = 3.8 litre
3. 3000 mm =
   (*a*) 3 m (*b*) 300 cm (*c*) 0.3 dam (*d*) All of these
4. To circulate the information about Global Olympiad Federation, the coordinator decided to paste a poster on the notice board, whose maximum vertical height is 18 inches. The coordinator wanted to know whether the height of the poster should be 2 feet long or 40 cm long.
   (*a*) 2 feet (*b*) 40 cm (*c*) can't say (*d*) None of these
5. A car's fuel tank holds 85 litres of petrol. A second car's fuel tank holds 8.6 decalitre of petrol. How much more petrol can the second car's fuel tank hold?
   (*a*) 1 litre (*b*) 50 decilitre (*c*) 100 decilitre (*d*) 10 litre
6. A city tower is 1,385 feet tall with 85 stories. The residential building is 1505 feet tall with 105 stories. How much taller is the residential building than the city tower?
   (*a*) 50 feet (*b*) 130 feet (*c*) 80 feet (*d*) 120 feet
7. Students collected a number of bags full with juice bottles to help Earthquake victims. Each bag holds 21 bottles and each bottle contains 600 mL of juice. If students collected 15 bags, then how much of juice did they collect?
   (*a*) 632 litres (*b*) 212.2 litres (*c*) 189 litres (*d*) 214.2 litres
8. Which container holds the minimum capacity?
   Container A – 8 hL; Container B – 0.08 kL; Container C – 80000 cL; Container D – 80 dL;
   (*a*) A (*b*) B (*c*) C (*d*) D
9. Which two boxes have the same weight?
   Box P – 600 cg; Box Q – 60 dag; Box R – 0.6 hg; Box S – 60000 mg
   (*a*) P and Q (*b*) Q and R (*c*) R and S (*d*) P and S
10. A tea pot holds about 1.8 L of tea. How many people can drink if they each want 2 cups of tea, with each cup having a capacity of 150 mL?
    (*a*) 7 (*b*) 6 (*c*) 3 (*d*) 2
11. Maria bought 450 g butter of Brand A and 2500 dg butter of Brand B. How much butter in kg she bought altogether?
    (*a*) 0.5 kg (*b*) 5 kg (*c*) 7 kg (*d*) 0.7 kg
12. Aman's bag is 2.14 kg lighter than Ajay's bag. The weight of Ajay's bag is 4720 g. How much does Aman's bag weigh?
    (*a*) 2.58 kg (*b*) 5.28 kg (*c*) 4.02 kg (*d*) 3.28 kg

ORANGE

ASSIGNMENT–16

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. Rosy cuts 19 m 35 cm out of 35 m of tape with her. So, she has left ..... cm of tape.
2. Total weight of 10 tablets each weighing 25 mg is ..... g.
3. Anshika drinking 375 mL of milk daily consumes ..... L in a week.
4. To convert 2.5 L into ....., it is multiplied by 100.
5. To convert kg into ton, it is ..... by 1000.

B. Label True or False.

1. From a ribbon of 7 m length, 28 pieces each of length 25 cm can be cut. .....
2. 7 km 387 hm = 45700 m. .....
3. 7 kg 8 hg – 3 dag 6 g = 7764 g. .....
4. Half of a litre + Quarter of 4 dL = 90 cL. .....
5. If A + B = 11 kg, B + C = 13 kg and C + C = 12 kg, the weight of A = 4 kg. .....

C. Match the following.

Column I	Column II
1. 1 mile	(*a*) 119.24 litre
2. 1 pound	(*b*) 2.5 cm
3. 1 inch	(*c*) 5280 feet
4. 1 barrel	(*d*) 100 kg
5. 1 quintal	(*e*) 453.59 g

D. Utilise Your Brain



1. A shopkeeper mixed 4.75 kg of hazelnuts with 0.75 kg of raisins. He packed the mixture equally into 5 boxes. What is the weight of each box?

2. Tank A contains 6 times as much water as Tank B. How much water must Mohan transfer from Tank A to Tank B so that each tank contains 70 litres of water?







9 Time and Temperature

Learning Objectives

After studying this chapter, students will be able to...

- explain the 24-hour clock and convert the 24-hour clock time to 12-hour clock time and its converse.
- convert higher units of time to lower units and its converse.
- perform operations (addition, subtraction, multiplication and division) on time units.
- understand temperature and convert units of temperature.

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, wall clock/table clock, thermometers, etc.

Keywords: A.M., P.M., 24-hours clock, Minutes, Seconds, Conversion, Degree-Celsius, Degree-Fahrenheit, etc.

Pre-requisite knowledge: Students must be familiar with a.m., p.m., reading time when minute hand is at half past the hour, quarter the hour, days of the week, days in the year, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topic: The 24-hour clock, Conversion of time	Suggested extra teaching aids: Wall clock or table clock and a 24 hours digital clock, etc. Math Genius! 5 pages 181–186

ENGAGE

Ask the class to pay attention. Show a 12-hour clock and a 24-hour digital clock in the classroom. Instruct: observe and read aloud the displayed time in both of the clock. Ask: Why there is difference in the timing of the clock. Accept the responses. Explain the reason behind it. Discuss the concepts given on "Get Ready" and "Let's Recall" sections on pages 180 and 181.

EXPLORE

Divide the class into 4 teams, and name them as 12-hours, 24 hours, minutes and seconds team.

Instruct one student from each team to tell the time as per their choice, and the other team will convert the time as per their team name and report the answer.

For example: 12-hours team select the time 7:55 p.m.

Then the 24-hours team convert it to 1955 hours with help of their team member and answer.

Similarly, minutes team will answer 475 minutes.

And seconds team will answer 28500 seconds.

In the same way, seconds team can select 35678 second and the other team convert into the time unit as per their name. Quick and correct responses from any team get rewarded with the score.

[Collaborative Learning]

EXPLAIN

We normally use the 12-hour clock to measure the time. But some organization like the railways, the airlines, etc. use 24-hours' clock. In 24-hours clock, we use 4 digits to show the time. The first two digits from the left show the hours and the last two digits from the left show the minutes.

A day starts at 12 mid-nights and is written as 0000 hours or 2400 hours.

12 O'clock at noon is expressed as 1200 hours.

Further, explain the conversion of 24-hour clock to 12-hours clock time and viceversa by taking the references and examples given on pages 181, 182.

Next, explain that the conversion of higher units of time to lower units, we use the multiplication and the relationship between different units of time as follows:

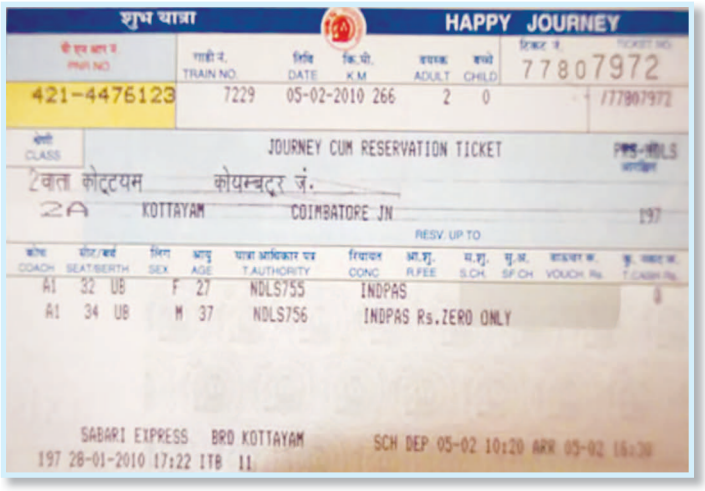
1 minute	=	60 seconds	1 fortnight	=	2 weeks = 14 days
1 hour	=	60 minutes	1 year	=	12 months
1 day	=	24 hours	1 year	=	365 days
1 week	=	7 days	1 leap year	=	366 days

Use the examples given on pages 184, 185 and 186 for detailed explanation.

Similarly, to convert the lower units to higher units, we divide by using the above mentioned relationships. Demonstrate this concept on board by using the examples given on page 186.

ELABORATE

Bring any train/air ticket in the class to demonstrate the conversion of 12-hour clock time and 24-hour clock time. For example, have a look at the ticket shown here.



It has mentioned: The departure time on 05-02-2010 from Kottayam is 10:20, which means 10:20 am.

Here the first two digits show hour 10. It is less than 12, so no need to subtract 12 from 10. The last two digits show 20 minutes, so keep it as it is and suffix am to indicate the time between midnight to noon.

Hence, 10:20 = 10:20 am, which indicates morning time.

The arrival time on 05-02-2010 to Coimbatore Junction is 16:30, which means 4:30 pm.

Here the first two digits show hour 16. It is more than 12, so subtract 12 from 16. 16 – 12 = 4. The last two digits show 30 minutes, so keep it as it is and suffix pm to indicate the time between noon to midnight. Hence, 16:30 = 4:30 pm, which indicates evening time.

Also discuss the Railway time-table given on page 183 and motivate and help the students to solve the questions. **[Experimental Learning]**

EVALUATE

Classwork: Ask to solve Q1–2 of Practice Time 9A and Q1 of Practice Time 9B.

Homework: Ask to solve Q3 of Practice Time 9A, 'Life Skills' given on page 183, Q2–5 of Practice Time 9B.

ENHANCE

- Discuss the 'Knowledge desk's section given on page 183 and 186 of the book.
- Further the teacher will give task to prepare a short article on the difference of GMT and IST with help of internet. **[Tech Connect]**

Periods: 4–7	Topic: Operations on time units	Suggested extra teaching aids: Wall clock or table clock, etc. Math Genius! 5 pages 187–192

ENGAGE

Start the class, by asking some questions like:

- When do you reach home after school?
- At what time do you start the studying?
- If you start your homework at 4 pm and it takes 1 hour and 30 minutes to complete, then at what time do you complete it?

Accept the responses. Introduce operations on time units.

EXPLORE

Divide the class into pairs.

Assign one student the role of supervisor and provide him a stopwatch.

Call each pair one by one, and ask them to do different activities one by one, like standing on one leg.

The supervisor will record and note the timing of each one on board.

Ask the class to calculate the timing of standing on one leg by each pair by adding the times.

Also, who stands longer and how much by subtracting the times. **[Collaborative Learning]**

EXPLAIN

We can perform operations on time units as we did for length, weight and capacity.

To perform addition or subtraction of time, we arrange the same units of time in same columns and then add or subtract. Also, explain the method of calculating the elapsed time.

Further, explain the method of multiplication and division of units of time.

ELABORATE

Demonstrate on board "Add 11 hours 15 minutes and 49 seconds to 6 hours, 46 minutes and 33 seconds".

Step 1: Add seconds: 49 + 33 = 82 seconds, as it is more than 60 seconds, so we regroup it as 60 s (1 min) + 22 s.

Step 2: Add minutes: 1 + 15 + 46 = 62 mins. Regroup it as 60 min (1 h) + 2 min.

Step 3: Finally, add the hours: 1 + 11 + 6 = 18 hours.

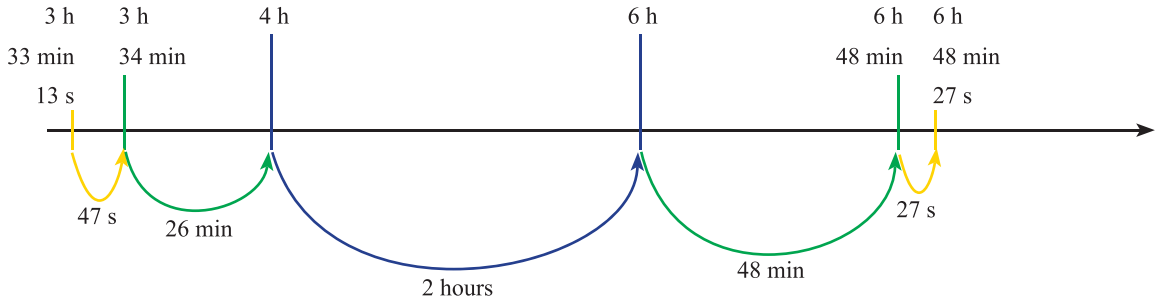
	h	min	s
	①	①	
	11	15	49
+	6	46	33
	18	02	22

Further, demonstrate the difference between two times measured in hours, minutes and seconds. Find the difference between 6 hours, 48 minutes, and 27 seconds and 3 hours, 33 minutes, and 13 seconds.

To find the difference between the two given times, we can place them on a time line.

Step 1: Take the next minute after the smaller time, that is, 3 hours and 34 minutes and 13 seconds and take the next hour: 4 hours.

Step 2: Place the last minute before the larger time: 6 hours, 48 minutes and 27 sec and take the previous hour: 6 hours.



Step 3: Count the number of seconds between 3 hours 33 minutes 13 seconds and 3 hours 34 minutes, i.e., the number of seconds required 13 s to get 60 s, i.e., 47 s. Then, count the time difference between 3 hours 34 minutes and 4 hours i.e., 26 minutes. Check that time between 4 hours and 6 hours is 2 hours, that between 6 hours and 6 hours 48 minutes is 48 minutes, and, finally, that between 6 hours 48 minutes and 6 hours 48 minutes 27 seconds is 27 seconds.

Step 4: Add all the in-between times,

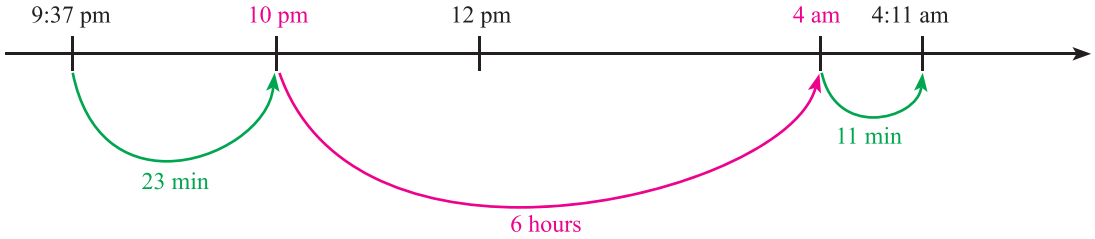
47 s + 26 min + 2 h + 48 min + 27 s = 2 h + 74 min + 74 s = 3 h + 15 min + 14 s (after regrouping)

Next, explain that we can also find the time duration by using the time line as follow:

To find the elapsed time from 9:37 p.m. to 4:11 a.m.

Step 1: On the time line mark the earlier time 9:37 p.m., then mark 10 p.m. next mark then complete hour before the later time 4:11 a.m., i.e., 4 a.m.

Step 2: Mark the difference between 9:37 and 10 p.m. that is 23 min 10 p.m. and 4 a.m. that is 6 hours and 4 a.m. and 4:11 a.m. that is 11 min.



Step 3: Add the in-between time together.

23 min + 6 hours + 11 min = 6 hours 34 min.

Also, discuss the references and examples given on pages 187 – 190.

Further demonstrate, the multiplication and division of units of time by using the references and examples given on pages 191 – 192 of the textbook. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 4, 5 of Practice Time 9C, Q1(*a*)-(*c*), 2 (*a*)-(*c*) of Practice Time 9D.

Homework: Ask to solve the remaining questions of Practice Time 9C and 9D.

ENHANCE

- Discuss 'Knowledge Desk' given on page 189 in the classroom. **[Logical and Critical Thinking]**
- Watch the video on time on "www.fullmarksonline.com". **[Tech Connect]**

Periods: 8–10	Topic: Temperature	Suggested extra teaching aids: Normal thermometer and digital thermometer. Math Genius! 5 pages 193–197

ENGAGE

Keep two glasses of water one with cold water and other with warm water on teacher's table. Instruct: Touch each glass one by one and feel what is the difference. Accept the responses. Introduce them about the temperature and its measurements in degree Fahrenheit and degree Celsius scales.

EXPLORE

Divide the class into pairs. Choose a pair of students randomly. Give two different thermometers in which one measures temprature in degree Celsius and other in degree Fahrenheit. Instruct: Dip both the thermometers one by one in both the glasses filled with hot and cold water, write the temperature showed in both the thermometers on board.

Ask: What is the difference in the temperatures in both the cases? Accept the responses.

Teacher will help them to convert the temperature from Fahrenheit scale to Celsius scale and Celsius to Fahrenheit scale. Repeat the above activity with other pairs of students and with other objects till the time permits. **[Experimental Learning]**

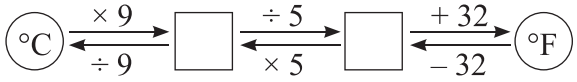
EXPLAIN

The measure of hotness or coldness of an object is known as its temperature.

The instrument which measures the temperature of the object is known as thermometer. It has marking in degrees (°). There are two types of scales for measuring temperature: Celsius scale (°C) and Fahrenheit scale (°F). Use the explanation given on page 193 and 194 of the book.

Further explain the method of conversion temperature from Celsius to Fahrenheit as follows:

- Multiply the temperature given in Celsius by 9.
- Divide the product by 5.
- Add 32 to the quotient.



Reverse above steps to convert Fahrenheit to Celsius.

ELABORATE

Demonstrate the clinical thermometer and the digital thermometer in the classroom, and discuss the difference between them, elaborate the relation between the Celsius and Fahrenheit scale on board.

Demonstrate the conversion of temperature on the board, as follow:

Convert 20°C into °F

Step 1: Multiply by 9. $20 \times 9 = 180$

Step 2: Divide the product by 5. $180 \div 5 = 36$

Step 3: Add 32 to the result $36 + 32 = 68$

Answer: 20°C = 68° F

Next, convert 188°F to °C

Step 1: Subtract 32.

$188 - 32 = 156$

Step 2: Multiply the result by 5.

$156 \times 5 = 780$

Step 3: Divide the product by 9.

$780 \div 9 = 86.67$

Answer: 188° F = 86.67° C

Also, discuss the examples given on pages 195 and 196 of the book. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 4 and 5 of Practice Time 9E.

Homework: Ask to solve Q2, 3 and 6 of Practice Time 9E.

ENHANCE

- Discuss the 'Quick Check' and 'Life Skill' given on page 195. **[Cross-Curricular Learning]**
- Ask to do the task given in 'Project' on page 196. **[Experimental Learning]**

Period: 12	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 197–200

ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.

EXPLORE

Help them to do the activity given in 'Learning by Doing' section on page 200. **[Cross curricular Learning]**

EXPLAIN

Start the revision of the exercise by using Encapsulate, Mental Maths, Chapter Assessment, Life Skills and Maths Fun.

ELABORATE

Discuss questions 1 to 5 in the Chapter Assessment and accept students' answers. If they have any confusion or they make any error then explain and correct them. Discuss and motivate students to solve Mental Maths.

EVALUATE

Classwork: Discuss questions 1 to 5 of the chapter assessment in the classroom. Ask to solve 'Mental Maths' given on page 197.

Homework: Ask to solve Q6 to 10 of Chapter Assessment as homework assignment.

ENHANCE

- Discuss and motivate to solve 'Brain Sizzlers' given on page 200.

ORANGE

ASSIGNMENT–17

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

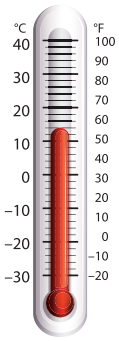
1. Choose the odd one out.

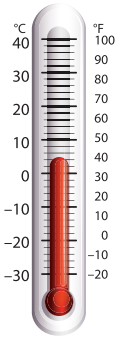
(*a*) Hour (*b*) Minute (*c*) Degree Celsius (*d*) Second

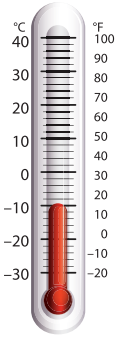
2. What could be the temperature outside on a snowy day? Choose the more reasonable answer.

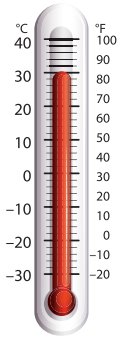
(*a*) 40°C (*b*) 0°C (*c*) 50°C (*d*) 36°C

3. Which thermometer best represents the temperature 30°C?

(*a*) 

(*b*) 

(*c*) 

(*d*) 

4. A television serial runs for $\frac{1}{2}$ hour. If it had 9 minutes 15 seconds of advertisements, how long the story of the serial is displayed?

(*a*) 20 min 45 s (*b*) 20 min 85 s (*c*) 21 min 15 s (*d*) 19 min 45 s

5. It takes Alia's family complete 3 days to drive to the hill station. They spend 4 days at the shore. Then drive home again. If they left home early Saturday on 7th Jan, what day and date will they return to home?

(*a*) 14th Jan, Friday (*b*) 17th Jan, Tuesday (*c*) 15th Jan, Monday (*d*) 14th Jan. Wednesday

6. Sonia can cycle from point A to point B and return to point A in 10 minutes. She can cycle and walk back in 18 minutes. It will take ___ minutes for her to walk there and walk back.

(*a*) 36 minutes (*b*) 20 minutes (*c*) 26 minutes (*d*) 28 minutes

7. Sumant started studying at 6:25 p.m. and finished at 2210 hours. How long did he study?

(*a*) 4 hours 15 minutes (*b*) 4 hours 35 minutes (*c*) 3 hours 15 minutes (*d*) 3 hours 45 minutes

8. Match the equivalent value of Fahrenheit scale with the Celsius scale.

	A	B	C	D
(*a*)	3	1	4	2
(*b*)	2	1	3	4
(*c*)	1	2	3	4
(*d*)	4	1	3	2

List I		List II	
A.	167°F	1.	65°C
B.	149°F	2.	55°C
C.	113°F	3.	75°C
D.	131°F	4.	45°C

ORANGE

ASSIGNMENT–18

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. ..... is the instrument that is used to measure the temperature.
2. 8 hours 20 minutes = ... seconds.
3. There are ..... hours in 3 weeks and 4 days.
4. 225 minutes before 1345 hours is ....., in 12-hour clock time.
5. 8 hours 5 minutes after 9:55 pm is ....., in 24-hour clock time.

B. Label True or False.

1. 4 hours 15 minutes 30 seconds × 4 = 17 hours 20 minutes. .....
2. 16 hours 32 minutes 40 seconds ÷ 5 = 3 hours 18 minutes 32 seconds. .....
3. 23 years – 18 years 9 months = 51 months. .....
4. 52 minutes 48 seconds + 36 minutes 56 seconds = 1 hour 29 minutes 44 seconds. .....
5. There are 1810 hours in 2 months and 5 days. .....

C. Match the following.

Column I	Column II
1. Temperature of boiling water	(*a*) 32°F
2. Temperature of freezing water	(*b*) 260°C
3. Normal temperature of human body	(*c*) 30°C
4. Temperature of a hot barbecue grill	(*d*) 100°C
5. 86°F is equivalent to	(*e*) 98.6°F

D. Utilise Your Brain

Shridhi goes Karate class on every even-numbered dates in May 20XX. Assume that 2nd and 4th Saturdays and, all Sundays are holidays.

May 20XX						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

1. How many days does she go to the class?
2. If she practices 1 hour 5 minutes daily, how much time does she practice in this month?



Money

Learning Objectives

After studying this chapter, students will be able to...

- apply unitary method to find the values of articles or items.
- calculate the profit, loss, cost price and selling price of an item.

LESSON PLAN

Suggested number of periods: 7

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, some dummy notes and coins of different denominations.

Keywords: Unit Price, Cost Price, Selling Price, Profit and Loss, etc.

Pre-requisite knowledge: Students must be familiar with addition and subtraction of money, multiplication and division of money, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topic: Unitary method	Suggested extra teaching aids: Some real-life objects, Math Genius! 5 pages 202–203

ENGAGE

After the introduction, ask from the class, if cost of 1 pencil is ₹5, then what is cost of such 10 pencils. Accept the answers. Discuss 'Get Ready' and ask to solve questions given in 'Let's Recall' section. Introduce the topic unitary method.

EXPLORE

Write a situation on the board.

"I bought 20 bananas and paid ₹100 to the shopper. When I reached home, my mother asked me to bring 10 more bananas. I return to the market to bring 10 more bananas. How much more money do I have to pay the shopkeeper for 10 bananas?"

And write some questions based it on board. Like:

How much bananas I bought? ……

How much I paid for this?.....

To pay for 10 more bananas what do I need to know?.....

How would I know the rate of bananas?.....

And ask students to answer those questions, with help of each other in their notebook.

At the end teacher will explain the answers and students will match with their own. The student who solve all or the maximum will be appreciated. **[Conceptual Learning]**

EXPLAIN

The method of finding the value of one article, when the value of some articles is given, is called the unitary method. The price of 1 item is called the unit price.

ELABORATE

Demonstrate on board the unitary method and its requirement in real-life by using the examples 1, 2 and 3 given on pages 202 and 203 of the textbook. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 2 and 3 of Practice Time 10A in the classwork notebook.

Homework: Ask to solve the remaining questions of Practice Time 10A as their homework assignment.

ENHANCE

- Ask to download some worksheets based on unitary method from the internet and solve them.

Periods: 4–6	Topic: Profit and Loss	Suggested extra teaching aids: Some objects for selling, dummy currency notes, etc. Math Genius! 5 pages 203–207

ENGAGE

Start the class by discussing like: Everyone in this world has to earn his or her living. Some are in service, while others do independent business. Ask question like:

- How do shopkeepers earn their living?
- Do they sell articles at the same price at which they buy?
- What do we call the additional amount they got by selling the product?

Accept the students' answers.

Also tell them that sometimes they are compelled to sell at a lower price depending on circumstances, it is known as selling at loss.

EXPLORE

- Arrange the tables for selling the products.
- Ask students to select the products they want to sell.
- Now, ask them to decide the cost price and selling price for each product.
- Distribute dummy currency notes to all students.
- Now, give shopping time to students in batches. Encourage them to negotiate the pricing and get a better deal for themselves.
- After this, each student should calculate how many products they have sold and what is their profit or loss.
- Encourage and help them to find the profit by applying the formula of subtracting the cost price from the selling price to get the profit amount. Discuss their experience too.

[Experiential and Collaborative Learning]

EXPLAIN

The price at which an article (item) is bought is called the cost price (CP).
The price at which an article or item is sold is called the selling price (SP).
When the selling price (SP) is greater than the cost price (CP), that is, SP > CP, then there will be a profit.
Profit = SP – CP.
When the selling price (SP) is less than the cost price (CP), that is, SP < CP, then there will be a loss.
Loss = CP – SP.
When the selling price (SP) is equal to the cost price (CP), that is, SP = CP, then there will be neither a profit nor a loss.
In case of profit, the Cost price is Selling price – Profit.
In case of loss, Cost price is Selling price + Loss.
Further, in case of profit, the Selling price is Cost price + Profit.
In case of loss, the Selling price is Cost price – Loss.

ELABORATE

Demonstrate on board examples based on 'Profit and Loss' , finding the cost price, selling price, profit and loss by taking references given on pages 203 – 206. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1 and 5 of Practice Time 10B in the classroom.

Homework: Ask to solve Q2, 3, 4, 6 and 7 of Practice Time 10B as homework assignment.

ENHANCE

- Discuss and motivate to solve 'Quick Check' given on page 204. **[Logical Thinking]**
- Ask to solve 'Think and Answer' given on page 207.

Period: 7	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 208–210

ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.

EXPLAIN

Start the revision of the exercise by using, Encapsulate, Chapter Assessment, Life Skills, Mental Maths and Brain Sizzlers.

ELABORATE

Ask to solve questions 1 to 5 of the chapter assessment. If they have any confusion or do error, then explain and correct it. Discuss and motivate students to solve Mental Maths. Guide them to solve Brain Sizzler given on page 208.

EVALUATE

Classwork: Ask to solve Q1 to 5 of the Chapter Assessment in the classroom.

Homework: Ask to solve Q6 to 11 of Chapter Assessment and 'Mental Maths' as homework assignment.

EXPLORE

Guide students to do activity as suggested in 'Learning by Doing' given on page 210.

[Experiential and Collaborative Learning]

ORANGE

ASSIGNMENT–19

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. Raja bought 13 kg of groundnuts. He saved ₹195 by using a store coupon. How much did he save per kg of groundnuts?
   (*a*) ₹10 (*b*) ₹12 (*c*) ₹15 (*d*) ₹17
2. Juhi has ₹61.50 in her digital wallet. If she pays ₹32.75 digitally for buying a sandwich, how much money is left in her wallet?
   (*a*) ₹24.75 (*b*) ₹28.75 (*c*) ₹26.25 (*d*) ₹28.25
3. Anita has ₹200, she has to buy a jar of chilly, a bottle of tomato sauce and mixed fruit jam. So, how much more money does she need to buy these?
   Bottle of mixed fruit jam - ₹85.00; Bottle of apple jam - ₹95.00
   Jar of chilly - ₹82.00; Jar of tomato sauce - ₹76.00
   (*a*) ₹62.00 (*b*) ₹50.00 (*c*) ₹40.00 (*d*) ₹43.00
4. A man buys erasers at 10 for ₹30 and sells at 6 for ₹30. How much will he gain or lose by selling all 10 erasers?
   (*a*) Gain ₹20 (*b*) Loss ₹20 (c) Gain ₹12 (*d*) No gain or loss
5. Navesh saves ₹300. His brother, Sarvesh, saves 220. How much money must Navesh give his brother so that both of them will have the same amount of money?
   (a) ₹80 (*b*) ₹20 (*c*) ₹40 (*d*) ₹520
6. Kavita's savings is four times that of her sister. When she spends ₹25 and her sister saves ₹50, both of them have the same amount of money. How much does Kavita and her sister respectively have in their savings at first?
   (*a*) ₹80, ₹20 (*b*) ₹100, ₹25 (*c*) ₹40, ₹160 (*d*) ₹520, ₹130
7. Razia has ₹288. Iqra has ₹12 more than Razia. Shabnam has twice as much as Iqra. How much money does Shabnam have?
   (a) ₹276 (*b*) ₹300 (*c*) ₹576 (*d*) ₹600
8. 6 oranges cost the same as a pineapple. 4 oranges cost the same as 8 cherries. How many cherries have the same cost as 4 pineapples?
   (*a*) 24 cherries (*b*) 48 cherries (*c*) 36 cherries (*d*) 12 cherries
9. Vishal bought a jug and two identical glasses. He gave the cashier a ₹200 note and got back ₹36 in change. How much did each glass cost if the jug costs ₹104?
   (*a*) ₹30 (*b*) ₹60 (*c*) ₹72 (*d*) ₹52
10. A jeweller bought 18 rings at ₹29700 and sold each one at ₹2600. How much money did he earn altogether?
    (*a*) ₹46800 (*b*) ₹11700 (*c*) 17100 (*d*) 10710
11. 3 mangoes cost ₹110 at a fruit store. What is the cost of 57 mangoes?
    (*a*) ₹2090 (*b*) ₹2180 (*c*) ₹2200 (*d*) ₹2010
12. A TV set was sold for ₹57200 at a profit of ₹2400. Find its cost price.
    (*a*) ₹55800 (*b*) ₹51800 (*c*) ₹54800 (*d*) ₹59600

ORANGE

ASSIGNMENT–20

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks.

1. If Shuraj paid ₹156 for 6 kg of wheat, then price of 2 kg of wheat would be .....
2. A earns ₹420 for working 7 hours. He will earn ₹600 for working ..... hours.
3. There is a ..... in a deal if SP > CP.
4. If SP < CP, then CP – SP = ...
5. If a typist types 24 pages in 8 hours, then she will type ..... in 12 hours.

B. Label True or False.

1. If cost of 4 ballpoint pens is same as the cost of 10 pencils, then the cost 6 pens will be same as the cost of 15 pencils. .....
2. If SP + Loss = CP, then SP > CP. .....
3. If cost price of 12 dolls = the selling price of 10 dolls, then there is a loss in the deal. .....
4. If CP of a table = ₹2500 and SP = ₹2650, then profit = ₹150 .....
5. 5 candies for ₹10 is cheaper than 3 candies for ₹8. .....

C. Match the following.

Column I	Column II
1. CP = ₹68.50, SP = ₹75	(*a*) CP = ₹1875
2. CP = ₹685, SP = ₹575	(*b*) SP = ₹121
3. Loss = ₹850, SP = ₹1025	(*c*) CP = ₹4500
4. SP = ₹5140, Gain = ₹640	(*d*) Profit = ₹6.50
5. CP = ₹112.80, Gain = ₹8.20	(*e*) Loss = ₹110

D. Utilise Your Brain.

Keshav went to the amusement park with his wife and two children aged 6 years and 8 years. They entered at 10:20 a.m. and left at 1:05 p.m. How much did Keshav pay?

Entry fee per person.	₹200
Charges for every half an hour or part thereof for each adult.	₹90.25
Charges for every half an hour or part thereof for each child.	₹45.25

(*a*) ₹2256 (*b*) ₹1848 (*c*) ₹3152 (*d*) ₹2426



Perimeter, Area and Volume

Learning Objectives

After studying this chapter, students will be able to...

- find the perimeter of geometrical shapes.
- find the area of geometrical shapes.
- find the area of irregular shapes.
- find the volume of cubical and cuboidal shapes.

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, measuring tape, some cubical and cuboidal boxes, etc.

Keywords: Boundary, Perimeter, Region, Area, Length, Breadth, Height, Space, Volume, etc.

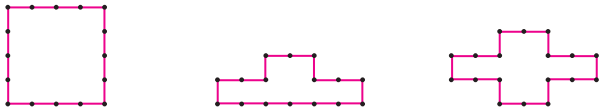
Pre-requisite knowledge: Students must be familiar with finding the area and perimeter of 2D regular shape and irregular shapes, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–4	Topic: Perimeter	Suggested extra teaching aids: Chalk, marker, duster, measuring tape, etc. Math Genius! 5 pages 211–215

ENGAGE

Ask the students to construct the following figures using ear buds/ matchsticks and observe the total length of their boundary. The students may be asked to calculate the length of the boundary of these shapes. They may check if the lengths are the same.



Students may be encouraged to construct more shapes, such as triangles, with the same boundary length. This will give them an idea that different shapes can have the same boundary length or perimeter.

Introduce: The concept of perimeter of a rectangle. Discuss the concepts given on “Get Ready” and motivate to solve “Let’s Recall” given on pages 211 and 212, respectively.

EXPLORE

Take the class into the playground. Make a rectangular shape on the playground by standing any four students at four different points of the playground. Instruct: Another student to make lines using sand/ chalk by walking in a line between the two students who stand at two different points.

Again, instruct another student to measure the length of the sides of the rectangular shape formed on the playground by using the measuring tape.

Ask: What is the perimeter of the rectangular shape formed? Accept the responses.

Further, make another shape like square/ triangle and repeat the process till the time permits.

[Collaborative and Experiential Learning]

EXPLAIN

The perimeter is the sum of the lengths of the sides of any rectilinear figure. So the perimeter of a rectangle is the sum of the lengths of all four sides. Explain the method of deriving the formula 2 (Length + Breadth) as the opposite sides of a rectangle are of same length.

Further, we know that a square is a 4-sided polygon whose all four sides are of equal length.

Hence, perimeter of a square = 4 × side.

Similarly, perimeter of a triangle = sum of its three sides.

ELABORATE

Demonstrate on board how to find the perimeter of different rectilinear figures like: rectangle, square and types of triangles.

The perimeter of a rectangle with measurements 9 cm and 4 cm = 2 × (length + breadth) = 2 × (9 + 4) cm
= 2 × 13 cm = 26 cm.

The perimeter of a square with side 8 cm = 4 × side = 4 × 8 cm = 32 cm.

The perimeter of a scalene triangle ABC, with measurement AB = 5 cm, BC = 8 cm and AC = 11 cm,
= AB + BC + CA = 5 cm + 8 cm + 11 cm = 24 cm.

The perimeter of an equilateral triangle of side 5 cm = 3 × sides = 3 × 5 cm = 15 cm.

The perimeter of an isosceles triangle in which each of the equal sides is 6 cm and the third side is 5 cm.
= 6 cm + 6 cm + 5 cm = 17 cm.

Also demonstrate on board the solved examples and examples based on real-life situations where we use the concept of perimeter given on pages 212–215 of the book. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q5–9 of Practice Time 11A.

Homework: Ask to solve Q1–4 and 10–12 of Practice Time 11A.

ENHANCE

- Discuss the 'Note' and ask to do the question of 'Think and Answer' section given on pages 213 and 214 of the book.

Periods: 5–7	Topic: Area, Area of irregular shapes	Suggested extra teaching aids: Chalk, duster, square paper having images, crayons or colour pencils, etc. Math Genius! 5 pages 216–223

ENGAGE

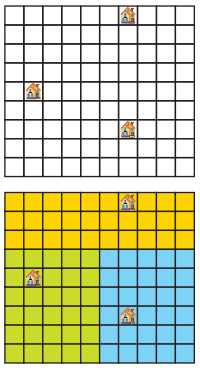
Refer some real-life objects and ask questions based on area.

- Which of the following has a larger area a carom board or a chess board?

- If you have to clean a door or a window pan, for which one will you take less time?
- On which sheet can you draw a bigger smiley – on a chart paper or on a notebook page?

Accept their responses and talk about their logic behind. Introduce the topic Area.

EXPLORE



Divide the class into groups. Distribute the shown grid paper with image of three houses in each group.

Now, ask the group to divide the area equally among three parts, by colouring it in three colours, such that each part include one image of the house. The group who did it correctly in minimum time will be the winner. If students have any confusion, teacher will help them and ask them to distribute the area in three equal parts by counting the square and colour them as shown in given figure. **[Experiential and Collaborative Learning]**

EXPLAIN

Area is the amount of surface that a plane-closed figure covers. Area of an object which takes more space is larger than an object which takes less space. To measure the area of a closed figure, we count the squares with convenient unit of area. For example, a square whose side is 1 cm, square centimetre or sq. cm is a unit of area.

Explain that, area of a rectangle can also be calculated by using the formula "(Length × Breadth) sq. units". And if area is given, length and breadth can be calculated by using the formula,

$$\text{Length} = \frac{\text{Area of rectangle}}{\text{Breadth}} \quad \text{and} \quad \text{Breadth} = \frac{\text{Area of rectangle}}{\text{Length}}$$

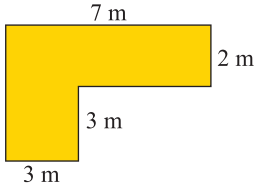
Explain, area of a square = (side × side) sq. units.

Further, to explain area of a triangle, a diagonal divides a square or a rectangle into two halves. Each half is a triangle. Thus, the area of a triangle is half the area of the square or rectangle.

Next, explain how to find the area of irregular shapes, using the squared paper counting the squares by using the formula given below:

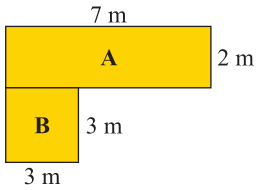
Area of the irregular closed figure = Number of complete squares (m) + Number of squares having more than half parts enclosed (n) + $\frac{1}{2}$ × Number of squares having half parts enclosed (p).

ELABORATE



Demonstrate on board the method of finding the area of a rectangle and square, by taking the reference and examples given on pages 217–218.

Further, demonstrate the area of composite figure as shown:



Show that the figure can be divided into one rectangle A and one square B, where the length and breadth of rectangle A are 7 m and 2 m respectively.

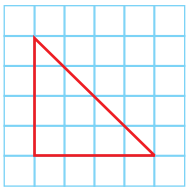
And each side of square B is 3 m.

So, area of rectangle A = $2 \times 7 = 14$ sq. m

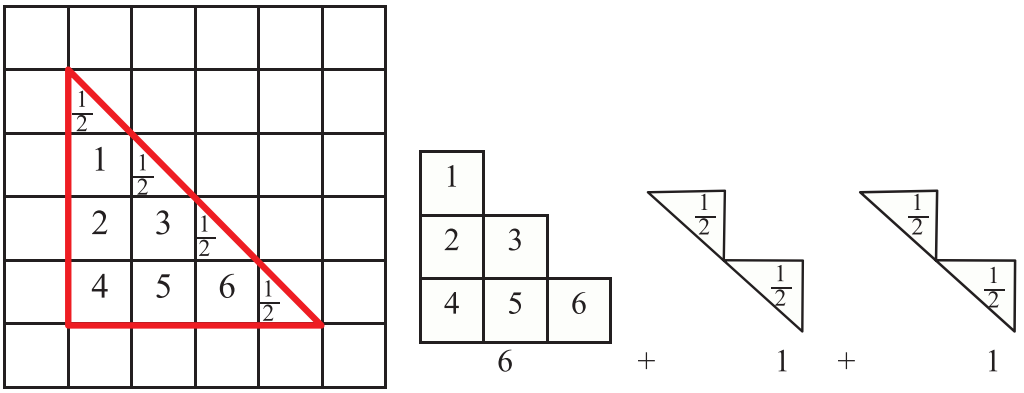
And area of square B = $3 \times 3 = 9$ sq. m

So, area of composite figure = 14 sq. m + 9 sq. m = 23 sq. m

Also, demonstrate the examples 1, 2 of area of composite figures given on page 219 of the textbook. For area of triangles, show the triangle on a square grid paper as given alongside:



Here, the triangle does not contain all complete squares. It has 6 complete squares and 4 half squares.

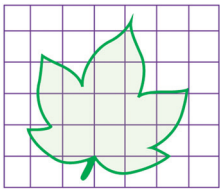


Number of complete squares = 6 + 2

So, the area of the triangle is 8 square units.

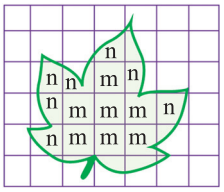
Also, demonstrate area of triangle by taking the references and examples given on pages 219–221.

To demonstrate area of irregular shapes, count the squares that are completely covered, half covered and so on. Marked as shown:



Number of complete squares (m) + Number of squares having more than half parts enclosed (n) + × Number of squares having half parts enclosed (p).

$m = 7$; $p = 0$; $n = 7$



So, area of the given shape = $\left(m + n + \frac{1}{2}p\right)$ = 7 + 7 = 14 sq. units

For detailed explanation of area of irregular shapes, use the references and examples given on pages 222–223. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 2, 4, 10 of Practice Time 11B and Q1–3 of Practice Time 11C.

Homework: Ask to solve the remaining questions of Practice Time 11B and 11C.

ENHANCE

- Discuss 'Think and Answer' given on page 218 of the textbook.
- Ask to solve 'Maths Fun' given on page 223 in the classroom. **[Logical and Critical Thinking]**

Periods: 8–10	Topic: Volume, Volume of a cuboid, Volume of a cube	Suggested extra teaching aids: Some real-life objects like match box, shoe-box, bottles, some plastic cubes and cuboids etc. Math Genius! 5 pages 224–227

ENGAGE

Show two bottles of different size. Ask: Which one will take more amount of water? Accept the responses. Again, ask which bottle has greater volume? Accept the responses. Introduce the concept of volume and discuss how to find the volume of solid shapes.

EXPLORE

Divide the class into 4/5 groups. Provide each group a certain number of unit cubes and tell them to build a cuboid by using these cubes.

Instruct the class to compare and observe that different shapes and sizes can also have the same volume and how solids with the same volume can look different. **[Experimental and Collaborative Learning]**

EXPLAIN

The plane figures have only two dimensions—length and breadth. But the solid figures or shapes have three dimensions—length, breadth (or width) and thickness (height).

The amount of space occupied by a solid is called its volume. The volume of a unit cube is 1 cubic unit. Through the activity students already learnt that different shapes and sizes can also have same volume.

Further, explain that volume of a cuboid is the product of its dimensions, length, breadth and height, *i.e.*, volume of a cuboid (V) = Length (l) × Breadth (b) × Height (h) cubic units.

And volume of a cube = (Side × Side × Side) cubic units.

ELABORATE

Demonstrate on board, the method of finding the volume of cuboid and cube by taking the references and examples given on pages 225–226. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 2 and 4 of Practice Time 11D.

Homework: Ask to solve Q3 and 6–8 of Practice Time 11D.

ENHANCE

Take two rectangular papers of the same size and different colours (say green and yellow). First take any paper, say green colour, crease it along the larger side from the middle such that both parts become equal (Fig. 1).



Fig. 1

Crease the same paper from the middle such that both parts become equal and this divides the paper into four equal parts (Fig. 2).



Fig. 2

Now, join the open sides of the paper with power tape and form a box (Fig. 3).

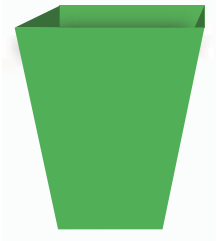


Fig. 3

Do the same with another paper, say yellow colour, by creasing it along the shorter side and form another box (Fig. 4 and Fig.5).

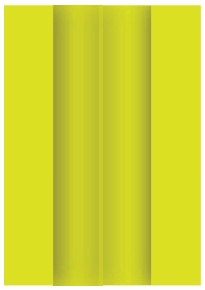


Fig. 4



Fig. 5

Now put the green box on the table vertically so that one open side faces the table and the other side upwards and fill it completely with rice/grains. Empty all the rice in a container and fill the yellow box with this rice. Does it fill the yellow box completely or not?

[Experiential Learning]

Periods: 11–12	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 227–231

ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.

EXPLORE

Help them to do the activity given in 'Learning by Doing' on page 231 of book in the classroom.

[Collaborative Learning]

EXPLAIN

Start the revision of the exercise by using Encapsulate, Mental Maths, Maths Connect and Chapter Assessment.

ELABORATE

Discuss questions 1, 5 and 7 in the Chapter Assessment and accept students' answers. If they have any confusion or do any error then explain and correct it. Discuss and motivate students to solve Mental Maths.

EVALUATE

Classwork: Ask to do questions 1, 2, 3 and 4 of the Chapter Assessment in the classroom.

Homework: Ask to solve Q6 and Q8 to 14 of Chapter Assessment as homework assignment.

ENHANCE

- Ask to solve 'Maths Connect' given on page 228.
- Ask to solve 'Brain Sizzlers' given on page 230.

ORANGE

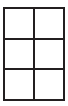
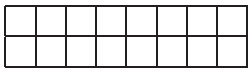
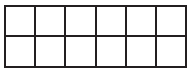
ASSIGNMENT–21

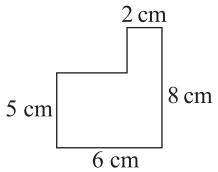
Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. Each side of a square is of 10 m. What will be the area of the square?
   (*a*) 40 m (*b*) 100 m (*c*) 100 sq m (*d*) 40 sq m
2. What will be the perimeter of a carpet whose length is 2 m and breadth is 1.80 m?
   (*a*) 7.6 m (*b*) 3.6 m (*c*) 3.64 m (*d*) 7.6 sq m
3. Find the adjacent side of a rectangle if the perimeter of the rectangle is 28 m and length is 8 m.
   (*a*) 12 m (*b*) 3 m (*c*) 9 m (*d*) 6 m
4. What will be the perimeter of a square whose area is 64 sq cm?
   (*a*) 16 cm (*b*) 32 cm (*c*) 8 cm (*d*) 64 cm
5. The difference between the length and the breadth of a rectangle is 8 cm and the perimeter is 64 cm. Which of the following can be the length and breadth of this rectangle?
   (*a*) L = 12 cm, B = 4 cm (*b*) L = 20 cm, B = 8 cm
   (*c*) L = 20 cm, B = 12 cm (*d*) L = 16 cm, B = 8 cm
6. The breadth of a rectangle is increased by 2 units. Its perimeter is now increased by?
   (*a*) 2 units (*b*) 4 units (*c*) 8 units (*d*) 16 units
7. The area of a square is equal to the area of a rectangle of I = 8 cm and b = 2 cm. What is the side length of the square?
   (*a*) 4 cm (*b*) 3 cm (*c*) 6 cm (*d*) 8 cm
8. How many small cubes of side 1 cm can be put in a cubical box of side 3 cm?
   (*a*) 9 (*b*) 12 (*c*) 27 (*d*) 6
9. A cuboid measures 12 cm × 6 cm × 7 cm. How many cubes of side 2 cm can fit in the box?
   (*a*) 72 (*b*) 63 (*c*) 54 (*d*) 96
10. Which of these figures represents the area of 24 sq m if given that each block ☐ = 4 sq m?
    (*a*)  (*b*)  (*c*)  (*d*) 
11. Find the area and Perimeter of the given shape.
    (*a*) Area 40 sq cm; Perimeter 40 cm
    (*b*) Area 36 sq cm; Perimeter 28 cm
    (*c*) Area 28 sq cm; Perimeter 36 cm
    (*d*) Area 30 sq cm; Perimeter 40 cm



ORANGE

ASSIGNMENT–22

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Fill in the blanks in the given passage by appropriate answers.

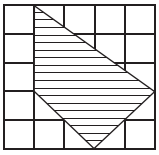
Jayant has a garden of 20 feet × 25 feet. He wants to have a grass lawn on some part of it. He wants the grass lawn to be 10 feet by 13 feet.



1. To find area of grass lawn, he should use the formula .....
2. He also wants to fence the whole garden. For that Jayant will have to calculate the ..... of the garden which is = ...
3. So, he will have a grass lawn of area ..... sq feet.
4. And it will cost him ₹..... for fencing the garden at ₹10 per foot.

B. Label True or False.

1. If we want to fence an area we, calculate perimeter of that place. .....
2. A rectangle has all its four sides equal. .....
3. If two unequal sides of an isosceles triangle are 4 cm and 10 cm, then its perimeter would be 18 cm. .....
4. In the figure, side of each square is 1 cm. The area of the shaded part is 10 sq cm. .....



.....

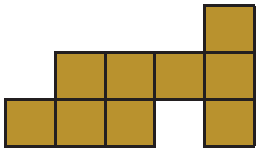
5. A cube of side 24 cm can be cut into 64 smaller cubes each of side 6 cm. .....

C. Match the following.

List I	List II
1. Area of rectangle	(*a*) Side × Side
2. Perimeter of triangle	(*b*) Length × Breadth
3. Area of square	(*c*) 4 × Side
4. Perimeter of square	(*d*) Sum of the lengths of three sides

D. Utilise Your Brain.

If each square tile has perimeter 80 cm, then find the perimeter and area of the following shape.





Visualisation of 3D Objects and Maps

Learning Objectives

After studying this chapter, students will be able to...

- draw net of 3D shapes.
- understand the concept of perspective and their related terms.
- draw a 2D Floor Map and 3D Deep Drawings.
- understand and draw route maps.

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, chalk, duster, compass, isometric paper, etc.

Keywords: Net, Isometric, Perspective, Vanishing point, Eye point, Horizon line, Illusion, etc.

Pre-requisite knowledge: Students must be familiar with difference in 2D and 3D objects. drawing net of solid shapes, different view of a shape and map of a location, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–2	Topic: Solid shapes	Suggested extra teaching aids: Chart based on solid shapes and its net, Isometric dot paper, etc. Math Genius! 5 pages 233–236

ENGAGE

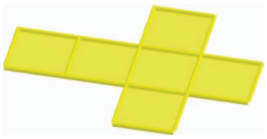
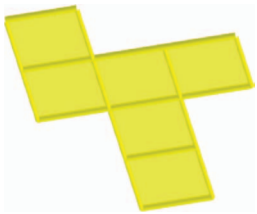
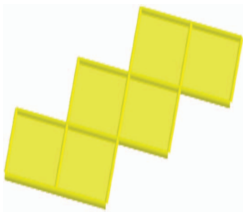
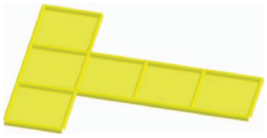
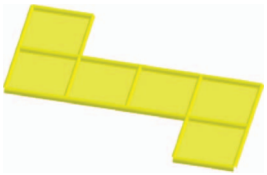
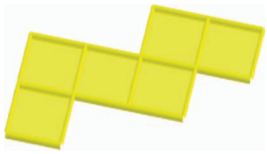
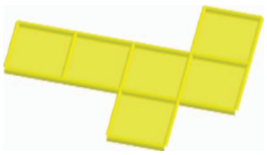
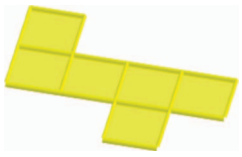
Start the class by asking few questions like:

- Why solids are called 3-dimensional figures/shapes?
- When we add two cube what shape do we get?

Discuss the concepts given on 'Get Ready' section and ask to do the questions of Let's Recall section given on page 233.

EXPLORE

Take the class to the computer lab. Divide the class into pairs. Ask each pair to open Geogebra in their system. Instruct: Start exploring net of solids, like: net of a cube.

Cube	Net with maximum 4 squares in a row	Net with maximum 3 squares in a row	Net with maximum 2 squares in a row
			
			
			
			
			
			

And note the shapes in their notebook.

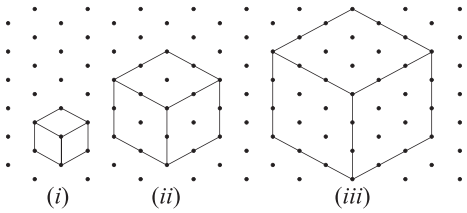
At last the students will discuss and present their observation in the classroom. **[Tech Connect]**

EXPLAIN

By opening the hollow 3D shape/object, we get its 2D net. A cube is a 3D shape whose all faces are squares. It has six faces, eight corners and twelve edges. Cuboid also has six faces, eight corners and twelve edges, but its faces are in rectangular shape. Further, a cylinder has two identical circular bases joined by a curved surface. And a cone is a 3D solid shape with a flat and curved surface pointed towards the top. Teacher can take the references and images given on pages 233 and 234 for the detailed explanation.

ELABORATE

Distribute isometric dot paper in the class and instruct to observe how this paper is different from the square dot paper. Demonstrate that on isometric dot paper, the dots form an equilateral triangle. Further demonstrate on board how to draw cubes of sides 1 cm, 2 cm and 3 cm.



Also show the construction of cuboids of different dimensions. **[Experiential Learning]**

EVALUATE

Classwork: Discuss Q1, 2 and 3 of Practice Time 12A in the classroom.

Homework: Ask to solve Q4 of Practice Time 12A as the homework assignment.

ENHANCE

- Ask to draw at least 5 cuboids of dimension 2 × 3 × 4 on a isometric dot paper.

Periods: 3–5	Topic: What is perspective, Illusion, 2D floor maps and 3D deep drawings	Suggested extra teaching aids: Some real life objects like: Flower pot, tea cup, drawing sheets, sample of some floor map and 3D deep drawing, etc. Math Genius! 5 pages 236–239

ENGAGE

Start the class with asking questions based on some real life situations where the phenomenon of perspective works. Like:

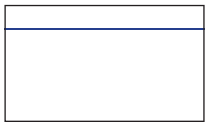
- Why a big aeroplane looks like a bird when seen flying in the sky?
- Why a tall tree looks smaller when seen from a distance and looks taller when seen from close by?

Accept the responses. Introduce the topic perspective.

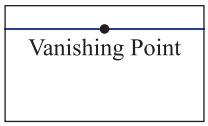
EXPLORE

To create the illusion of 3-D depth on a 2-D surface by using linear perspective the teacher will instruct the class to draw a geometrical shape, which appears to meet at a single point i.e., vanishing point, as follow:

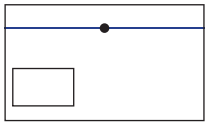
- Ask to take out the drawing sheet, and with help of pencil, draw a straight line (horizon line) as shown.



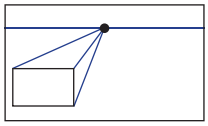
- Mark a point(vanishing) at the centre of the line.



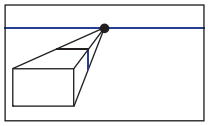
- Draw a square or rectangle at the lower corner of the sheet.



- Now connect the three corners of your rectangle or square to the vanishing point. These are orthogonal.

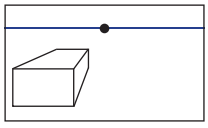


- Draw a horizontal line and a vertical line down from the horizontal line to complete the side.



- Erase the remaining orthogonal.

  This is an in depth drawing of a cuboid, with a vanishing point on the horizon.



[Art Integrated Learning]

EXPLAIN

Perspective means viewing or drawing 3D objects on 2D surfaces showing the impression of length, width, depth, distance, etc. Explain about the important terms, vanishing point, eye point and eye level or horizon line that help us to understand how perspective (one point) drawings give smaller appearance of objects from farther distance and how 3D objects look realistic when drawn on 2D shape.

Further, explain that due to illusion while travelling in a train or car, objects like Moon, tree, etc., seem moving with us and give us a feeling as they are changing their positions.

Similarly, when we look the same object from different points, it looks different due to illusion.

Further, show a sample of floor map and its 3D deep drawing in the classroom and explain 2D floor plans show the basic outline of a building including walls, doorways, windows and entrances. Before construction, the building is described by the floor map. A floor map illustrate how the available space should be used. Deep drawing is a 3D drawing show the length, width and the height of a house or a building. It is drawn on the basis of the floor map.

The deep drawing matches the specifications of the floor map.

ELABORATE

Demonstrate vanishing point, eye point and eye level or horizon line using the smart board or by taking the references given in pages 236 and 237 of the textbook.

Further put a flower pot or any bottle or cup on the teacher's table and instruct to students to draw a rough sketch of the part they view from their seat. And explain that each position, he/she is viewing different parts of the same pot because of the level of horizon.

Show the duster in the classroom and instruct the class to observe its side view, top view and front view and draw in their notebook. **[Experiential Learning]**

EVALUATE

Classwork: Discuss Q1 and 2 of Practice Time 12B in the classroom. If students make any error, teacher will correct it and explain.

Homework: Ask to do Q3 of Practice Time 12B as homework assignment.

ENHANCE

- Ask to do the 'Project' and 'Brain Sizzlers' given on page 243 of the textbook.

[Experiential learning]

Periods: 6–8	Topic: Maps	Suggested extra teaching aids: Chart showing maps or route between two locations, etc. Math Genius! 5 pages 239–242

ENGAGE

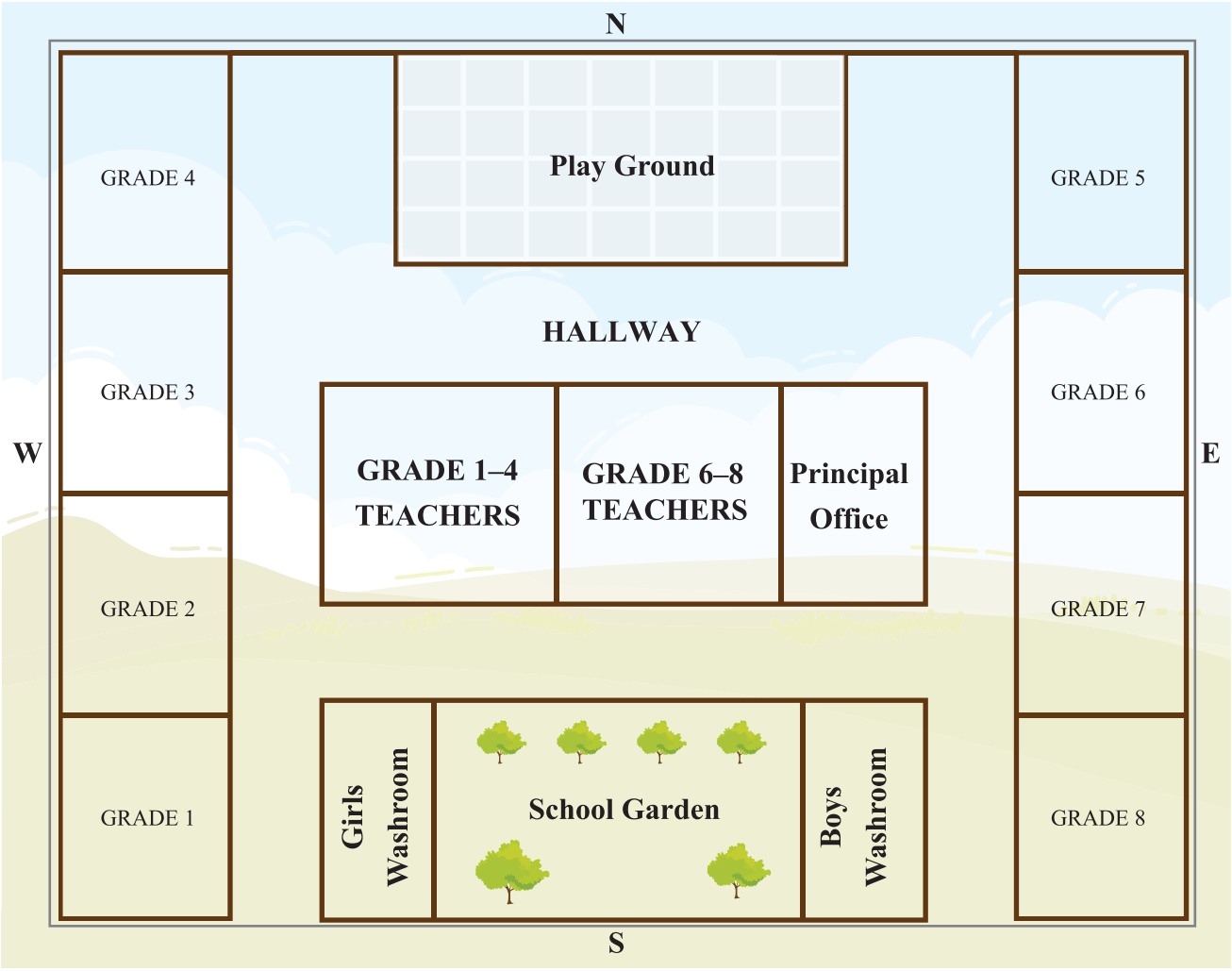
Exploring Directions on a Map

In this activity students will explore different places using a map and understand the value of directions mentioned in it. Ask them to get a Map of their school. They may be asked to look for a compass rose on the map. It's usually a small star or flower-like symbol with arrows pointing in different directions.

This handy tool will guide them as they explore directions. They may be familiarised with the four main directions:

1. North is at the top of the map.
2. South is at the bottom.
3. East is on the right side.
4. West is on the left side.

They may be asked to face a certain direction. They may then use the compass rose to figure out which direction they are facing. It's like using a compass to find their way. Now, allow them to try to locate different places on the map using the directions they have learned. For example, they might find their classroom to the north of the playground. You may call out a direction, and the student should point to that direction on the map. Introduce the topic maps.



EXPLORE

Divide the class into groups. Distribute plain paper to each group. Ask to draw route map from the classroom to principal room or they can draw the route of school from their home, important landmarks come on the way using keys. Accept the Teacher will help if any group want it. The group whose route map is best and proper is the winner.

[Experiential Learning]

EXPLAIN

A map is simply a drawing or picture or a landscape of a location. It shows the landscape as it would be seen from above (top view). It is also used for guiding directions and to find out distances in a locality.

ELABORATE

Take reference of map given on pages 239 and 240 to explain the map. Discuss the example given on page 240 on board. Also demonstrate the components of a map: title, scale, keys.

Demonstrate the directions in details by using the compass, and taking the references given on page 241.

EVALUATE

Classwork: Ask to solve Q1 of Practice Time 12C in the classroom. If any student makes any error, the teacher will correct and explain.

Homework: Ask to solve Q2 of Practice Time 12C as homework assignment.

ENHANCE

- Ask to do the 'Project' given on page 242 of the textbook. **[Experiential Learning]**

Periods: 9–10	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 244–247

ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts/queries and start the revision of the exercise.

EXPLORE

Help the students to perform the activity given in 'Learning by Doing' on page 247. **[Art Integration]**

EXPLAIN

Start the revision of the exercise by using Encapsulate and Chapter Assessment.

ELABORATE

Discuss questions 1, 2 and 6 of the Chapter Assessment and accept students' answers. If they have any confusion or do any error, then explain and correct it.

EVALUATE

Classwork: Discuss questions 1, 2, 3 and 4 of the Chapter Assessment in the classroom.

Homework: Ask to solve Q5 to 7 of Chapter Assessment as homework assignment.

ORANGE

ASSIGNMENT–23

Marks Obtained: _____

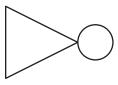
Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. Which of the following net will make a cone?



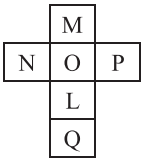
(*a*) 

(*b*) 

(*c*) 

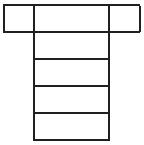
(*d*) 

2. The net shown below can be folded into the shape of a cube. The face marked with the letter L is opposite to the face marked with which letter?

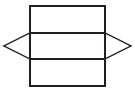


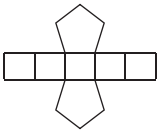
(*a*) M (*b*) N (*c*) Q (*d*) O

3. Which of the following figure/net will fold up to form a cuboid?

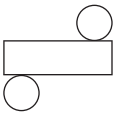
(*a*) 

(*b*) 

(*c*) 

(*d*) 

4. Which of the following shapes will be formed using given net?

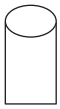


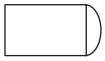
(*a*) Cube (*b*) Cylinder (*c*) Cone (*d*) Cuboid

5. What is the top view of the can shown here?



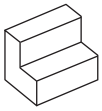
(*a*) 

(*b*) 

(*c*) 

(*d*) 

6. What is the side view of the solid given below?



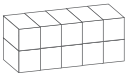
(*a*) 

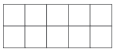
(*b*) 

(*c*) 

(*d*) 

7. What is the front view of the solid below?



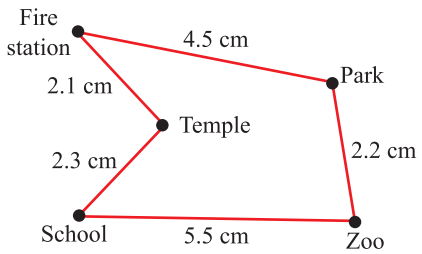
(*a*) 

(*b*) 

(*c*) 

(*d*) 

8. In the given map, the distance between the places is shown using the scale 1 cm : 0.5 km. Then the actual distance between Temple and the School is



(*a*) 1.15 km (*b*) 2.5 km

(*c*) 4.6 km (*d*) 10.5 km

ORANGE

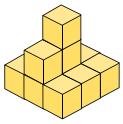
ASSIGNMENT–24

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

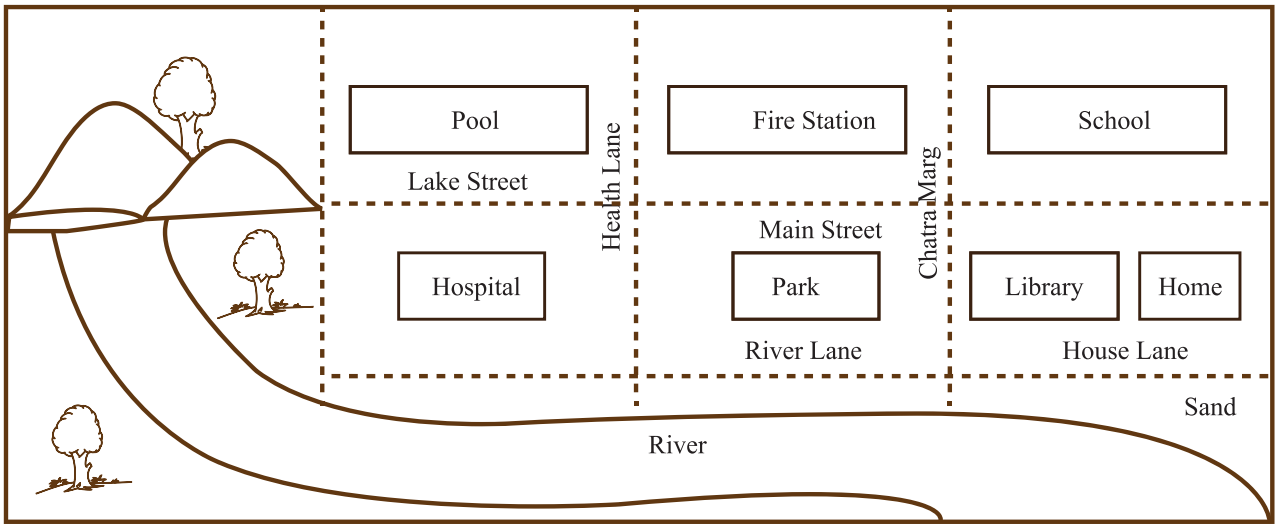
A. Fill in the blanks.

1. A solid figure with only 1 vertex is a .....
2. If 4 km on a map is represented by 1 cm, then 16 km is represented by ..... cm.
3.  is the ..... view of  .
4. The number of cubes in the given set is ..... 
5. A ..... depicts the location of a particular object/place in relation to other objects/places.

B. Label True or False.

1. The sum the number of edges and vertices of a cuboid is 20. .....
2. There is no difference between a circle and a sphere as both are round. .....
3. A cylinder is a 3-D shape having two circular faces of different radii. .....
4. A point where lines parallel to each other in 3D site appear to vanish or converge is called a vanishing point. .....
5. The upper part of a compass always shows 'North direction'. .....

C. Look at the map of city given below and do as directed.



- Colour the map using the given colour code as follows.
  Blue-water, Red-Fire station, White-Hospital, Green-Park and trees, Cream-River Bed, Brown-Mountains.
- Mark the shortest route from House to Pool with the help of arrows.
- Put X at the intersection of Chatra Marg and House Lane.



13 Data Handling

Learning Objectives

After studying this chapter, students will be able to...

- collect data related to various daily life situations.
- represent and organise the data in tabular form using tally marks.
- interpret and draw bar graphs for the given data.
- interpret and draw circle graphs (pie graph) for the given data.

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Textbook (Math Genius! 5), blackboard or whiteboard, some charts, etc.

Keywords: Data, Collection, Tally marks, Tally chart, Pictograph, Key, Bar graph, Circle graph, Pie chart etc.

Pre-requisite knowledge: Students must be familiar with data and its collection to gather the information, tabular form of data, pictograph, reading bar graph, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–2	**Topic: Data, Organising the data in tabular form or tally chart, Organising data using tally marks**	**Suggested extra teaching aids: Chalk, marker, duster, etc.** **Math Genius! 5 pages 248–252**

ENGAGE

After introduction, ask some questions based on data handling that they are already learnt in their previous classes. Like:

- What is data?
- How can we represent data?
- Why do we organise it?
- Suppose teacher wants to compare the performance of the students of Class V in various subjects, what will he/she do?

Accept the responses. Discuss 'Get Ready' and 'Let's Recall' sections given on pages 248 and 249, respectively. Introduce the topic organising the data in tabular form or tally chart.

EXPLORE

Write name of 4 favourite ice-cream flavour on board in a tabular form as follows:

Favourite ice-cream flavour	Tally marks	Number of students
Vanilla		
Chocolate		
Blueberry		
Mango		

Ask students one-by-one to come on board and mark a vertical line (|) in front of their favourite flavour. The teacher will introduce the rules for tally marks. Ask: How many of them like mango ice cream? Which flavour is liked by the most? Which flavour is liked by the least? Accept the responses. **[Experiential Learning]**

EXPLAIN

When the data is represented in a tabular form with tally marks, that table is known as a tally mark chart. The general way of writing tally marks is as a group or set of five lines. The first four lines are drawn vertically and each of the fifth line runs diagonally over the previous four vertical lines, i.e. from the top of the first line to the bottom of the fourth line.

Tally marks are the representation of numbers in bars as follows:

1 as |, 2 as ||, 3 as |||, 4 as ||||, 5 as ~~||||~~, 6 as ~~||||~~|, , 7 as ~~||||~~||, and so on.

A tally chart is a quick and easy way to count how many data or items are there in each category.

ELABORATE

Demonstrate organizing the data using the tally marks or tally chart by elaborating the examples on board by using the references given on pages 250–252 of the book. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve questions 1 and 2 of Practice Time 13A in their classwork notebook. If any student make any error, the teacher will correct and explain it.

Homework: Ask to do Q3 and 4 of Practice Time 13A in homework assignment.

ENHANCE

- Discuss 'Knowledge Desk' given on page 249.
- Ask to solve 'Think and Answer' given on page 251.

Periods: 5–6	**Topic: Reading bar graphs, Drawing a bar graph**	**Suggested extra teaching aids: Chalk, duster, square grid paper, colour pencils/ crayon, etc.** **Math Genius! 5 pages 253–256**

ENGAGE

Call two students from the class and ask them to collect the data within the class about favourite fruits of all students. Accept the responses. Introduce how can we represent this data using bar graph.

EXPLORE

Distribute square grid paper in the classroom. Instruct each group to collect the data within the class about favourite fruits, favourite sweets or favourite subjects, etc. of each student. Accept the responses and instruct each group to represent the collected data in tally mark chart/ bar graph on a paper sheet/board.

Ask: How many children like (fruits name/sweet name/ subject name) the most? Which fruit name/sweet name/subject name do they like least? Accept the responses. **[Experimental and Collaborative Learning]**

EXPLAIN

When the numeric data is represented using rectangular bars of different heights, it is called a bar graph. It is a very effective way of representing data graphically. A bar graph also helps us to compare information. In bar graph we represent data using rectangular bars of equal width. On a bar graph, the bars have equal spaces between them.

Further explain the method of drawing a bar graph to represent the data. Explain that a bar graph has: (*i*) a title (*ii*) horizontal and vertical axes (*iii*) labels on both the axes.

ELABORATE

Demonstrate how to represent data through a bar graph and how to read the information from a given bar graph. Every bar graph has:

(*a*) a title explaining the information given in the graph.
(*b*) the horizontal and the vertical axes.
(*c*) the labels explaining the meaning of each bar.
(*d*) the scale that is chosen for given data.

Focus on these terms and finding the solution by reading the bar graph through example given on page 254 of the textbook.

Further, demonstrate drawing a bar graph for the given data by using the reference given on page 255 of the textbook. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1 and 3 of Practice Time 13B.
Homework: Ask to solve Q2, 4 and 5 of Practice Time 13B.

ENHANCE

- Ask to focus on points given in 'Note' given on page 255 of the textbook.
- Motivate the class to collect more information on various things within the class. By using those data, draw more bar graphs on the board. Demonstrate the interpretation of those bar graphs.

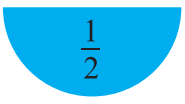
[Collaborative Learning]

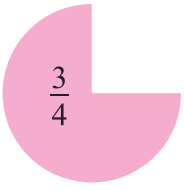
Periods: 7–8	Topic: Circle graphs	Suggested extra teaching aids: Cut-out/drawing of Circular parts, etc. Math Genius! 5 pages 257–258

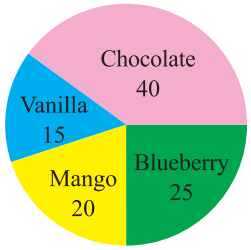
ENGAGE

Recall the fraction by showing part of the whole as follows:









And show that if we collect data of 100 students for their favourite flavour of ice-cream as we done earlier, we can also represent this data as shown here, knowing as circle graph or pie graph or chart.

EXPLORE

Ask to do the activity given in 'Learning by Doing' section on page 261 of the textbook. After finding the fractions for each of the given fruit in their notebook, ask students to try to divide a circle as per these fraction with the help of each other.

[Experimental and Collaborative Learning]

EXPLAIN

Circle graph or pie chart is another way to represent data graphically. Circle graphs show different parts of an information putting together in the form of a whole. In a circle graph (pie chart), a circle is divided into sectors (slices). Each sector represents a different part of the data as a fraction or percentage of the complete circle. The size of each sector shows, what part of the whole it is.

For constructing a circle graph for given data, first find the fractional part for each in the whole, and then construct the circle graph accordingly.

ELABORATE

Demonstrate on board, the method of constructing the circle graph in detail by using the methods and examples given on pages 257–258. **[Conceptual Learning]**

EVALUATE

Classwork: Discuss Q1 of Practice Time 13C in the classroom.

Homework: Ask to do Q2 and 3 Practice Time 13C as homework assignment.

ENHANCE

- Ask to solve 'Brain Sizzlers' given on page 259. **[Critical Thinking]**

Periods: 9–10	Topic: (Revision) Chapter Assessment	Suggested extra teaching aids: Math Genius! 5 pages 259–260

ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts/queries and start the revision of the exercise.

EXPLAIN

Start the revision of the exercise by using Encapsulate and Chapter Assessment.

ELABORATE

Discuss questions 1 and 2 of the Chapter Assessment and accept students' answers. If they have any confusion or do any error, then explain and correct it.

EVALUATE

Classwork: Ask to do Q3 and 4 of the Chapter Assessment in the classroom.

Homework: Ask to do Q5 and 6 of Chapter Assessment as homework assignment.

ENHANCE

- Ask to do the 'Project' given on page 259 of the textbook. **[Experiential Learning]**

ORANGE

ASSIGNMENT–25

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

Identify the correct answer.

1. Which of the following represents appearing of an observation 18 times in a data?

   (*a*) 𝍸 𝍸 𝍸 III (*b*) 𝍸 𝍸 𝍸 𝍸 (*c*) 𝍸 𝍸 𝍸 𝍸 (*d*) 𝍸 𝍸 IIII

Direction for question 2-3: The table shows how rats grew every year.

Time	Start	1 year	2 years	3 years	4 years	5 years	6 years
No. of rats	10	18	32	58	106		

2. After each year, the number of rats was

   (*a*) A little less than double the number of rats in the last year.

   (*b*) More than double the number of rats in the last year.

   (*c*) Double the number in the last year.

   (*d*) 8 more than the number in the last year.

3. At the end of year 6, the number of rats was close to

   (*a*) 400 (*b*) 600 (*c*) 800 (*d*) 1000

4. From the following table tell the serial number of the area from which the minimum numbers of pedestrians passed:

S. No.	Area	No. of pedestrians passed	
		Female	Male
1	From Ghadi Chowk to Jai Stambh	132	315
2	From Ghadi Chowk to Railway Station	14	286
3	From Ghadi Chowk to Shankar Nagar	15	185
4	From Ghadi Chowk to Kali Badi	22	128

   (*a*) 2 (*b*) 3 (*c*) 1 (*d*) 4

Direction for question 5-6: The bar graph shows the grades obtained by students of class V in a test.

5. If grade C is the passing mark, how many students passed the test?

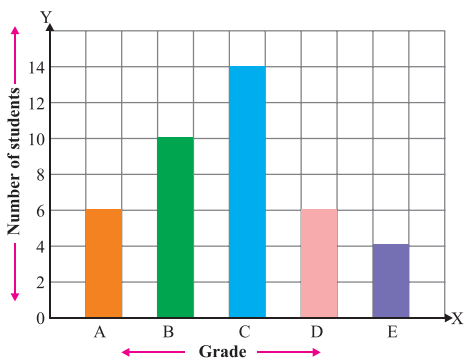
   (*a*) 10 (*b*) 14

   (*c*) 24 (*d*) 30

6. How many students in the class could not score passing grades?

   (*a*) 10 (*b*) 16

   (*c*) 22 (*d*) 26



ORANGE

ASSIGNMENT–26

Marks Obtained: _____

Student's Name: _____ Section: _____

Roll Number: _____ Date: _____

A. Complete the statements which are based on the following pictograph.

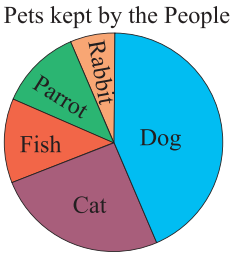
To make the pictograph 1000 children were asked about their hobbies. The children who told about their hobby, has been shown in the following pictograph. But some children did not reply.

Hobbies	Number of Children
Dancing	
Singing	
Playing	
Travelling	
Adventuring	

One represents 25 children.

1. There are ..... children whose hobby is adventuring.
2. ..... is liked by least number of children.
3. There are ..... children whose hobby is either dancing or singing.
4. There are ..... children in all who replied.
5. ..... children did not reply.

B. Label True or False the statements which are based on the given circle graph.



The pie chart shown here represents the pets kept by 80 people in the Jolly's society.

1. Dog is the most popular pet.
2. Cat and rabbit are equally liked by people.
3. Parrot is more popular pet than fish.
4. Cat, fish and parrot together are liked by as many people as dog and rabbit together liked.
5. One-fourth of the people in the society have cat.

C. Match the following.

Column I	Column II
1. A graph drawn using pictures	(*a*) Circle chart or graph
2. A graph drawn using vertical rectangles	(*b*) Tally chart
3. A graph looking as a pie	(*c*) Data
4. A table showing each item using tally marks	(*d*) Bar graph
5. A collection of facts or information	(*e*) Pictograph

ANSWERS OF THE ASSIGNMENTS

ASSIGNMENT-1

1. (*c*) **2.** (*b*) **3.** (*d*) **4.** (*d*) **5.** (*d*)
6. (*c*) **7.** (*c*) **8.** (*c*) **9.** (*b*) **10.** (*a*)
11. (*d*) **12.** (*c*) **13.** (*b*) **14.** (*b*) **15.** (*c*)

ASSIGNMENT-2

A. 1. 1 **2.** 0 **3.** 390098 **4.** 59999
5. 102345
B. 1. False **2.** False **3.** False **4.** False **5.** True
C. 1. (*e*) **2.** (*d*) **3.** (*c*) **4.** (*a*) **5.** (*b*)
D. 4768139 (Answer may vary)

ASSIGNMENT-3

1. (*d*) **2.** (*c*) **3.** (*b*) **4.** (*b*) **5.** (*c*)
6. (*a*) **7.** (*b*) **8.** (*c*) **9.** (*b*) **10.** (*d*)

ASSIGNMENT-4

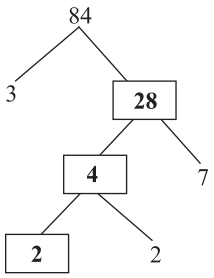
A. 1. 1 **2.** 81,00,000 **3.** 1
4. 1,00,999 **5.** 9 **6.** 1,00,00,000
B. 1. False **2.** False **3.** False **4.** True **5.** False
C. 1. (*e*) **2.** (*c*) **3.** (*d*) **4.** (*a*) **5.** (*b*)
D. 45,670 × 2143 = 97,870,810
Therefore, Siya is right.

ASSIGNMENT-5

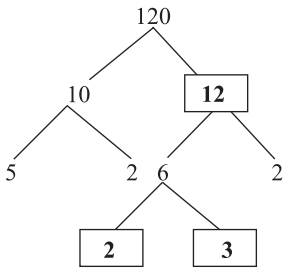
1. (*a*) **2.** (*a*) **3.** (*c*) **4.** (*a*) **5.** (*d*)
6. (*a*) **7.** (*d*) **8.** (*b*) **9.** (*a*) **10.** (*a*)
11. (*a*) **12.** (*d*) **13.** (*a*)

ASSIGNMENT-6

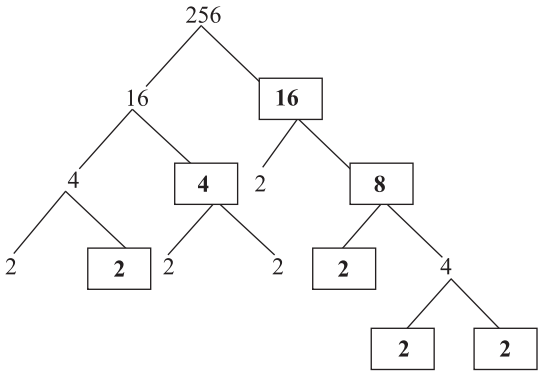
A. (*a*)



(*b*)



(*c*)



B. 1. False **2.** True **3.** True **4.** True **5.** False
C. 1. (*e*) **2.** (*a*) **3.** (*b*) **4.** (*c*) **5.** (*d*)
D. Only one pair. (45 and 360)

ASSIGNMENT-7

1. (*b*) **2.** (*a*) **3.** (*d*) **4.** (*a*) **5.** (*d*)
6. (*a*) **7.** (*d*) **8.** (*d*)

ASSIGNMENT-8

A. 1. Equivalent **2.** $\frac{50}{16}$ **3.** $\frac{7}{8}$ **4.** 6
B. 1. True **2.** False **3.** True **4.** False
C. 1. (*b*) **2.** (*c*) **3.** (*d*) **4.** (*a*)
D. HCF (16, 120) = 8
LCM (5, 15, 25) = 75
Required fraction is $\frac{8}{75}$

ASSIGNMENT-9

1. (*b*) **2.** (*a*) **3.** (*d*) **4.** (*c*) **5.** (*d*)
6. (*a*) **7.** (*b*) **8.** (*d*) **9.** (*c*) **10.** (*b*)
11. (*d*) **12.** (*a*)

ASSIGNMENT-10

A. 1. Thousandths **2.** $\frac{5}{100}$ **3.** 425.307
4. 0.82 **5.** ₹2.04
B. 1. False **2.** True **3.** False **4.** False **5.** True
C. 1. (*b*) **2.** (*e*) **3.** (*d*) **4.** (*a*) **5.** (*c*)
D. 1. Hardev's house is 0.04 km farther than Sukesh's house from the farm.
2. 4.61 acres **3.** ₹252

ASSIGNMENT-11

1. (*b*) **2.** (*a*) **3.** (*a*) **4.** (*b*) **5.** (*b*)
6. (*c*) **7.** (*d*) **8.** (*b*) **9.** (*a*)

ASSIGNMENT-12

A. 1. Two **2.** Two **3.** Eight **4.** Semicircle
5. Equilateral triangle

B. 1. False **2.** False **3.** True **4.** True **5.** True

C.

	No. of Acute angles	No. of Right angles	No. of Obtuse angles
1.	3	0	0
2.	2	1	0
3.	0	4	0
4.	2	0	2
5.	0	0	5

D. 1. Hexagon; Sides- AB, BC, CD, DE, EF, FA; Angles- ∠ABC, ∠BCD, ∠CDE, ∠DEF, ∠EFA, ∠FAB; Vertices- A, B, C, D, E, F
2. Join AE and BD. Triangles AFE, BCD; Rectangle ABDE
3. Yes, by joining ACE or BDF.

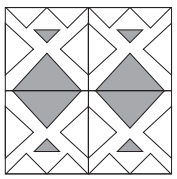
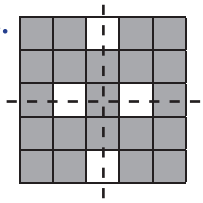
ASSIGNMENT-13

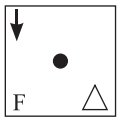
1. (*a*) **2.** (*c*) **3.** (*a*) **4.** (*b*) **5.** (*b*)

ASSIGNMENT-14

A. 1. Three **2.** Seven **3.** 2625 **4.** Four
5. 120° or 240°

B. 1. True **2.** True **3.** True **4.** False **5.** False

C. 1. 
2. 

D. 1. 

2. 6, 41

ASSIGNMENT-15

1. (*b*) **2.** (*a*) **3.** (*d*) **4.** (*b*) **5.** (*a*)
6. (*d*) **7.** (*c*) **8.** (*d*) **9.** (*c*) **10.** (*b*)
11. (*d*) **12.** (*a*)

ASSIGNMENT-16

A. 1. 1565 **2.** 0.250 **3.** 2.625 **4.** Hectolitre
5. Divided

B. 1. True **2.** True **3.** True **4.** False **5.** True

C. 1. (*c*) **2.** (*e*) **3.** (*b*) **4.** (*a*) **5.** (*d*)

D. 1. 1.1 kg **2.** 50 litres

ASSIGNMENT-17

1. (*c*) **2.** (*b*) **3.** (*d*) **4.** (*a*) **5.** (*b*)
6. (*c*) **7.** (*d*) **8.** (*a*)

ASSIGNMENT-18

A. 1. Thermometer **2.** 30,000 **3.** 600 **4.** 10 a.m.
5. 06:00 hours

B. 1. False **2.** True **3.** True **4.** True **5.** False

C. 1. (*d*) **2.** (*a*) **3.** (*e*) **4.** (*b*) **5.** (*c*)

D. 1. 11 days **2.** 11 hours 55 minutes

ASSIGNMENT-19

1. (*c*) **2.** (*b*) **3.** (*d*) **4.** (*a*) **5.** (*c*)
6. (*b*) **7.** (*d*) **8.** (*b*) **9.** (*a*) **10.** (*c*)
11. (*a*) **12.** (*c*)

ASSIGNMENT-20

A. 1. ₹52 **2.** 10 **3.** Profit **4.** Loss
5. 36 pages

B. 1. True **2.** False **3.** False **4.** True **5.** True

C. 1. (*d*) **2.** (*e*) **3.** (*a*) **4.** (*c*) **5.** (*b*)

D. (*d*) ₹2426

ASSIGNMENT-21

1. (*c*) **2.** (*a*) **3.** (*d*) **4.** (*b*) **5.** (*c*)
6. (*b*) **7.** (*a*) **8.** (*c*) **9.** (*c*) **10.** (*a*)
11. (*b*)

ASSIGNMENT-22

A. 1. Area = Length × Breadth **2.** Perimeter, 46 feet
3. 130 **4.** 1300

B. 1. True **2.** False **3.** False **4.** True **5.** True

C. 1. (*b*) **2.** (*d*) **3.** (*a*) **4.** (*c*)

D. Perimeter = 360 cm, Area = 3600 sq cm

ASSIGNMENT-23

1. (*b*) **2.** (*a*) **3.** (*a*) **4.** (*b*) **5.** (*d*)
6. (*b*) **7.** (*a*) **8.** (*a*)

ASSIGNMENT-24

A. 1. Cone **2.** 4 **3.** Top **4.** 12 **5.** Map

B. 1. True **2.** False **3.** False **4.** True **5.** True

C. Do it yourself.

ASSIGNMENT-25

1. (*a*) **2.** (*a*) **3.** (*a*) **4.** (*d*) **5.** (*b*)
6. (*d*)

ASSIGNMENT-26

A. 1. 75 **2.** Adventuring **3.** 350 **4.** 825
5. 175

B. 1. True **2.** False **3.** False **4.** True **5.** True

C. 1. (*e*) **2.** (*d*) **3.** (*a*) **4.** (*b*) **5.** (*c*)

DETAILED SOLUTIONS

CHAPTER 1 : LARGE NUMBERS

Let's Recall

1. Distance between the earth and the moon = 384400 km.

Number name: Three lakh eighty-four thousand four hundred.

2. Largest 6-digit number = 999999.

Smallest 6-digit number = 100000.

3. (*a*) 754894 = Seven lakh fifty-four thousand eight hundred ninety-four.

(*b*) 500489 = Five lakh four hundred eighty-nine.

4. (*a*) Eight lakh forty-seven thousand one = 8,47,001.

(*b*) Nine lakh ninety-nine thousand nine hundred ninety-nine = 9,99,999.

5. (*a*) Given number = 424781.

Face value = 2, Place value = 20000.

(*b*) Given number = 875014.

Face value = 0, Place value = 0

6. 540789 > 507489

540789 is greater.

Practice Time 1A

1. We arrange the given numbers in the value chart in the following way.

	Crores	Lakhs		Thousand		Ones		
	C	TL	L	TTh	Th	H	T	O
(*a*)		4	6	3	4	5	6	1
(*b*)		4	0	5	6	2	4	9
(*c*)	7	7	3	2	6	4	3	4
(*d*)	8	7	9	2	8	0	4	3
(*e*)	7	3	0	3	8	9	6	3
(*f*)			5	4	5	8	6	4

Number name

(*a*) Forty-six lakh thirty-four thousand five hundred sixty-one.

(*b*) Forty lakh fifty-six thousand two hundred forty-nine.

(*c*) Seven crore seventy-three lakh twenty-six thousand four hundred thirty-four.

(*d*) Eight crore seventy-nine lakh twenty-eight thousand forty-three.

(*e*) Seven crore thirty lakh thirty-eight thousand nine hundred sixty-three.

(*f*) Five lakh forty-five thousand eight hundred sixty-four.

2. (*a*) Five lakh thirty-four thousand nine hundred forty-eight = 5,34,948.

(*b*) Fifty lakh seventy thousand six hundred ninety-four = 50,70,694.

(*c*) Six crore sixty-six lakh twenty-four thousand four hundred twelve = 6,66,24,412.

(*d*) Seven crore seventy-three thousand sixteen = 7,00,73,016.

3. (*a*) 78,54,475 = Seventy-eight lakh fifty-four thousand four hundred seventy-five.

(*b*) 7,98,76,560 = Seven crore ninety-eight lakh seventy-six thousand five hundred sixty.

(*c*) 8,00,78,004 = Eight crore seventy-eight thousand four.

(*d*) 5,76,54,323 = Five crore seventy-six lakh fifty-four thousand three hundred twenty-three.

(*e*) 6,00,52,902 = Six crore fifty-two thousand nine hundred two.

(*f*) 5,99,34,230 = Five crore ninety-nine lakh thirty-four thousand two hundred thirty.

4. Ones = 1, tens = 40, hundreds = 900, thousands = 7000, ten thousands = 80000, lakhs = 700000, ten lakhs = 6000000, crores = 10000000.

Think and Answers (Page 11)

Given number is 6708813. The smallest digit having the same place value and face value is 0.

Practice Time 1B

1. (*a*)

L	TTh	Th	H	T	O
5	2	4	5	7	4

Place value $7 \times 10 = 70$

(*b*)

TL	L	TTh	Th	H	T	O
2	9	6	6	4	1	3

Place value $6 \times 1000 = 6000$

(*c*)

TL	L	TTh	Th	H	T	O
6	4	9	6	4	0	1

Place value
4 × 100000 = 400000

(*d*)

C	TL	L	TTh	Th	H	T	O
2	0	0	4	2	0	0	2

Place value
0 × 100000 = 0

(*e*)

C	TL	L	TTh	Th	H	T	O
7	8	8	7	7	7	2	3

Place value
7 × 10000000 = 70000000

(*f*)

C	TL	L	TTh	Th	H	T	O
4	3	8	4	8	9	6	0

Place value
8 × 100000 = 800000

(*g*)

L	TTh	Th	H	T	O
1	3	4	0	5	3

Place value
0 × 100 = 0

(*h*)

TL	L	TTh	Th	H	T	O
5	4	3	9	8	1	4

Place value
5 × 1000000 = 5000000

(*i*)

TL	L	TTh	Th	H	T	O
8	4	7	0	3	2	9

Place value
7 × 10000 = 70000

2. Given numbers = 8642819.

Place value of digit 8 = 8000000.

Place value of digit 8 = 800.

Difference = 8000000 – 800 = 7999200.

3. Place value of 6 in 76458 = 6 × 1000 = 6000.

Place value of 6 in 611389 = 6 × 100000 = 600000.

Sum of the place values = 6000 + 600000

= 606000.

4. (*a*) Given number = 2684503.

Predecessor = 2684203 – 1 = 2684502.

Successor = 2684503 + 1 = 2684504.

(*b*) Given number = 7095205.

Predecessor = 7095205 – 1 = 7095204.

Successor = 7095205 + 1 = 7095206.

(*c*) Given number = 5598005.

Predecessor = 5598005 – 1 = 5598004.

Successor = 5598005 + 1 = 5598006.

(*d*) Given number = 4030200.

Predecessor = 4030200 – 1 = 4030199.

Successor = 4030200 + 1 = 4030201.

(*e*) Given number = 67600542.

Predecessor = 67600542 – 1 = 67600541.

Successor = 67600542 + 1 = 67600543.

(*f*) Given number = 90908032.

Predecessor = 90908032 – 1 = 90908031.

Successor = 90908032 + 1 = 90908033.

(*g*) Given number = 30540320.

Predecessor = 30540320 – 1 = 30540319.

Successor = 30540320 + 1 = 30540321.

(*h*) Given number = 88732101.

Predecessor = 88732101 – 1 = 88732100.

Successor = 88732101 + 1 = 88732102.

5. (*a*) Given number = 77856432.

C	TL	L	TTh	Th	H	T	O
7	7	8	5	6	4	3	2

Place value
2 × 1 = 2
3 × 10 = 30
4 × 100 = 400
6 × 1000 = 6000
5 × 10000 = 50000
8 × 100000 = 800000
7 × 1000000 = 7000000
7 × 10000000 = 70000000

Expanded form of 77856432

= 70000000 + 7000000 + 800000 + 50000 + 6000 + 400 + 30 + 2.

(*b*) Given number = 95678981.

C	TL	L	TTh	Th	H	T	O
9	5	6	7	8	9	8	1

Place value

$1 \times 1 = 1$

$8 \times 10 = 80$

$9 \times 100 = 900$

$8 \times 1000 = 8000$

$7 \times 10000 = 70000$

$6 \times 100000 = 600000$

$5 \times 1000000 = 5000000$

$9 \times 10000000 = 90000000$

Expanded form of 95678981
= 90000000 + 5000000 + 600000 + 70000 + 8000 + 900 + 80 + 1.

(*c*) Given number = 7340718.

TL	L	TTh	Th	H	T	O
7	3	4	0	7	1	8

Place value

$8 \times 1 = 8$

$1 \times 10 = 10$

$7 \times 100 = 700$

$0 \times 1000 = 0000$

$4 \times 10000 = 40000$

$3 \times 100000 = 300000$

$7 \times 1000000 = 7000000$

Expanded form of 7340718
= 7000000 + 300000 + 40000 + 0 + 700 + 10 + 8.

(*d*) Given number = 86987655.
Expanded form of 86987655
= 80000000 + 6000000 + 900000 + 80000 + 7000 + 600 + 50 + 5.

(*e*) Given number = 37898762.
Expanded form of 37898762
= 30000000 + 7000000 + 800000 + 90000 + 8000 + 700 + 60 + 2.

(*f*) Given number = 8499385.
Expanded form of 8499385
= 8000000 + 400000 + 90000 + 9000 + 300 + 80 + 5.

(*g*) Given number = 76259005.
Expanded form of 76259005
= 70000000 + 6000000 + 200000 + 50000 + 9000 + 000 + 00 + 5.

(*h*) Given number = 45600282.
Expanded form of 45600282
= 40000000 + 5000000 + 600000 + 00000 + 0000 + 200 + 80 + 2.

(*i*) Given number = 9983451.
Expanded form of 9983451
= 9000000 + 900000 + 80000 + 3000 + 400 + 50 + 1.

6. Combining the place values of the digits, we get

(*a*) 80000000 + 40000 + 6000 + 50 + 3 = 80046053.

(*b*) 70000000 + 70000 + 4000 + 500 + 2
= 70074502.

(*c*) 9000000 + 50000 + 9000 + 300 + 4 = 9059304.

(*d*) 5000000 + 900000 + 8000 + 70 + 3 = 5908073.

(*e*) 40000000 + 400000 + 5000 + 2 = 40405002.

Practice Time 1C

1. (*a*) Place both the numbers in the place value chart.
Here, both numbers have 6 digits.
So, we compare the left-most digits of both numbers.
Since, 8 > 7.

L	TTh	Th	H	T	O
8	0	5	6	3	7
7	0	7	6	5	6

Hence, 805637 > 707656.

(*b*) Place both the numbers in the place value chart.
Clearly, the given numbers are of 7-digit and 6-digit numbers, respectively.

TL	L	TTh	Th	H	T	O	
2	0	5	6	9	5	3	→ 7-digit
	2	0	6	0	7	5	→ 6-digit

Thus, 2056953 > 206075.

(*c*) Place both the numbers in the place value chart.
Both numbers are of 7-digits.
So, first, we compare the left-most digits of the two given numbers.

First left-most digits are same, *i.e.*, 8.

Now, compare second left-most digits.

Second, third and fourth left-most digit are also now, comparing fifth left most digit, here 7 < 9.

TL	L	TTh	Th	H	T	O
8	6	7	0	7	5	7
8	6	7	0	9	5	4

Same — Different (7 < 9)

So, 8670757 < 8670954

(*d*) 44524017 > 44324017 (Same as above).

(*e*) 42003600 = 42003600 (Same as above).

(*f*) 79000000 < 79999999 (Same as above).

2. (*a*) Let us arrange the given numbers in the place value chart.

Here, we can see that there are three 7-digit numbers and one 6-digit number clearly, the 6-digit number is the smallest. In the 7-digit numbers, 7324545 < 7825216 < 8654627.

TL	L	TTh	Th	H	T	O	
	8	6	3	5	3	2	6-digit
8	6	5	4	6	2	7	7-digit
7	8	2	5	2	1	6	7-digit
7	3	2	4	5	4	5	7-digit

So, the ascending order of the numbers are:

863532, 7324545, 7825216, 8654627

Same as above.

(*b*) 2000413, 2050009, 2500496, 5231761

(*c*) 6954521, 6954524, 6954530, 6954544

(*d*) 7546321, 7546325, 7546452, 7546542

3. (*a*) First, we arrange the given numbers in the place value chart and then start comparing.

Clearly, 97479 is the greatest number and 75959 is the smallest number.

Also, 76049 is greater than 75959.

TTh	Th	H	T	O
8	7	9	7	6
7	6	0	4	9
7	5	9	5	9
9	7	4	7	9

Same; < ; >

So, 97479 > 87976 > 76049 > 75959.

Same as above.

(*b*) 654675, 528781, 453170, 452678

(*c*) 9400045, 7983678, 7893569, 798667

(*d*) 98645321, 9865021, 9864542, 9864521

4. Smallest digit is 3 (other than 0).

And the other digits in ascending order are 5, 6, 7, and 8.

So, the smallest number formed by the given digits is 305678.

Here, the largest digit from the given digits is 8.

So, the largest number formed by the given digits is 876530.

Thus, smallest number = 305678 and largest number = 876530

5. Smallest digit is 1 (other than 0)

And the other digits in ascending order are 4, 5, 6, 7, 8, 9.

So, the smallest number formed by the given digits is 10456789.

Here, the largest digit from the given digits is 9.

And the other digits in descending order are 8, 7, 6, 5, 4, 1, 0.

So, the largest number formed by the given digits is 98765410.

Thus, smallest number = 10456789 and largest number = 98765410.

6. (*a*) To form the greatest 7-digit number using the given digits, repeat the greatest digit 7 thrice.

Thus, the greatest 7-digit number formed using the given digits is 7775420.

To form the smallest 7-digit number using the given digits, repeat the smallest digit 0 thrice.

Thus, the smallest 7-digit number formed using the given digits is 2000457.

Hence, greatest number = 7775420 and smallest number = 2000457.

(*b*) To form the greatest 7-digit number using the given digits, repeat the greatest digit 9 four times.
Thus, the greatest 7-digit number formed using the given digits is 9999756.
To form the smallest 7-digit number using the given digits, repeat the smallest digit 5 four times.
Thus, the smallest 7-digit number formed using the given digits is 5555679.
Hence, greatest number = 9999756 and smallest number = 5555679.

(*c*) 7777320, 2000037

(*d*) 9999953, 3333359

Think and Answer (Page 19)

We know that 1 million = 10 lakhs

$\therefore$ 10 million = 10 × 10 = 100 lakhs

Practice Time 1D

1. (*a*) Sixty-five million twenty-eight thousand one hundred seven = 65,028,107.

(*b*) Eighty-two million two hundred forty-five thousand =82,245,000.

(*c*) Fifty-nine million one hundred six thousand three hundred seven = 59,106,307.

(*d*) Forty million ninety-three thousand four hundred six = 40,093,406.

(*e*) Seventy-two million seven thousand seven hundred = 72,007,700.

(*f*) Ninety-eight million nine hundred ninety-nine thousand ninety-nine = 98,999,099.

2.

	Millions		Thousands			Ones			Number name
	TM	M	HTh	TTh	Th	H	T	O	
(*a*)	2	5	8	9	0	4	6	7	Twenty-five million eight hundred ninety thousand four hundred sixty-seven.
(*b*)	4	3	8	6	5	8	9	0	Forty-three million eight hundred sixty-five thousand eight hundred ninety.
(*c*)		5	0	7	0	0	0	6	Five million seventy thousand six.
(*d*)	5	2	8	0	0	5	3	1	Fifty-two million eight hundred thousand five hundred thirty-one.
(*e*)		6	1	0	0	7	8	2	Six million one hundred thousand seven hundred eighty-two.
(*f*)	2	0	2	0	0	2	0	0	Twenty million two hundred thousand two hundred.

3. (*a*) 7,89,87,656 = 78,987,656.

(*b*) 8,90,07,650 = 89,007,650.

(*c*) 8,00,04,905 = 80,004,905.

(*d*) 75,40,565 = 7,540,565.

(*e*) 9,54,93,207 = 95,493,207.

(*f*) 3,48,96,705 = 34,896,705.

4. (*a*) 1000 thousands = 1 million

(*b*) 100 lakhs = 10 millions

(*c*) 10 millions = 1 crore

(*d*) 100 thousands = 1 lakh

Practice Time 1E

1. (*a*) In 75, the digit at ones place is 5, which is equal to 5.
So, we increase the digits at tens place by 1 and replace the digit at ones place by 0.
Thus, 75 becomes 80 after rounding off to the nearest 10.

(*b*) In 247, the digit at ones place is 7, which is greater than 5.
So, we increase the digits at tens place by 1 and replace the digit at ones place 0.
Thus, 247 becomes 250 after rounding off to the nearest 10.

(*c*) Same as (*a*) and (*b*).

(*d*) In 4242, the digit at ones place is 2, which is less than 5. So, we replace the digit at ones place by 0. Thus, 4242 becomes 4240 after rounding off to nearest 10.

(*e*) to (*h*) — (Same as above).

2. (*a*) In 414, the digit at tens place is 1, which is less than 5.
So, we replace the digit at tens place and ones place by 0.
Thus, 414 becomes 400 after rounding off to the nearest 100.
(*b*) In 584, the digit at tens place is 8, which is greater than 5.
So, we increase the digit at hundred place by 1 and replace tens and ones digits by 0.
Thus, 584 becomes 600 after rounding off to the nearest 100.
(*c*) In 7650, the digit at tens place is 5, which is equal to 5.
So, we increase the digit at hundred place by 1 and replace tens and ones digits by 0.
Thus, 7650 becomes 7700 after rounding off to the nearest 100.
(*d*) to (*h*) — (Same as above).

3. (*a*) In 9373, the digit at hundreds place is 3, which is less than 5.
So, we replace the digit at hundred, tens and ones digit by 0.
Thus, 9373 becomes 9000 after rounding off to the nearest 1000.
(*b*) In 8720, the digit at hundreds place is 7, which is greater than 5.
So, we increase the digits at thousands place by 1 and replace hundreds, tens and ones by 0.
Thus, 8720 becomes 9000 after rounding off to the nearest 1000.
(*c*) In 107898, the digit at hundreds place is 8, which is greater than 5.
So, we increase the digits at thousands place by 1 and replace hundreds, tens and ones digit by 0.
Thus, 107898 becomes 108000 after rounding off to the nearest 1000.
(*d*) to (*h*) — (Same as above).

4. (*a*) (*i*) In 52670 becomes 52670 after rounding off to the nearest 10.
(*ii*) In 52670, the digit at tens place is 7, which is greater than 5.
So, we increase the digit at hundreds place by 1 and replace tens and ones place by 0.
Thus, 52670 becomes 52700 after rounding off to the nearest 100.
(*iii*) In 52670, the digit at hundreds place is 6, which is greater than 5.
So, we increase the digit at hundreds place by 1 and replace hundreds, tens and ones place by 0.
Thus, 52670 becomes 53000 after rounding off to the nearest 1000.
(*b*) (*i*) In 37645, the digit at ones place is 5, which is equal to 5.
So, we increase the digit at tens place by 1 and replace ones place by 0.
Thus, 37645 becomes 37650 after rounding off to the nearest 10.
(*ii*) In 37645, the digit at tens place is 4, which is less than 5.
So, we replace the digit at tens and ones place by 0.
Thus, 37645 becomes 37600 after rounding off to the nearest 100.
(*iii*) In 37645, the digit at hundreds place is 6, which is greater than 5.
So, we increase the digit at thousands place by 1 and replace hundreds, tens and ones digit by 0.
Thus, 37645 becomes 38000 after rounding off to the nearest 1000.
(*c*) to (*h*) — (Same as above).

Practice Time 1F

1. (*a*) 328 = 300 + 10 + 10 + 8 = CCCXXVIII.
(*b*) 518 = 500 + 10 + 8 = DXVIII.
(*c*) 892 = 500 + 100 + 100 + 100 + 90 + 2
= DCCCXCII.
(*d*) 2090 = 1000 + 1000 + 90 = MMXC.
(*e*) 785 = 500 + 100 + 100 + 50 + 10 + 10 + 10 + 5 = DCCLXXXV.
(*f*) 1600 = 1000 + 500 + 100 = MDC.

2. (*a*) XXXV = 10 + 10 + 10 + 5 = 35.
(*b*) LXXIII = 50 + 10 + 10 + 3 = 73.
(*c*) VII = 5 + 1 + 1 = 7.
(*d*) MIX = 1000 + 9 = 1009.
(*e*) CLXV = 100 + 50 + 10 + 5 = 165.
(*f*) MXXXIV = 1000 + 10 + 10 + 10 + 4 = 1034.

3. (*a*) CDIV = (500 – 100) + 4 = 404 < 406.
∴ CDIV < 406.

(*b*) CCCXC = 100 + 100 + 100 + (100 – 10)
= 300 + 90 = 390 > 380.
∴ CCCXC > 380.

(*c*) CMXC = (1000 – 100) + (100 – 10)
= 900 + 90 = 990.
∴ CMXC = 990.

(*d*) CDVIII = (500 – 100) + 5 + 3.
= 400 + 8 = 408 > 208.
∴ CDVIII > 208.

(*e*) CCCLXXXVI = 100 + 100 + 100 + 50 + 10 + 10 + 10 + 5 + 1 = 386 = 386.
∴ CCCLXXXVI = 386.

(*f*) CLXV = 100 + 50 + 10 + 5 = 165 < 168
∴ CLXV < 168.

4. (*b*), (*c*), (*d*), (*e*) and (*f*) are meaning less.

5. (*a*) Born in Porbandar, Gujrat - 1869
= MDCCCLXIX.

(*b*) Married to Kasturba Gandhi - 1883
= MDCCCLXXXIII.

(*c*) Started the boycott of British goods and non-co-operation movement - 1920 = MCMXX.

(*d*) Lead the salt March in Dandi - 1930
= MCMXXX.

(*e*) Launched the Quit India movement - 1942
= MCMXLII.

(*f*) Kasturba Gandhi died - 1944 = MCMXLIV.

(*g*) Gandhiji was assassinated in Delhi - 1948
= MCMXLVIII.

Mental Maths (Page 25)

1. (*d*) The number of zeros in 100 million are 8.

2. (*b*) LXXX + LXX + LX + L = 80 + 70 + 60 + 50
= 260.

3. (*c*) V

4. (*d*) MXLV = 1000 + 40 + 5 = 1045.
Predecessor of 1045 = 1045 – 1 = 1044.
∴ Predecessor of MXLV = 1044.

5. (*b*) CDXXI = (500 – 100) + 10 + 10 + 1 = 421.
Successor of 421 = 421 + 1 = 422.

6. (*a*) 80 lakhs = 8 millions. [∵ 10 lakhs = 1 million]

Maths Connect (Page 25)

Ascending order:
84580777 < 104099452 < 112374333 < 199812341.
Thus, the states in ascending order according to their population are as follows:
Andhra Pradesh < Bihar < Maharashtra < Uttar Pradesh.

Descending order:
199812341 > 112374333 > 104099452 > 184580777.
Thus, the states in descending order according to their population are as follows:
Uttar Pradesh > Maharashtra > Bihar > Andhra Pradesh.

Maths Fun (Page 25)

1. IX – V = IV.
2. VII – IV = III.
3. XI – V = VI.
4. III + IV = VIII.

Chapter Assessment

1. (*a*) - (*ii*) Thirty-three million seven hundred sixty-nine thousand fourteen
= 33,769,014.
Smallest place value = 0.

(*b*) - (*iii*) CCCLX + MDL = 100 + 100 + 100 + 50 + 10 = 360.
MDL = 1000 + 500 + 50
= 1550.
CCCLX + MDL = 360 + 1550
= 1910 = MCMX.

(*c*) - (*iv*) 500

(*d*) - (*iii*) To form the greatest 8-digit number using the given digits, repeat the digit 1 thrice, 8 fourth and 6 ones.
Thus, the greatest 8-digit number formed using the given digits is 88886111.

2. To form the largest 7-digit even number using the given digits, repeat the digit 8 twice.
So, the largest 7- digit even number formed using the given digits is 9985314.
∴ Predecessor of 9985314 = 9985314 – 1
= 9985313.

3. In the number 6708813, the smallest digit having the same place value and face value is 0.

4. 100 thousands are in 1 lakh.

5. 10000 thousand make 10 million.

6. Let the number 5123.
5123 rounding off to the nearest 10 = 5120.
5123 rounding off to the nearest 100 = 5100.
5123 rounding off to the nearest 1000 = 5000.
Thus, rounds off a number to the nearest 1000, she will get the smallest number.

7. IM and VX roman numbers do not make sense.

8. Radius of Earth = 6400 km = 6400000 m.
Radius of Mars = 3390000 m.
Difference between the radius of Earth and Mars
= (6400000 – 3390000) m = 3010000 m
Hence, Radius of Earth is bigger.

9. Shweta's mother paid for a toy = DCCX = 500 + 100 + 100 + 10 = ₹710.
Discount on toy = CXV = 100 + 10 + 5 = ₹115.
So, teddy bear cost = 710 – 115 = 595.
Roman numbers of 595 = DXCV.

10. Number of Saplings = MMMDCCLXXXII.
= 1000 + 1000 + 1000 + 500 + 100 + 100 + 50 + 10 + 10 + 10 + 2 = 3,782.
Indian system of numeration: Three thousand seven hundred eighty-two.
International system of numeration: Three thousand seven hundred eighty-two.

CHAPTER 2 : OPERATIONS ON LARGE NUMBERS

Let's Recall

1.

	L	TTh	Th	H	T	O
	(1)		(2)	(1)	(1)	
Number of toys produced in October =		2	2	4	6	6
Number of toys produced in September =	1	9	0	8	9	5
Number of toys produced in November = +	2	0	5	7	2	5
Total number of toys produced in three months =	4	1	9	0	8	6

Thus, 4,19,086 toys produced in three months.

2.

	TL	L	TTh	Th	H	T	O
		(11)	(12)				
	(6)	(1)	(2)	(11)		(6)	(12)
Total population of town =	7	2	3	1	5	7	2
Population of men in the town = –	4	7	9	7	2	3	7
Population of women in the town =	2	4	3	4	3	3	5

Thus, population of women of the town is 24, 34, 335.

3.

	C	TL	L	TTh	Th	H	T	O
					(1)		(1)	
					(2)	(1)	(3)	
					(2)	(1)	(2)	
Number of bedsheets produced in one day =				3	0	4	2	5
Number of bedsheets produce in one year = 365 days = ×						3	6	5
	(1)	(1)	(1)	(1)	(1)			
Total population of town =			1	5	2	1	2	5
		1	8	2	5	5	0	0
+		9	1	2	7	5	0	0
	1	1	1	0	5	1	2	5

Thus, 1,11,05,125 bedsheets will produce in one year.

4.
$$\begin{array}{r} 28 \\ 1895\overline{)\,53060} \\ -\,3790 \\ \hline 15160 \\ -\,15160 \\ \hline 0 \end{array}$$
Quotient; Remainder

Thus, the rate of rice per kg is ₹28.

Think and Answer (Page 29)

Greatest 9-digit number = 99,99,99,999
Smallest 9-digit number = 10,00,00,000
Their sum = 1,09,99,99,999
Thus, there are 10 digits in the sum.

Practice Time 2A

1. (*a*)

	C	TL	L	TTh	Th	H	T	O
	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
		7	8	6	7	8	9	4
+		2	9	5	3	5	0	7
	1	0	8	2	1	4	0	1

Thus, 78,67,894 + 29,53,507
= 1,08,21,401

(*b*)

	C	TL	L	TTh	Th	H	T	O
	(1)	(1)	(1)	(1)	(1)	(1)		
		9	8	6	7	8	4	9
+		3	4	5	3	5	7	0
	1	3	3	2	1	4	1	9

Thus, 98,67,849 + 34,53,570
= 1,33,21,419

(*c*)

	C	TL	L	TTh	Th	H	T	O
	(1)		(1)	(1)	(1)			
		6	0	6	9	8	9	0
+		8	4	5	9	5	0	9
	1	4	5	2	9	3	9	9

Thus, 60,69,890 + 84,59,509
= 1,45,29,399

(*d*)

	TL	L	TTh	Th	H	T	O
	(1)	(1)		(1)	(1)	(1)	
	7	9	8	0	0	3	7
+		6	7	8	9	8	7
	8	6	5	9	0	2	4

Thus, 79,80,037 + 6,78,987
= 86,59,024

(*e*)

	L	TTh	Th	H	T	O
	(2)	(2)	(2)	(1)	(1)	
	2	8	6	9	7	3
	1	7	6	9	5	6
+	2	9	8	7	6	5
	7	6	2	6	9	4

Thus, 2,86,973 + 1,76,956 + 2,98,765
= 7,62,694

(*f*)

		L	TTh	Th	H	T	O
		(1)	(1)	(1)	(2)	(1)	
		8	7	5	0	3	4
		3	1	5	6	8	2
+		4	5	6	7	8	9
	1	6	4	7	5	0	5

Thus, 8,75,034 + 3,15,682 + 4,56,789
= 16,47,505

2. (*a*)

	TL	L	TTh	Th	H	T	O
	(1)	(1)	(1)	(1)	(1)		
	3	7	5	8	4	9	1
+	4	2	4	5	7	8	1
	8	0	0	4	2	7	2

Thus, 37,58,491 + 42,45,781
= 80,04,272

(*b*)

	C	TL	L	TTh	Th	H	T	O
							(1)	
	2	2	4	3	2	6	4	6
+	4	4	2	2	3	1	1	6
	6	6	6	5	5	7	6	2

Thus, 2,24,32,646 + 4,42,23,116
= 6,66,55,762

(*c*) to (*f*) — (Same as above).

3. (*a*)

	5	4	**3**	6	8
+	**6**	3	8	**3**	2
1	1	**8**	2	0	0

(*b*)

6	3	4	3	6	8
+	**4**	9	**3**	**6**	4
6	8	**3**	7	3	**2**

(*c*)

7	2	6	4	3	8
+ **2**	5	4	8	**4**	**3**
9	**8**	**1**	**2**	8	1

(*d*) to (*f*) — (Same as above).

4. (*a*) 4326 + 26458 = 26458 + 4326

(*b*) 436483 + 71364 = 71364 + 436483

(*c*) 56436 + 0 = 56436

(*d*) 0 + 364834 = 364834

(*e*) 249368 + 1 = 249369

5. (*a*)

	TL	L	TTh	Th	H	T	O
		(1)	(1)	(1)	(1)	(1)	
Number of toy cars manufactured in 2021 =			5	7	8	9	4
Number of toy cars manufactured in 2022 = +		9	8	7	3	7	9
Total number of toy cars manufactured in both years =	1	0	4	5	2	7	3

Thus, 10,45,273 toy cars manufactured by the factory in these two years.

(*b*)

	L	TTh	Th	H	T	O
	(1)	(1)	(2)	(1)		
Number of boys passed in the examination =		7	2	5	8	0
Number of girls passed in the examination =		3	7	9	8	7
Number of boys failed in the examination =			7	4	0	0
Number of girls failed in the examination = +			2	5	0	0
Number of students enrolled in the examination =	1	2	0	4	6	7

Thus, 1,20,467 students enrolled in the examination.

(*c*)

	L	TTh	Th	H	T	O
	(1)	(1)	(2)	(1)	(1)	
Number of people visited in the zoo in January =		9	7	9	3	2
Number of people visited in the zoo in February =		7	5	3	0	7
Number of people visited the zoo in March = +	1	0	5	9	7	5
Total number of people visited the zoo in these three months =	2	7	9	2	1	4

Thus, 2,79,214 people visited the zoo in these three months.

(*d*)

	L	TTh	Th	H	T	O
	(1)	(1)				
A postal van has letters =		7	5	6	0	3
Another van has letters = +		7	8	3	0	0
Total letters in the two postal vans =	1	5	3	9	0	3

Thus, 1,53,903 letters are there in the two postal vans.

(*e*)

	TC	C	TL	L	TTh	Th	H	T	O
	(1)	(1)	(1)	(2)	(1)	(1)	(2)	(1)	
Population of Uttar Pradesh in 2011 =	2	4	1	0	6	6	8	7	4
Population of Maharashtra in 2011 =	1	2	9	8	7	7	5	4	1
Population of Rajasthan in 2011 = +		8	0	7	8	2	4	9	5
Total population of the three states =	4	5	1	7	2	6	9	1	0

Thus, 45,17,26,910 is the total population of the three states.

Think and Answer (Page 32)

	TC	C	TL	L	TTh	Th	H	T	O
Greatest 9-digit number =	9	9	9	9	9	9	9	9	9
Smallest 9-digit number = –	1	0	0	0	0	0	0	0	0
Their difference =	8	9	9	9	9	9	9	9	9

Think and Answer (Page 33)

Sum of 88888 and 33333 = 122221

	L	TTh	Th	H	T	O
		(1)	(1)	(1)	(1)	
		8	8	8	8	8
+		3	3	3	3	3
	1	2	2	2	2	1

Required number = 122221 – 3676 = 118545

	L	TTh	Th	H	T	O
	1	2	2	2	2	1
–			3	6	7	6
	1	1	8	5	4	5

Think and Answer (Page 33)

Given number = 8 5 2 3 5 5 8 6

Place values of 5s = 5000000, 5000, 500

Sum of place values of 5s = 5000000 + 5000 + 500 = 5005500

Again, given number = 8 5 2 3 5 5 8 6

Place values of 8s = 80000000, 80

Sum of place values of 8s = 80000000 + 80 = 80000080

Subtract the sum of place values of 5s from the sum of place values of 8s = 80000080 – 5005500 = 7,49,94,580

Practice Time 2B

1. (*a*)

	TL	L	TTh	Th	H	T	O
		(18)					
	(2)	(8)	(15)		(5)	(12)	
	~~3~~	~~9~~	~~5~~	4	~~6~~	~~2~~	1
–	2	9	6	3	5	4	0
	0	9	9	1	0	8	1

Thus, 39,54,621 – 29,63,540 = 9,91,081

(*b*)

	C	TL	L	TTh	Th	H	T	O
		(11)						
	(3)	(1)	(15)					
	~~4~~	~~2~~	~~5~~	9	8	9	7	3
–	1	7	8	3	4	7	0	2
	2	4	7	6	4	2	7	1

Thus, 4,25,98,973 – 1,78,34,702 = 2,47,64,271

(*c*)

	TL	L	TTh	Th	H	T	O
			(9)	(11)	(10)	(11)	
		(7)	(10)	(1)	(0)	(1)	(13)
	5	~~8~~	~~0~~	~~2~~	~~1~~	~~2~~	~~3~~
–	4	0	2	6	7	8	7
	1	7	7	5	3	3	6

Thus, 58,02,123 – 40,26,787 = 17,75,336

(*d*) to (*f*) — (Same as above).

2. (*a*) Arrange the minuend and the subtrahend in columns.

	L	TTh	Th	H	T	O
	(5)	(14)				
	~~6~~	~~4~~	3	6	4	8
–	1	7	3	6	4	3
	4	7	0	0	0	5

Check

	L	TTh	Th	H	T	O	
	(1)						
	4	7	0	0	0	5	← Difference
+	1	7	3	6	4	3	← Subtrahend
	6	4	3	6	4	8	← Minuend

Thus, 6,43,648 – 1,73,643 = 4,70,005.

(*b*) Arrange the minuend and subtrahend in columns.

	TL	L	TTh	Th	H	T	O
		(7)	(18)		(3)	(13)	
	7	~~8~~	~~8~~	2	~~4~~	~~3~~	6
–	5	2	9	0	3	6	4
	2	5	9	2	0	7	2

Check

	TL	L	TTh	Th	H	T	O	
		(1)			(1)			
	2	5	9	2	0	7	2	← Difference
+	5	2	9	0	3	6	4	← Subtrahend
	7	8	8	2	4	3	6	← Minuend

Thus, 78,82,436 – 52,90,364 = 25,92,072.

(*c*) Arrange the minuend and subtrahend in columns.

	TL	L	TTh	Th	H	T	O
		(9)			(13)		
	(7)	~~(10)~~	(13)	(5)	~~3~~	(13)	
	~~8~~	~~0~~	~~3~~	~~6~~	~~4~~	~~3~~	6
–	4	2	9	3	6	7	3
	3	7	4	2	7	6	3

Check

	TL	L	TTh	Th	H	T	O	
	(1)	(1)		(1)	(1)			
	3	7	4	2	7	6	3	← Difference
+	4	2	9	3	6	7	3	← Subtrahend
	8	0	3	6	4	3	6	← Minuend

Thus, 80,36,436 – 42,93,673 = 37,42,763.

(*d*) to (*f*) — (Same as above).

3. (*a*)

	5	2	**7**	3	**6**	4
–	**1**	1	2	**9**	1	8
	4	**1**	4	4	4	**6**

(*b*)

	6	0	8	**0**	9	0
–	**1**	8	0	5	**0**	8
	4	**2**	**7**	5	8	**2**

(*c*)

	4	7	6	4	**3**	6
–	2	3	9	4	8	**2**
	2	**3**	6	**9**	5	4

(*d*)

	5	7	3	6	**9**	4
–	2	9	4	8	3	**3**
	2	**7**	8	**8**	6	1

(*e*)

	6	7	3	**6**	4	8
–	4	1	**7**	3	4	2
	2	5	6	3	0	**6**

(*f*)

	8	4	**0**	3	6	5
–	**5**	2	9	**6**	**3**	7
	3	**1**	0	7	2	**8**

4. (*a*) 867383 – 0 = **867383**

(*b*) 64361 – **0** = 64361

(*c*) 420805 – 1 = **420804**

(*d*) 996494 – **1** = 996493

(*e*) 7143260 – 7143260 = **0**

(*f*) 243646 – **243646** = 0

5. (*a*) 3214567 + 5479410 – 2134571

Step 1. First add all the numbers having either '+' sign or no sign in front of them.

	TL	L	TTh	Th	H	T	O
			(1)				
	3	2	1	4	5	6	7
+	5	4	7	9	4	1	0
	8	6	9	3	9	7	7

Step 2. Subtract the numbers having '–' sign in front of it from the sum obtained in step 1.

	TL	L	TTh	Th	H	T	O
			(8)	(13)			
	8	6	~~9~~	~~3~~	9	7	7
–	2	1	3	4	5	7	1
	6	5	5	9	4	0	6

Thus, 3214567 + 5479410 – 2134571 = 65,59,406.

(*b*) 96457891 – 5467894 – 201345

	C	TL	L	TTh	Th	H	T	O
			(13)	(14)	(16)	(17)	(18)	
		(5)	~~(3)~~	~~(4)~~	~~(6)~~	~~(7)~~	~~(8)~~	(11)
	9	~~6~~	~~4~~	~~5~~	~~7~~	~~8~~	~~9~~	~~1~~
–		5	4	6	7	8	9	4
	9	0	9	8	9	9	9	7

	C	TL	L	TTh	Th	H	T	O
	9	0	9	8	9	9	9	7
–			2	0	1	3	4	5
	9	0	7	8	8	6	5	2

Thus, 96457891 – 5467894 – 201345 = 9,07,88,652.

(*c*) and (*d*) — (Same as above).

6. (*a*)

	TC	C	TL	L	TTh	Th	H	T	O
		(9)	(9)	(9)	(9)	(9)	(9)	(9)	
		~~(10)~~	~~(10)~~	~~(10)~~	~~(10)~~	~~(10)~~	~~(10)~~	~~(10)~~	(10)
Smallest 9-digit number =	~~1~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
Greatest 7-digit number = –			9	9	9	9	9	9	9
		9	0	0	0	0	0	0	1

Thus, their difference is nine crore one (90000001)

(*b*)

	C	TL	L	TTh	Th	H	T	O
		(16)	(18)					
	(6)	~~(6)~~	~~(8)~~	(15)				
The sum of two numbers =	~~7~~	~~7~~	~~9~~	~~5~~	6	9	7	4
First number = –		8	9	9	5	0	4	0
Other number =	6	8	9	6	1	9	3	4

Thus, the other number is 6,89,61,934.

(*c*)

	TL	L	TTh	Th	H	T	O
				(14)	(12)		
			(7)	~~(4)~~	~~(2)~~	(17)	
Number of votes candidate A got =	7	2	~~8~~	~~5~~	~~3~~	~~7~~	8
Number of votes candidate B got = –	7	1	3	7	3	9	5
Difference =	0	1	4	7	9	8	3

Thus, Candidate A got 1,47,983 more votes than candidate B.

(*d*)

	L	TTh	Th	H	T	O
					(11)	
		(4)	(10)	(6)	~~(7)~~	(15)
Number of bags of wheat purchased by the government =	8	~~5~~	~~0~~	~~7~~	~~2~~	~~5~~
Number of bags of wheat sold by the government = −	4	0	8	3	6	8
Number of bags left in their stock =	4	4	2	3	5	7

Thus, 4,42,357 bags of wheat left in their stock.

(*e*)

	L	TTh	Th	H	T	O
		(14)			(14)	
	(5)	~~(4)~~	(10)	(6)	~~(4)~~	(10)
Number of bricks purchased for construction =	~~6~~	~~5~~	~~0~~	~~7~~	~~5~~	~~0~~
Number of bricks used in a building = −	5	8	5	0	5	1
Number of bricks remained with the contractor =	0	6	5	6	9	9

Thus, 65699 bricks remained with contractor.

(*f*)

	L	TTh	Th	H	T	O
	(8)	(15)				
Anil invested in the business =	~~9~~	~~5~~	5	8	9	0
Sunil invested in the business = −	6	8	2	5	8	0
=	2	7	3	3	1	0

Thus, Anil invested ₹2,73,310 more in the business.

Practice Time 2C

1. (*a*)

Step 1. Expand the multiplier. 123 = 100 + 20 + 3
Step 2. Multiply by the ones. 2563 × 3 = 7689
Step 3. Multiply by the tens. 2563 × 20 = 51260
Step 4. Multiply by the hundreds.
2563 × 100 = 256300
Step 5. Add all the partial products.
7689 + 51260 + 256300 = 3,15,249
Thus, 2563 × 123 = 3,15,249.

	L	TTh	Th	H	T	O	
			(1)	(1)			
			(1)	(1)			
			2	5	6	3	
×				1	2	3	← 100 + 20 + 3
	(1)	(1)	(1)	(1)			
			7	6	8	9	← 2563 × 3
		5	1	2	6	0	← 2563 × 20
+	2	5	6	3	0	0	← 2563 × 100
	3	1	5	2	4	9	

(*b*) — (Same as above).

(*c*)

	TL	L	TTh	Th	H	T	O	
				7	8	9	4	
×					3	0	6	← 300 + 0 + 6
			4	7	3	6	4	← 7894 × 6
		0	0	0	0	0	0	← 7894 × 0
+	2	3	6	8	2	0	0	← 7894 × 300
	2	4	1	5	5	6	4	

Thus, 7894 × 306 = 24,15,564.

(*d*)

	C	TL	L	TTh	Th	H	T	O	
				4	8	7	9	2	
×						2	1	6	← 200 + 10 + 6
			2	9	2	7	5	2	← 48792 × 6
			4	8	7	9	2	0	← 48792 × 10
+		9	7	5	8	4	0	0	← 48792 × 200
	1	0	5	3	9	0	7	2	

Thus, 48792 × 216 = 1,05,39,072.

(*e*) to (*h*) — (Same as above).

2. (*a*) 7557 × 10 = 75570
(*b*) 78051 × 100 = 7805100
(*c*) 4655 × 100 = 465500
(*d*) 97435 × 100 = 9743500
(*e*) 7263 × 100 = 726300
(*f*) 5090 × 1000 = 5090000

3. (*a*) 5326 × 60 = 60 × 5326
(*b*) 2897 × 0 = 0
(*c*) (100 × 20) × 5 = (100 × 5) × 20
(*d*) 1 × 5566 = 5566
(*e*) (500 + 75) × 16 = 500 × 16 + 75 × 16
(*f*) (708 – 55) × 25 = 708 × 25 – 55 × 25

4. (*a*) (*iii*) 8753 × 20 = 175060
(*b*) (*iv*) 2 × 5 × 483 = 10 × 483 = 4830
(*c*) (*i*) 4 × 573 × 50 = 2292 × 50 = 114600
(*d*) (*ii*) 10 × 3845 × 10 = 100 × 3845 = 384500
(*e*) (*vi*) 900 × 714 = 9 × 100 × 714
= 6426 × 100 = 642600
(*f*) (*v*) 4000 × 36 = 4 × 1000 × 36 = 144000

5. (*a*) 250 × 8 × 100 = 2000 × 100 = 200000
(*b*) 5 × 195 × 20 = 5 × 20 × 195 = 100 × 195
= 19500
(*c*) 1500 × 50 × 2 = 1550 × 100 = 15500
(*d*) 400 × 25 × 4 = 4 × 100 × 25 × 4
= 100 × 4 × 100 = 40000
(*e*) 4365 × 20 × 5 = 4365 × 100 = 436500
(*f*) 10 × 3364 × 10 = 100 × 3364 = 336400
(*g*) 50 × 1000 × 2 = 100 × 1000 = 100000
(*h*) 4 × 6666 × 25 = 6666 × 100 = 666600
(*i*) 2005 × 50 × 20 = 2005 × 1000 = 2005000

6. (*a*) Cost of one ceiling fan = ₹3199
So, cost of 150 ceiling fans = 3199 × 150

	₹		3	1	9	9
×				1	5	0
			0	0	0	0
		1	5	9	9	5	0
+		3	1	9	9	0	0
	₹	4	7	9	8	5	0

Thus, the cost of 150 ceiling fans = ₹479850

(*b*) Number of items produced every day
= 27,628
Number of items produced in one year 2 weeks
(365 days + 14 days = 379 days)
= 27628 × 379

	₹				2	7	6	2	8
×							3	7	9
				2	4	8	6	5	2
			1	9	3	3	9	6	0
+			8	2	8	8	4	0	0
	₹	1	0	4	7	1	0	1	2

Thus, 1,04,71,012 items will be produced in one year and 2 weeks.

(*c*) Supply of milk in one day from dairy
= 1250 litres
Supply of milk in a leap year from dairy
= 1250 × 366 litres [∵ 1 leap year = 366 days]
= 4,57,500

	₹			1	2	5	0
×					3	6	6
				7	5	0	0
			7	5	0	0	0
+		3	7	5	0	0	0
	₹	4	5	7	5	0	0

Thus, the dairy supplies 4,57,500 litres of milk in a leap year.

(*d*) Number of toys contain in a one box = 150
Number of toys contain in 4500 boxes
= 4500 × 150 = 6,75,000 toys

	L	TTh	Th	H	T	O
			4	5	0	0
×				1	5	0
			0	0	0	0
	2	2	5	0	0	0
+	4	5	0	0	0	0
	6	7	5	0	0	0

Thus, total number of toys brought to the market on that day is 6,75,000.

(*e*) Milk sold in one day by the booth
= 1258 litres
Milk sold in the month of December
= 1258 × 31 litres = 38998 litres

	TTh	Th	H	T	O
		1	2	5	8
×				3	1
		1	2	5	8
+	3	7	7	4	0
	3	8	9	9	8

Cost of one litre milk = ₹98

So, cost of 38998 litres milk = 38998 × 48

	TL	L	TTh	Th	H	T	O
			3	8	9	9	8
×						4	8
		3	1	1	9	8	4
+	1	5	5	9	9	2	0
	1	8	7	1	9	0	4

Thus, 38,998 litres of milk sold in month of December and the cost of 38998 litres of milk is ₹18,71,904.

(*f*) Largest 5-digit number = 99999

and smallest 3-digit number = 100

Product = 99999 × 100 = 99,99,900

(*g*) Reading of odometer of a car

= 11152 km

Reading of odometer in hundred metres

$= \frac{11152 \times 1000 \text{ m}}{100}$ m [$\because$ 1 km = 1000 m]

= 111520 m

Think and Answer (Page 43)

Life of an inverter battery = 8760 hours

Number of hours in one whole day = 24 hrs

$\therefore$ Number of days will the battery run = 8760 ÷ 24 days

Thus, the battery will run 365 days.

```
24)8760(365
 -72
  156
 -144
   120
  -120
     0
```

Practice Time 2D

1. (*a*) 275736 ÷ 9

```
Divisor ---> 9)275736(30637 <--- Quotient
            -27
             057
            -54
              33
             -27
              66
             -63
               3 <--- Remainder
```

Step 1. 9 < 2, we divide 2-digit number 27 by 9. 9 × 3 = 27 is the maximum possible product obtained.

Subtract 27 from 27 and bring down 5 < 9, again bring down 7 by putting 0 in quotient .

Step 2. 57 is the new dividend. Here, 9 × 6 = 54 is the maximum possible product obtained < 57.

Subtract 54 from 57 and bring down 3.

Step 3. 33 is the new dividend. Here 9 × 3 = 27 is the maximum possible product < 33.

Subtract 27 from 33 and bring down 6.

Step 4. Now, 66 is the new partial dividend. Here, 9 × 7 = 63 is the maximum possible product < 66.

Subtract 63 from 66.

Step 5. 3 is left which is less than 9 and nothing is left to bring down.

Thus, Quotient = 30637 and Remainder = 3

Checking:

Quotient × Divisor + Remainder = Dividend

30637 × 9 + 3 = 275736

$\Rightarrow$ 275736 = 275736

Thus, the division is correct.

(*b*) 876048 ÷ 7

```
                Dividend
Divisor ---> 7)876048(125149 <--- Quotient
            -7
             17
            -14
              036
             -35
               010
              -07
                034
               -28
                 068
                -63
                  05 <--- Remainder
```

Thus, Quotient = 125149 and Remainder = 5.

Checking:

Quotient × Divisor + Remainder = Dividend

125149 × 7 + 5 = 876048

876043 + 5 = 876048

876048 = 876048

Thus, the divison is correct.

(*c*) 683396 ÷ 15

```
                Dividend
Divisor ---> 15)683396(45559 <--- Quotient
            -60
             83
            -75
              083
             -75
               089
              -75
                146
               -135
                 011 <--- Remainder
```

Thus, Q = 45559 and R = 11.

Checking:

Quotient × Divisor + Remainder = Dividend

45559 × 15 + 11 = 683396

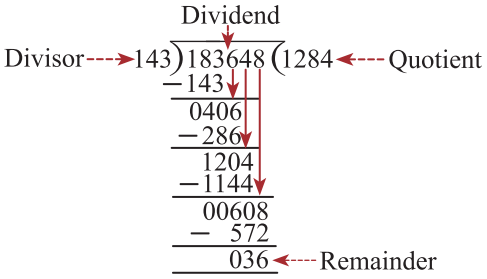
6883385 + 11 = 683396

683396 = 683396

Thus, the division is correct.

(*d*) and (*e*) — (Same as above).

(*f*) 183648 ÷ 143



Thus, Q = 1284 and R = 36.

Checking

Quotient × Divisor + Remainder = Dividend

1284 × 143 + 36 = 183648

183612 + 36 = 183648

183648 = 183648

Thus, the division is correct.

(*g*) and (*h*) — (Same as above).

2. (*a*) Divisor = 136, Quotient = 75 and Remainder = 31 (Given)

We know that,

Dividend = Quotient × Divisor + Remainder

= 75 × 136 + 31

= 10200 + 31

= 10231

Thus, Dividend = 10,231.

(*b*) Divisor = 403, Quotient = 801 and Remainder = 325 (Given)

We know that,

Dividend = Quotient × Divisor + Remainder

= 801 × 403 + 325

= 322803 + 325

= 323128

Thus, Dividend = 3,23,128.

3. (*a*) 789 ÷ 789 = 1

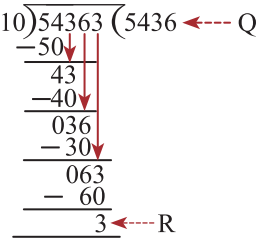
(*b*) 5342 ÷ 1 = 5342

(*c*) 6574 ÷ 6574 = 1

(*d*) 0 ÷ 218 = 0

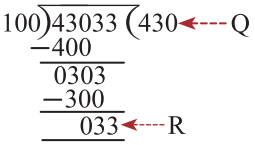
(*e*) 24 × 168 = 4032

4. (*a*) (*iii*) 54363 ÷ 10



Thus, Q = 5436 and R = 3.

(*b*) (*i*) 43033 ÷ 100



Thus Q = 430 and R = 33.

(*c*) (*v*) 921735 ÷ 1000 ⇒ Q = 921 and R = 735

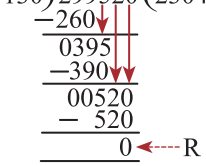
(*d*) (*vi*) 55569 ÷ 100 ⇒ Q = 555 and R = 69

(*e*) (*ii*) 4876 ÷ 10 ⇒ Q = 487 and R = 6

(*f*) (*iv*) 697770 ÷ 1000 ⇒ Q = 697 and R = 770

5. (*a*) Cost of 130 radio sets = ₹299520

Cost of 1 radio set = ₹299520 ÷ 130 = ₹2304

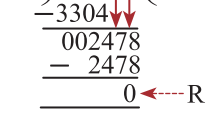


Thus, cost of 1 radio set is ₹2304.

(*b*) The product of two numbers = 332878

First number = 826

So, second number = 332878 ÷ 826 = 403



Thus, other number = 403

(*c*) Total collection for flood-affected people = ₹98762

Number of people = 437

Amount of money each person got

= ₹98762 ÷ 437 = ₹226

```
437)98762(226 <---Q
   -874
    1136
   - 874
     2622
    -2622
        0 <---R
```

Thus, each person got ₹226.

(*d*) Number of mangoes sold last year = 349300 kg

Number of mangoes in each box = 35 kg

Number of boxes use throughout the year

= 349300 ÷ 35 = 9980

```
35)349300(9980 <---Q
   -315
    0343
   - 315
     0280
    - 280
       00
     - 00
        0 <---R
```

Thus, he used 9980 boxes throughout the year.

Practice Time 2E

1. (*a*) $31972 \xrightarrow[\text{nearest } 10000]{\text{rounded to}} 30000$

$10322 \xrightarrow[\text{nearest } 10000]{\text{rounded to}} 10000$

Estimated sum

	3	0	0	0	0
+	1	0	0	0	0
	4	0	0	0	0

Actual sum

	3	1	9	7	2
+	1	0	3	2	2
	4	2	2	9	4

The estimated sum is close to the actual sum.

(*b*) $2575 \xrightarrow[\text{nearest } 1000]{\text{rounded to}} 3000$

$124 \xrightarrow[\text{nearest } 100]{\text{rounded to}} 100$

Estimated Product

			3	0	0	0
×				1	0	0
	3	0	0	0	0	0

Estimated Product

			2	5	7	5
×				1	2	4
		1	0	3	0	0
		5	1	5	0	0
+	2	5	7	5	0	0
	3	1	9	3	0	0

The estimated product is close to the actual product.

(*c*) $721994 \xrightarrow[\text{nearest } 100000]{\text{rounded to}} 700000$

$66159 \xrightarrow[\text{nearest } 10000]{\text{rounded to}} 70000$

Estimated difference

	7	0	0	0	0	0
−		7	0	0	0	0
	6	3	0	0	0	0

Actual difference

	7	2	1	9	9	4
−		6	6	1	5	9
	6	5	5	8	3	5

The estimated difference is close to the actual difference.

(*d*) $2,56,311 \xrightarrow[\text{nearest lakh}]{\text{rounded to}} 300000$

$578 \xrightarrow[\text{nearest } 100]{\text{rounded to}} 600$

Estimated quotient

300000 ÷ 600 = 500

Actual quotient

```
578)256311(443
   -2312
     02511
    - 2312
      01991
     - 1734
       0257
```

Thus, estimated quotient = 500

Actual quotient = 443

2. (*a*) Cost of washing machine =

$28,675 \xrightarrow[\text{nearest thousand}]{\text{rounded to}} 29,000$

Cost of mobile phone =

$36,435 \xrightarrow[\text{nearest thousand}]{\text{rounded to}} 36,000$

∴ Total cost of both the items

= 29,000 + 36,000 = 65,000

(*b*) Cost of washing machine =

$28,675 \xrightarrow[\text{nearest thousand}]{\text{rounded to}} 29,000$

Cost of airpods

$3,970 \xrightarrow[\text{nearest thousand}]{\text{rounded to}} 4,000$

Difference of the cost of washing machine and airpods = 29,000 – 4,000 = 25,000

(*c*) Total amount spent by Varun

= 6,29,575 + 28,675 + 36,435 + 3,970

$= 6{,}98{,}655 \xrightarrow[\text{nearest thousand}]{\text{rounded to}} 6{,}99{,}000$

= Thus, Varun spent ₹6,99,000

3. Estimated quotient

3,25,870 → 300000

(Rounding off to the nearest lakh)

8543 → 9000

(Rounding off to the nearest thousand)

Estimated quotient = 300000 ÷ 9000 = 33

Thus, estimated quotient = 33

4. Estimated sum:

= 483479 + 567891

= 480000 + 570000

= 10,50,000.

Actual sum

	4	8	3	4	7	9
+	5	6	7	8	9	1
1	0	5	1	3	7	0

Thus, actual sum = 10,51,370 and estimated sum = 10,50,0000.

5. $1{,}439 \xrightarrow[\text{nearest 1,000}]{\text{rounded to}} 1{,}000$

$784 \xrightarrow[\text{nearest 100}]{\text{rounded to}} 800$

Actual product

				1	4	3	9
×					7	8	4
				5	7	5	6
		1	1	5	1	2	0
+	1	0	0	7	3	0	0
	1	1	2	8	1	7	6

Estimated product

1000 × 800 = 800000

Thus, actual product = 11,28,176 and estimated product = 8,00,000.

6. Number of votes cast in constituency A =

$23{,}52{,}167 \xrightarrow[\text{nearest ten lakhs}]{\text{rounded to}} 20{,}00{,}000$

Number of votes cast in constituency B =

$30{,}14{,}184 \xrightarrow[\text{nearest ten lakhs}]{\text{rounded to}} 30{,}00{,}000$

Difference between the votes cast in these two constituencies

= 30,00,000 – 20,00,000 = 10,00,000

Practice Time 2F

1. 32 – 8 × 2 = 32 – 16 (Multiply: 8 × 2)
= 16 (Subtraction: 32 – 16)

2. 18 + 20 ÷ 4 = 18 + 5 (Division: 20 ÷ 4)
= 23 (Addition: 18 + 5)

3. 15 × 10 ÷ 2 = 15 × 5 (Division: 10 ÷ 2)
= 75 (Multiply: 15 × 5)

4. 35 × 48 + 2024 = 1680 + 2024 (Multiply: 35 × 48)
= 3704 (Addition: 1680 + 2024)

5. 4025 ÷ 175 + 1362
= 23 + 1362 (Division: 4025 ÷ 175)
= 1385 (Addition: 23 + 1362)

6. 16 – 16 ÷ 2 – 3 = 16 – 8 – 3 (Division: 16 ÷ 2)
= 8 – 3 (Subtraction: 16 – 8)
= 5 (Subtraction: 8 – 3)

7. 8 × 13 – 4 × 15
= 104 – 60 (Multiply: 8 × 13 and 4 × 15)
= 44 (Subtraction: 104 – 60)

8. 37 – 6 × 4 + 32 ÷ 4
= 37 – 6 × 4 + 8 (Division: 32 ÷ 4)
= 37 – 24 + 8 (Multiply: 6 × 4)
= 37 + 8 – 24
= 45 – 24 (Addition: 37 + 8)
= 21 (Subtraction: 45 – 24)

9. 30 – 28 + 36 ÷ 2
= 30 – 28 + 18 (Division: 36 ÷ 2)
= 30 + 18 – 28
= 48 – 28 (Addition: 30 + 18)
= 20 (Subtraction: 48 – 28)

10. 96 ÷ 16 + 34 × 10 – 13
= 6 + 34 × 10 – 13 (Division: 96 ÷ 16)
= 6 + 340 – 13 (Multiply: 34 × 10)
= 346 – 13 (Addition: 6 + 340)
= 333 (Subtraction: 346 – 13)

11. 3 × 4 – 45 ÷ 9 + 12 × 5
= 3 × 4 – 5 + 12 × 5 (Division: 45 ÷ 9)
= 12 – 5 + 60 (Multiply: 3 × 4 and 12 × 5)
= 12 + 60 – 5
= 72 – 5 (Addition: 12 + 60)
= 67 (Subtraction: 72 – 5)

12. $70 \div 14 \times 6 - 10 \div 5 + 1$
$= 5 \times 6 - 2 + 1$ (Division: $70 \div 14$ and $10 \div 5$)
$= 30 - 2 + 1$ (Multiply: 5×6)
$= 30 + 1 - 2$
$= 31 - 2$ (Addition: $30 + 1$)
$= 29$ (Subtraction: $31 - 2$)

Practice Time 2G

1. $63 \div [24 - \{15 - (4 \times 3)\}]$
$= 63 \div [24 - \{15 - 12\}]$
(Multiply: 4×3, in the parentheses)
$= 63 \div [24 - 3]$
(Subtraction: $15 - 12$, in the curly bracket)
$= 63 \div 21$
(Subtraction: $24 - 3$, in the square brackets)
$= 3$ (Division: $63 \div 21$)

2. $[97 + \{30 - (5 \times 2)\}] \times 15$
$= [97 + \{30 - 10\}] \times 15$
(Multiply: 5×2, in the parentheses)
$= [97 + 20] \times 15$
(Subtraction: $30 - 10$, in the curly brackets)
$= 117 \times 15$
(Addition: $97 + 20$, in the square brackets)
$= 1755$ (Multiply: 117×5)

3. $17 + [20 \times \{15 - (8 \div 4)\}]$
$= 17 + [20 \times \{15 - 2\}]$
(Division: $8 \div 4$, in the parentheses)
$= 17 + [20 \times 13]$
(Subtraction: $15 - 2$, in the curly bracket)
$= 17 + 260$
(Multiply: 20×13, in the square brackets)
$= 277$ (Addition: $17 + 260$)

4. $102 \times [12 \div \{65 + 7\}]$
(Division: $84 \div 12$, in the parentheses)
$= 102 \times [72 \div 72]$
(Addition: $65 + 7$, in the curly brackets)
$= 102 \times 1$
(Division: $72 \div 72$, in the square brackets)
$= 102$ (Multiply: 102×1)

5. $3982 \times \{45 - (90 \div 2)\}$
$= 3982 \times \{45 - 45\}$
(Division: $90 \div 2$, in the parentheses)
$= 3982 \times 0$
(Subtraction: $45 - 45$, in the curly brackets)
$= 0$ (Multiply: 3982×0)

6. $84 \div [40 - \{15 + (13 - 19)\}]$
$= 84 \div [40 - \{15 + 4\}]$
(Subtraction: $13 - 9$, in the parentheses)
$= 84 \div [40 - 19]$
(Addition: $15 + 4$, in the curly brackets)
$= 84 \div 21$
(Subtraction: $40 - 19$, in the square brackets)
$= 4$ (Division: $84 \div 21$)

7. $[25 \times \{33 - (3 \times 10)\}] \div 3$
$= [25 \times \{33 - 30\}] \div 3$
(Multiply: 3×10, in the parentheses)
$= [25 \times 3] \div 3$
(Subtraction: $33 - 30$, in the curly brackets)
$= 75 \div 3$
(Multiply: 25×3, in the square brackets)
$= 25$ (Division, $75 \div 3$)

8. $237 + [764 - \{165 + (132 \div 33)\}]$
$= 237 + [764 - \{165 + 4\}]$
(Division: $132 \div 33$, in the parentheses)
$= 237 + (764 - 169]$
(Addition: $165 + 4$, in the curly brackets)
$= 237 + 595$
(Subtraction: $764 - 169$, in the square brackets)
$= 832$ (Addition, $237 + 595$)

9. $80 + [20 \times \{20 - (10 \div 5)\}]$
$= 80 + [20 \times \{20 - 2\}]$
(Division: $10 \div 5$, in the parentheses)
$= 80 + [20 \times 18]$
(Subtraction: $20 - 2$, in the curly brackets)
$= 80 + 360$
(Multiply: 20×18, in the square brackets)
$= 440$ (Addition: $80 + 360$)

10. $17 \times [96 + \{30 - (11 + 5)\}]$
$= 17 \times [96 + \{30 - 16\}]$
(Addition: $11 + 5$, in the parentheses)
$= 17 \times [96 + 14]$
$= 17 \times 110$
(Addition: $96 + 14$, in the square brackets)
$= 1870$ (Multiply: 17×110)

Think and Answer (Page 50)

(*a*) $7 + 6 \times 8 = 104$

$(7 + 6) \times 8 = 104$

$13 \times 8 = 104$

$104 = 104$

Correct answer is $(7 + 6) \times 8 = 104$

(*b*) $5 + 3 \times 5 - 5 = 35$

$(5 + 3) \times 5 - 5 = 35$

$8 \times 5 - 5 = 35$

$40 - 5 = 35$

Correct answer is $(5 + 3) \times 5 - 5 = 35$

Practice Time 2H

1. (*a*) Average $= \dfrac{\text{Sum of numbers}}{\text{Total numbers}}$

$= \dfrac{16+24+35+25+20}{5} = \dfrac{120}{5} = 24$

(*b*) Average $= \dfrac{\text{Sum of amounts}}{\text{Total amounts}}$

$= \dfrac{₹120+₹56+₹108+₹32}{4} = \dfrac{₹316}{4} = ₹79$

(*c*) Average $= \dfrac{80\,\text{cm}+85\,\text{cm}+90\,\text{cm}}{3}$

$= \dfrac{255\,\text{cm}}{3} = 85$ cm

(*d*) Average $= \dfrac{8\text{h}+9\text{h}+13\text{h}}{3} = \dfrac{30\text{h}}{3} = 10$ hours

2. (*a*) First six even numbers = 2, 4, 6, 8, 10, 12

Average $= \dfrac{2+4+6+8+10+12}{6} = \dfrac{42}{6} = 7$

(*b*) First eight counting numbers = 1, 2, 3, 4, 5, 6, 7, 8

Average $= \dfrac{1+2+3+4+5+6+7+8}{8}$

$= \dfrac{36}{8} = 4.5$

(*c*) First three two-digit numbers = 10, 11, 12

Average $= \dfrac{10+11+12}{3} = \dfrac{33}{3} = 11$

(*d*) First six composite numbers = 4, 6, 8, 9, 10, 12

Average $= \dfrac{4+6+8+9+10+12}{6} = \dfrac{49}{6} = 8.2$

3. The sum of scored in five matches.

$60 + 44 + 8 + 95 + 110 = 317$

We have, Average scores $= \dfrac{\text{Sum of scores}}{\text{Number of matches}}$

$= \dfrac{317}{5} = 63.4$ runs

Thus, average score of 5 matches is 63.4 runs.

4. The sum of 5 numbers = 3840

Average $= \dfrac{\text{Sum of numbers}}{\text{Total numbers}} = \dfrac{3840}{5} = 768.$

5. The sum of income of 7 consecutive days

$= ₹110 + ₹70 + ₹80 + ₹95 + ₹57 + ₹120 + ₹140$

$= ₹672$

Average $= \dfrac{\text{Sum of total income}}{\text{Number of consecutive days}}$

$= \dfrac{₹672}{7} = ₹96$

Thus, average income of 7 consecutive days is ₹96.

6. Number of wickets per match = 4

Number of wickets taken by the bowler in 5 matches $= 4 \times 5 = 20$ wickets

Thus, number of wickets taken by him is 20.

7. The total marks obtained in 5 subjects = 460

We have, average marks $= \dfrac{\text{Total marks}}{\text{Number of subjects}}$

$= \dfrac{460}{5} = 92$ marks

Thus, the average marks obtained in five subjects by Anamika is 92.

8. Let the number of students present on Friday = x

Average of five successive days = 700 (Given)

Average $= \dfrac{725+635+735+625+x}{5}$

$= \dfrac{700}{1} = \dfrac{2720+x}{5}$

By cross multiplying,

$3500 = 2720 + x$

$\therefore x = 3500 - 2720 = 780$

Thus, 780 students present on Friday.

Maths Connect (Page 53)

The total area of the earth = Area of land + Area of water = 148326000 sq. km + 361740000 sq. km = 510066000 sq. km.

Brains Sizzlers (Page 54)

1.

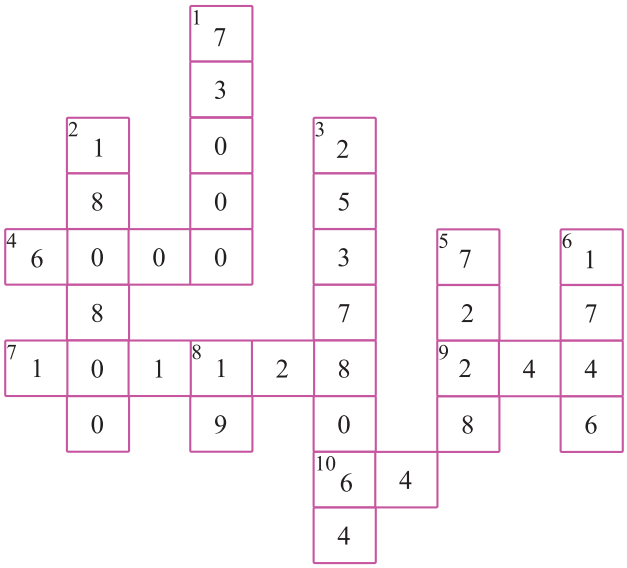
			1	1	1	1
×				1	1	1
			1	1	1	1
		1	1	1	1	0
+	1	1	1	1	0	0
	1	2	3	3	2	1

2.

```
124) 3 4 6 8 9 [6] ( [2] 7 [9] 7
    −2 4 8
       9 8 8
    − [8][6][8]
       1 2 0 [9]
    − 1 1 1 6
           9 3 [6]
        − 8 6 8
             6 8
```

Thus, A = 1

Maths Fun (Page 54)



Chapter Assessment

1. (*a*) (*i*) Target of toys to sell by the company = 585900

Number of sold toys = 4,99,729

Number of toys fell short of the target =

	L	TTh	Th	H	T	O
		(17)			(9)	
	(4)	~~(7)~~	(15)	(8)	~~(10)~~	(10)
	~~5~~	~~8~~	~~5~~	~~9~~	~~0~~	~~0~~
−	4	9	9	7	2	9
	0	8	6	1	7	1

Thus, 86171 toys fell short of the target.

(*b*)(*iii*)

$573 \xrightarrow[\text{nearest 100}]{\text{rounded to}} 600$ and $133 \xrightarrow[\text{nearest 100}]{\text{rounded to}} 100$

Estimated product = 600 × 100 = 60000

			6	0	0
×			1	0	0
			0	0	0
		0	0	0	0
+	6	0	0	0	0
	6	0	0	0	0

Thus, estimated product of 573 and 133 is 60000.

(*c*) (*i*) Cost of a house = ₹1,78,25,198

The house is sold at ₹7,95,000 less than the actual cost.

Therefore he sells the house at ₹1,78,25,194 – ₹7,95,000

	C	TL	L	TTh	Th	H	T	O
			(7)	(12)				
	1	7	~~8~~	~~2~~	5	1	9	4
−			7	9	5	0	0	0
	1	7	0	3	0	1	9	4

Thus, he sells the house at ₹1,70,30,194.

(*d*)(*iii*) 11 ÷ 11 + 11 × 11

= 1 + 11 × 11 (Division: 11 ÷ 11)

= 1 + 121 (Multiply: 11 × 11)

= 122 (Addition: 1 + 121)

2. Number of votes found valid = 1,29,52,179

Number of votes found invalid = 12,68,142

Number of voters who did not cast their votes = 72,898

Number of votes registered in all =

	C	TL	L	TTh	Th	H	T	O
		(1)	(1)	(1)	(1)	(2)	(1)	
	1	2	9	5	2	1	7	9
		1	2	6	8	1	4	2
+				7	2	8	9	8
	1	4	2	9	3	2	1	9

Thus, 1,42,93,219 votes registered in all.

3. Amount of rupees collected for charity fund in one year = ₹12,35,820

Amount of rupees collected for charity fund in another year = ₹28,25,320

Total amount of rupees collected for charity fund in both years

= ₹12,35,820 + ₹28,25,320 = ₹40,61,140

	TL	L	TTh	Th	H	T	O
	(1)		(1)	(1)			
₹	1	2	3	5	8	2	0
+ ₹	2	8	2	5	3	2	0
₹	4	0	6	1	1	4	0

Amount of rupees use out of the total amount in two years = ₹26,72,500

Amount of rupees left with now

= ₹40,611,40 – ₹26,72,500

	TL	L	TTh	Th	H	T	O
	(1)		(1)	(1)			
₹	4	0	6	1	1	4	0
– ₹	2	6	7	2	5	0	0
₹	1	3	8	8	6	4	0

Thus, ₹13,88,640 money one they left with now.

4. No. of days in month of October = 31 days

No. of days in month of November = 30 days

No. of days in month of December = 31 days

Total no. of days in these three months

= (31 + 30 + 31) days = 92 days

Milk booth sells of milk in a day = 1258 litres

Milk booth sells of milk in three months

= (1258 × 92) litres = 115736 litres

Cost of one litre milk = 48

Cost of 115736 litres milk

= ₹(115736 × 48) = ₹55,55,328

Thus, the cost of total milk sold in these three months = ₹55,55,328.

5. Total leaves of bread = 1,30,893

Number of bakeries = 23

Quantity of leaves of bread each bakery got

= 130893 ÷ 23 = 5691

```
23)130893(5691
 −115↓||
  158||
 −138↓|
   209|
  −207↓
    23
   −23
    0
```

Thus, 5691 leaves of bread each bakery got.

6. Distance covered in 175 days = 43400 km

Distance covered in one day = 43400 ÷ 175

```
175)43400(248
 −350↓
  840
 −700↓
  1400
 −1400
    0
```

Thus, distance covered in each day is 248 km

7. No. of pages read on first day = 36

No. of pages read on second day = 48

No. of pages read on third day = 90

Total no. of pages in three days

= 36 + 48 + 90 = 174

$$\text{Average number of pages} = \frac{174}{3} = 58$$

Thus, average number of pages read by Saumya per day is 58 pages.

8. The five likely values of the number of people in the stadium to round off number to 35,000 = 34999, 35400, 35499, 35444, 34766 (Answer may vary)

9. Ranjana reads 128 pages in 2 days

$$\therefore \text{ Ranjana reads in 1 day} = \frac{128}{2} = 64 \text{ pages}$$

Apurv reads 372 pages in 4 days

$$\therefore \text{ Apurv reads in 1 day} = \frac{372}{4} = 93 \text{ pages}$$

and Nikhil reads 574 pages in 1 week

$$\therefore \text{ Nikhil reads in 1 day} = \frac{574}{7} = 82 \text{ pages}$$

Thus, Apurv reads the fastest.

10. Number of books Yash and his 4 friends read each for the year = 24

Each book has 295 average number of pages.

∴ Number of pages they all read in total of that year

= 295 × 5 × 24 = 295 × 120 = 35400

Thus, they read 35,400 pages in total that year.

11. (*a*) (17 – 7) × 5 (*b*) (26 + 8) – 9

(*c*) (72 – 16) + 25 (*d*) (13 – 7) ÷ 36

(*e*) (16 + 8) ÷ (9 – 3)

12. Raj has 4 sets of 5 stamps *i.e.*, 4 × 5 stamps

Number of stamps he gave to Sanjay = 6

∴ Number of stamps left with Raj = 4 × 5 – 6

13. Total amount of money with Divya = ₹500
Cost of calculator = ₹210
Cost of 3 blue pens = ₹25 × 3 = ₹75
Cost of a maths notebook = ₹48
Total cost of these items
= ₹210 + ₹75 + ₹48 = ₹333
Amount of money left with her
= ₹500 – ₹333 = ₹167

14. (*a*) 18 – [6 + {40 – (3 × 4) – (8 + 6)} – 2]
= 18 – [6 + {40 – 12 – 14} – 2]
= 18 – [6 + {28 – 14} – 2]
= 18 – [6 + 14 – 2]
= 18 – [20 – 2]
= 18 – 18
= 0

(*b*) {100 + (16 × 3 – 14)} + 99 ÷ 9
= {100 + (48 – 14)} + 99 ÷ 9
= {100 + 34} + 99 ÷ 9
= 134 + 99 ÷ 9
= 134 + 11
= 145

15. (*a*) 125 ÷ 25 + 3 × 10 = 5 + 30 = 35
So, 125 ÷ 25 + 3 × 10 = 35

(*b*) 78 ÷ 3 + 16 – 4 = 26 + 12 = 38
So, 78 ÷ 3 + 16 – 4 = 38

(*c*) 20 + 5 × 6 – 30 ÷ 6 = 20 + 30 – 5 = 50 – 5 = 45
So, 20 + 5 × 6 – 30 ÷ 6 = 45

(*d*) 46 ÷ 2 – 8 × 2 = 23 – 16 = 7
So, 46 ÷ 2 – 8 × 2 = 7

Mental Maths (Page 56)

1. (*d*) Smallest 4-digit number = 1000
Smallest 5-digit number = 100000
Smallest 6-digit number = 1000000
Sum = 1000 + 100000 + 1000000
= 111000

2. (*c*) 786200 ÷ 100 = 7862

```
100)786200(7682
 −700
  862
 −800
   620
  −600
    200
   −200
      0
```

3. (*a*) 493685 ÷ 1000

```
100)493685(493
 −4000
  9368
 − 9000
   3685
  − 3000
    685  <--- R
Remainder = 685
```

4. (*d*) ÷ is performed first when simplifying a numerical expression.

5. (*b*) 8 × 8 – 8 = 64 – 8 = 56.

CHAPTER 3 : FACTORS AND MULTIPLES

Let's Recall

1. Factors of 67 = 1 × 67 and 67 × 1.
Thus, factors of 67 are 1 and 67.

2. Multiples of 7 = 35, 42, 49, 77, 56.

3. All the numbers between 20 and 60 whose factors are 2, 3 and 5 is 30.

4. (*a*) True
Factors of 127 = 1 × 127.
Clearly, 127 has two factors, 1 and the number itself. So, it is a prime number.

(*b*) False
In 533, 5 + 3 + 3 = 11.
So, 11 is not divisible by 3.
Thus, 533 is not divisible by 3.

(*c*) A factor of a number is an exact divisor of that number.
So, divide 134 by 4.
Clearly, 4 is not the exact divisor of 134.
Hence, 4 is not a factor of 134.

```
4)134(33
 −12
  14
 −12
   2
```

(*d*) If 1210 is multiple of 10 and 11, then it should be completely divisible by 10 and 11.
Here, both remainder is 0, so, 1210 is completely divisible by 10 and 11.

```
10)1210(121        11)1210(110
 −10                −11
  21                 11
 −20                −11
   10                 00
  −10                −00
    0                  0
```

Hence, 1210 is multiple of 10 and 11.

Practice Time 3A

1. (*a*) 1 is a factor of every number.

(*b*) The greatest factor of a number is the number itself.

(*c*) The number 1 has only one factor.

(*d*) When a number is divided by its factor, the remainder is 0.

(*e*) The smallest number which has exactly two factors 1 and the number itself is 2.

(*f*) The factor of a non-zero number is either less than or equal to the number.

(*g*) The factors of 6 are 1, 2, 3, 6.

2. (*a*) $1 \times 9 = 9$; 1 and 9 are the factors of 9.

$3 \times 3 = 9$; 3 and 3 are the factors of 9.

$9 \times 1 = 9$; 9 and 1 are the factors of 9.

Since, there are no pair of numbers is left whose product is 9.

So, 1,3 and 9 are all possible factors of 9.

(*b*) $1 \times 16 = 16$; 1 and 16 are the factors of 16.

$2 \times 8 = 16$; 2 and 8 are the factors of 16.

$4 \times 4 = 16$; 4 and 4 are the factors of 16.

$8 \times 2 = 16$; 8 and 2 are the factors of 16.

$16 \times 1 = 16$; 16 and 1 are the factors of 16.

Since, there are no pair of numbers left whose product is 16.

So, 1,2,4,8 and 16 are all possible factors of 16.

(*c*) $1 \times 28 = 28$

$2 \times 14 = 28$

$4 \times 7 = 28$

$7 \times 4 = 28$

$14 \times 2 = 28$

$28 \times 1 = 28$

Thus, the factors of 28 are 1, 2, 4, 7, 14 and 28.

(*d*) $1 \times 32 = 32$

$2 \times 16 = 32$

$4 \times 8 = 32$

$8 \times 4 = 32$

$16 \times 2 = 32$

$32 \times 1 = 32$

Thus, the factors of 32 are 1, 2, 4, 8, 16 and 32.

(*e*) to (*j*)— (Same as above).

3. A factor of a number is an exact divisor of that number. So, divide 1004 by 9. Clearly, 9 is not the exact divisor of 1004.

Hence, 9 is not a factor of 1004.

```
9)1004(111
 - 9
   10
 - 9
    14
  - 9
     5
```

4. (*a*) Divide 148 by 8.

Since, the division of 148 by 8 leaves a remainder 4. So, 8 is not a factor of 148.

```
8)148(18 ← Q
 - 8
   68
 - 64
    4 ← R
```

(*b*) Divide 296 by 16.

Since, the division of 296 by 16 leaves a remainder 8. So, 16 is not a factor of 296.

```
16)296(18 ← Q
 - 16
   136
 - 128
    08 ← R
```

(*c*) Divide 342 by 24.

Since, the division of 342 by 24 leaves a remainder 6. So, 24 is not a factor of 342.

```
24)342(14 ← Q
 - 24
   102
 - 96
    06 ← R
```

(*d*) Divide 441 by 21.

Since, the division of 441 by 21 leaves no remainder. So, 21 is a factor of 441.

```
21)441(21 ← Q
 - 42
   021
 - 21
    0 ← R
```

Quick Check (Page 61)

(*a*) (*ii*) (*b*) (*iii*) (*c*) (*iv*) (*d*) (*v*) (*e*) (*i*)

Think and Answer (Page 62)

Multiples of 13 between 100 and 200 are: 104, 117, 130, 143, 156, 169, 182, 195. These are 8 in number.

Practice Time 3B

1. (*a*) 7 is the smallest multiple of 7.

(*b*) Multiples of an even number is a/an even number.

(*c*) Every number is a multiple of 1 and itself.

(*d*) 0 is the multiple of every non-zero number.

(*e*) There are 9 multiples of 10 between 1 and 100.

2. (*a*) We know that, $11 \times 1 = 11$, $11 \times 2 = 22$, $11 \times 3 = 33$, $11 \times 4 = 44$ and $11 \times 5 = 55$.

Thus, the first five multiples of 11 are 11, 22, 33, 44 and 55.

(*b*) We know that, $13 \times 1 = 13$, $13 \times 2 = 26$, $13 \times 3 = 39$, $13 \times 4 = 52$ and $13 \times 5 = 65$.

Thus, the first five multiples of 13 are 13, 26, 39, 52 and 65.

(*c*) We know that, $18 \times 1 = 18$, $18 \times 2 = 36$, $18 \times 3 = 54$, $13 \times 4 = 72$ and $18 \times 5 = 90$.

Thus, the first five multiples of 18 are 18, 36, 54, 72 and 90.

(*d*) and (*e*)—Same as above.

3. (*a*) We know that, $8 \times 48 = 384$.
Thus, the 8th multiple of 48 is 384.
(*b*) We know that, $10 \times 50 = 500$.
Thus, the 10th multiple of 50 is 500.
(*c*) Same as above.
(*d*) We know that, $2 \times 9 = 18$, $4 \times 9 = 36$, $6 \times 9 = 54$, $8 \times 9 = 72$ and $10 \times 9 = 90$.
Thus, the first five even multiples of 9 are 18, 36, 54, 72 and 90.
(*e*) We know that, $1 \times 11 = 11$, $3 \times 11 = 33$, $5 \times 11 = 55$, $7 \times 11 = 77$ and $9 \times 11 = 99$.
Thus, the first five odd multiples of 11 are 11, 33, 55, 77 and 99.

4. (*a*) The multiples 11 less than 200 are 11, 22, 33, 44, 55, 66, 77, 88, 99, 110, 121, 132, 143, 154, 165, 176, 187 and 198.
(*b*) The multiples 25 between 100 and 200 are 125, 150, 175 and 200.
(*c*) The multiples of 15 are 15, 30, 45, 60, 75 and 90.

5. (*a*) If 238 is a multiple of 8, then it should be completely divisible by 8.
Here, remainder is 6. So, 238 is not completely divisible by 8.
Hence, 238 is not a multiple of 8.

$$\begin{array}{r} 8\overline{)238}(29 \\ -16\downarrow \\ \hline 78 \\ -72 \\ \hline 06 \end{array}$$

(*b*) If 196 is a multiple of 16, then it should be completely divisible by 16.
Here, remainder is 4. So, 196 is not completely divisible by 16.
Hence, 196 is not a multiple of 16.

$$\begin{array}{r} 16\overline{)196}(12 \\ -16\downarrow \\ \hline 036 \\ -\ 32 \\ \hline 04 \end{array}$$

(*c*) If 386 is a multiple of a, then it should be completely divisible by 9.
Here, remainder is 8. So, it is not completely divisible by 9. Hence, 386 is not divisible by 9.

$$\begin{array}{r} 9\overline{)386}(42 \\ -36\downarrow \\ \hline 26 \\ -18 \\ \hline 8 \end{array}$$

(*d*) If 1440 is a multiple of 12, then it should be completely divisible by 12.
Here, remainder is 0, 1440 is completely divisible by 12.
Hence, 1440 is a multiple of 12.

$$\begin{array}{r} 12\overline{)1440}(120 \\ -12\downarrow\ \ \downarrow \\ \hline 24\ \ \downarrow \\ -24 \\ \hline 00 \\ -00 \\ \hline 0 \end{array}$$

Practice Time 3C

1. (*b*) **Divisible by 2.**
Given number = 1605.
If the digit at ones place is 0, 2, 4, 6 or 8, it is divisible by 2.
The digit at ones place is 5. So, it is not divisible by 2.
Thus, 1605 is not divisible by 2.
Divisible by 3.
Given number is 1605.
If the sum of the digits of a number is divisible by 3, then the number is divisible by 3.
Here, $1 + 6 + 0 + 5 = 12$, it is divisible by 3.
Thus, 1605 is divisible by 3.
Divisible by 4.
Given number is 1605.
If the number formed by last two digits (tens and ones digit) of the number is divisible by 4, then the number is divisible by 4.
Here, 05 is not divisible by 4.
Thus, 1605 is not divisible by 4.
Divisible by 5.
Given number is 1605.
If the digit at ones place of the number is either 5 or 0, the number is divisible by 5.
Here, the ones digit is 5.
Thus, 1605 is divisible by 5.
Divisible by 6.
Given number is 1605.
A number is divisible by 6, if it is divisible by both 2 and 3.
Ones digit is 5, it is neither divisible by 2 nor by 3.
Thus, 1605 is not divisible by 6.
Divisible by 9.
Given number is 1605.
If the sum of digits of a number is divisible by 9, then the number divisible by 9.
Here, $1 + 6 + 0 + 5 = 12$, which is not divisible by 9.
Thus, 1605 is not divisible by 9.
Divisible by 10.
Given number is 1605.
If the digit at ones place is 0, the number is divisible by 10.
Here, the digit at ones place is 5, it is not divisible by 10.
Thus, 1605 is not divisible by 10.

(*c*) to (*k*) —(Same as above).

	Number	Divisible by						
		2	3	4	5	6	9	10
(*a*)	1359	✗	✓	✗	✗	✗	✓	✗
(*b*)	1605	✗	✓	✗	✓	✗	✗	✗
(*c*)	3420	✓	✓	✓	✓	✓	✓	✓
(*d*)	6543	✗	✓	✗	✗	✗	✓	✗
(*e*)	5004	✓	✓	✓	✗	✓	✓	✗
(*f*)	7625	✗	✗	✗	✓	✗	✗	✗
(*g*)	4790	✓	✗	✗	✓	✗	✗	✓
(*h*)	5423	✗	✗	✗	✗	✗	✗	✗
(*i*)	9963	✗	✓	✗	✗	✗	✓	✗
(*j*)	6739	✗	✗	✗	✗	✗	✗	✗
(*k*)	8400	✓	✓	✓	✓	✓	✗	✓

2. We know that, if the difference of sum of digits at odd places and sum of digits at even places is 0 or divisible by 11, then the number is divisible by 11.

(*a*) Given number is 28316.

As, $[(2 + 3 + 6) - (8 + 1)] = (11 - 9) = 2$, it is not divisible by 11.

Thus, 28316 is not divisible by 11.

(*b*) Given number is 84535.

As, $[(8 + 5 + 5) - (4 + 3)] = (18 - 7) = 11$, which is divisible by 11.

Thus, 84535 is divisible by 11.

(*c*) Given number is 19026.

As, $[(1 + 0 + 6) - (9 + 2)] = (7 - 11)$, which is not divisible by 11.

Thus, 19026 is not divisible by 11.

Practice Time 3D

1. (*a*) False (*b*) False (*c*) True

(*d*) True (*e*) False (*f*) False

2. (*a*) 97 is the only prime number between 90 and 100.

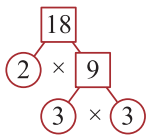
(*b*) 2 is the smallest and only even prime number.

(*c*) There are 25 prime numbers between 1 and 100.

(*d*) The prime factors of 32 are $2 \times 2 \times 2 \times 2 \times 2$.

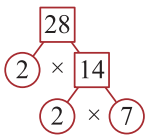
(*e*) 9 is the smallest odd composite number.

3. (*a*)



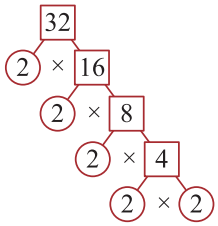
Therefore, $18 = 2 \times 3 \times 3$.

(*b*)



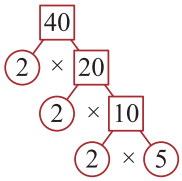
Therefore, $28 = 2 \times 2 \times 7$.

(*c*)



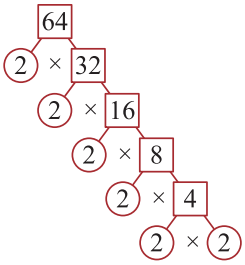
Therefore, $32 = 2 \times 2 \times 2 \times 2 \times 2$.

(*d*)



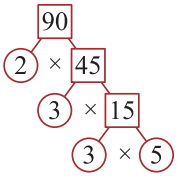
Therefore, $40 = 2 \times 2 \times 2 \times 5$.

(*e*)



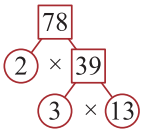
Therefore, $64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$.

(*f*)



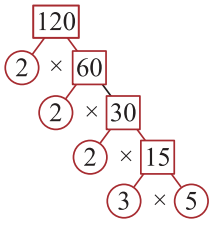
Therefore, $90 = 2 \times 3 \times 3 \times 5$.

(*g*)



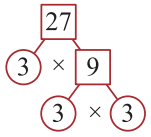
Therefore, $78 = 2 \times 3 \times 13$.

(*h*)



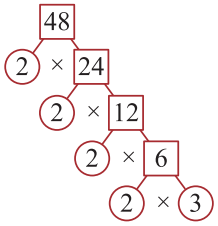
Therefore, $120 = 2 \times 2 \times 2 \times 3 \times 5$.

4. (*a*)



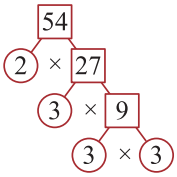
Therefore, $27 = 3 \times 3 \times 3$.

(*b*)



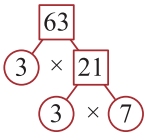
Therefore, $48 = 2 \times 2 \times 2 \times 2 \times 3$.

(*c*)



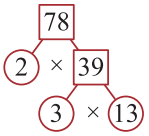
Therefore, $54 = 2 \times 3 \times 3 \times 3$.

(*d*)



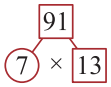
Therefore, $63 = 3 \times 3 \times 7$.

(*e*)



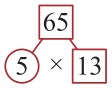
Therefore, 78 = 2 × 3 × 13.

(*f*)



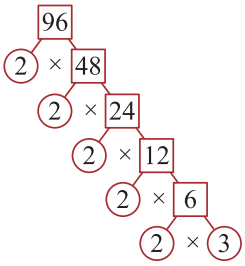
Therefore, 91 = 7 × 13.

(*g*)



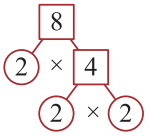
Therefore, 65 = 5 × 13.

(*h*)



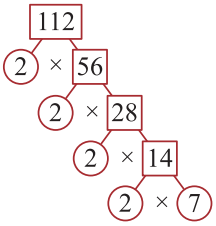
Therefore, 96 = 2 × 2 × 2 × 2 × 2 × 3.

(*i*)



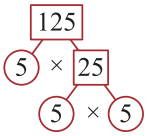
Therefore, 8 = 2 × 2 × 2.

(*j*)



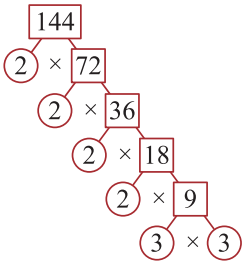
Therefore, 112 = 2 × 2 × 2 × 2 × 7.

(*k*)



Therefore, 125 = 5 × 5 × 5.

(*l*)



Therefore, 144 = 2 × 2 × 2 × 2 × 3 × 3.

Practice Time 3E

1. (*a*) **Step 1.** List the factors of the first number, that is, 18.

Factors of 18 are 1, 2, 3, 6, 9 and 18.

Step 2. List the factors of the second number, that is, 24.

Factors of 24 are 1, 2, 3, 4, 6, 8 and 12.

Step 3. List the common factors of both the numbers.

Common factors of 18 and 24 are 1, 2, 3 and 6.

(*b*) **Step 1.** List the factors of the first number, that is, 21.

Factors of 21 are 1, 3, 7 and 21.

Step 2. List the factors of the second number, that is, 36.

Factors of 36 are 1, 2, 3, 4, 6, 9,12,18 and 36.

Step 3. List the common factors of both the numbers.

Common factors of 21 and 36 are 1 and 3.

(*c*) and (*d*) — (Same as above).

2. (*a*) **Step 1.** List the factors of the first number, that is, 15.

Factors of 15 are 1, 3, 5 and 15.

Step 2. List the factors of the second number, that is, 15.

Factors of 20 are 1, 2, 4, 5, 10 and 20.

Step 3. List the common factors of both the numbers.

Common factors of 15 and 20 are 1, 5.

Step 4. Choose the highest common factor, that is, 5.

Thus, the highest common factor (HCF) of 15 and 20 is 5.

(*b*) **Step 1.** List the factors of the first number, that is, 12.

Factors of 12 are 1, 2, 3, 4, 6 and 12.

Step 2. List the factors of the second number, that is, 18.

Factors of 18 are 1, 2, 3, 6, 9 and 18.

Step 3. List the common factors of both the numbers.

Common factors of 12 and 18 are 1, 2, 3 and 6.

Step 4. Choose the highest common factor, that is, 6.

Thus, the highest common factor (HCF) of 12 and 18 is 6.

(*c*) **Step 1.** List the factors of the first number, that is, 33.

Factors of 33 are 1, 3, 11 and 33.

Step 2. List the factors of the second number, that is, 55.

Factors of 55 are 1, 5 and 11.

Step 3. List the common factors of both the numbers.
Common factors of 33 and 55 are 1 and 11.
Step 4. Choose the highest common factor, that is, 11.
Thus, the highest common factor (HCF) of 33 and 55 is 11.

(*d*) **Step 1.** List the factors of the first number, that is, 35.
Factors of 35 are 1, 5, 7 and 35.
Step 2. List the factors of the second number, that is, 42.
Factors of 42 are 1, 2, 3, 6, 7, 14, 21 and 42.
Step 3. List the common factors of both the numbers.
Common factors of 35 and 42 are 1 and 7.
Step 4. Choose the highest common factor (HCF) of 35 and 42 is 7.

(*e*) and (*f*) — (Same as above).

(*g*) **Step 1.** List the factors of the first number, that is, 18.
Factors of 18 are 1, 2, 3, 6, 9 and 18.
Step 2. List the factors of the second number, that is, 42.
Factors of 24 are 1, 2, 3, 6, 8, 12 and 24.
Step 3. List the factors of third numbers, that is, 32.
Factors of 32 are 1, 2, 4, 8, 16 and 32.
Step 4. List the common factors of first to third numbers.
Common factors of 18, 24 and 32 are 1 and 2.
Step 5. Choose the highest common factor, that is, 2.
Thus, the highest common factor (HCF) of 18, 24 and 32 is 2.

(*h*) to (*l*) — (Same as above).

3. (*a*)

3	15
5	5
	1

$15 = 3 \times 5$

2	24
2	12
2	6
3	3
	1

$24 = 2 \times 2 \times 2 \times 3$

The common factors of 15 and 24 is 3.

$\therefore$ HCF of 15 and 24 = 3.

(*b*)

2	18
3	9
3	3
	1

$18 = 2 \times 3 \times 3$

2	90
3	45
3	15
5	5
	1

$90 = 2 \times 3 \times 3 \times 5$

The common factors of 18 and 90 are 2, 3 and 3.

$\therefore$ HCF of 18 and 90 = $2 \times 3 \times 3 = 18$.

(*c*)

2	32
2	16
2	8
2	4
2	2
	1

$32 = 2 \times 2 \times 2 \times 2 \times 2$

2	40
2	20
2	10
5	5
	1

$40 = 2 \times 2 \times 2 \times 5$

The common factors of 32 and 40 are 2, 2 and 2.

$\therefore$ HCF of 32 and 40 = $2 \times 2 \times 2 = 8$.

(*d*)

2	42
3	21
7	7
	1

$42 = 2 \times 3 \times 7$

2	56
2	28
2	14
7	7
	1

$56 = 2 \times 2 \times 2 \times 7$

The common factors of 42 and 56 are 2 and 7.

$\therefore$ HCF of 42 and 56 = $2 \times 7 = 14$.

(*e*) and (*f*) — (Same as above).

(*g*)

2	12
2	6
3	3
	1

$12 = 2 \times 2 \times 3$

2	24
2	12
2	6
3	3
	1

$24 = 2 \times 2 \times 2 \times 3$

2	48
2	24
2	12
2	6
3	3
	1

$48 = 2 \times 2 \times 2 \times 2 \times 3$

The common factors of 12, 24 and 48 are 2, 2 and 3.

$\therefore$ HCF of 12, 24 and 48 = $2 \times 2 \times 3 = 12$.

(*h*)

2	22
11	11
	1

3	33
11	11
	1

2	66
3	33
11	11
	1

$22 = 2 \times 11$ $33 = 3 \times 11$ $66 = 2 \times 3 \times 11$

The common factors of 22, 33 and 66 is 11.

$\therefore$ HCF of 22, 33 and 66 = 11.

(*i*)

2	24
2	12
2	6
3	3
	1

2	36
2	18
3	9
3	3
	1

2	56
2	28
2	14
7	7
	1

$24 = 2 \times 2 \times 2 \times 3$ $36 = 2 \times 2 \times 3 \times 3$ $56 = 2 \times 2 \times 2 \times 7$

The common factors of 24, 36 and 56 are 2 and 2.

$\therefore$ HCF of 24, 36 and 56 = $2 \times 2 = 4$.

(*j*)

2	22
11	11
	1

2	66
3	33
11	11
	1

3	99
3	33
11	11
	1

$22 = 2 \times 11$ $66 = 2 \times 3 \times 11$ $99 = 3 \times 3 \times 11$

The common factors of 22, 66 and 99 is 11.

$\therefore$ HCF of 22, 66 and 99 = 11.

(*k*) to (*l*) — (Same as above).

4. (*a*) HCF of 21 and 63.

$21\overline{)63}(3$
-63
0

Thus, HCF of 21 and 63 is 21.

(*b*) HCF of 35 and 49.

$35\overline{)49}(1$
-35
$14\overline{)35}(2$
-28
$7\overline{)14}(2$
-14
0

Thus, HCF of 35 and 49 is 7.

(*c*) HCF of 92 and 132.

$92\overline{)132}(1$
-92
$40\overline{)92}(2$
-80
$12\overline{)40}(3$
-36
$4\overline{)12}(3$
-12
0

Thus, HCF of 92 and 132 is 4.

(*d*) First find the HCF of 36 and 54.

$36\overline{)54}(1$
-36
$18\overline{)36}(2$
-36
0

$\therefore$ HCF of 36 and 54 = 18.

Now, we find the HFC of 18 and 72.

$18\overline{)72}(4$
-72
0

Thus, HCF of 36, 54 and 72 is 18.

(*e*) First find the HCF of 132 and 140.

$132\overline{)140}(1$
-132
$8\overline{)132}(16$
$-8\downarrow$
52
-48
$4\overline{)8}(2$
-8
0

$\therefore$ HCF of 132 and 140 = 4.

Now, we find the HFC of 4 and 250.

$4\overline{)250}(62$
$-24\downarrow$
10
-8
$2\overline{)4}(2$
-4
0

Thus, HCF of 132, 140 and 250 is 2.

(*f*) First find the HCF of 165 and 285.

$165\overline{)285}(1$
-165
$120\overline{)165}(1$
-120
$45\overline{)120}(2$
-90
$30\overline{)45}(1$
-30
$15\overline{)30}(2$
-30
0

$\therefore$ HCF of 165 and 285 = 15.

Now, we find the HFC of 15 and 205.

$15\overline{)205}(13$
$-15\downarrow$
55
-45
$10\overline{)15}(1$
-10
$5\overline{)10}(2$
-10
0

Thus, HCF of 165, 285 and 205 is 5.

(*g*) First find the HCF of 164 and 180.

$164\overline{)180}(1$
-164
$16\overline{)164}(10$
-160
$4\overline{)16}(4$
-16
0

$\therefore$ HCF of 164 and 180 = 4.

Now, we find the HFC of 4 and 112.

$4\overline{)112}(28$
-8
32
-32
0

Thus, HCF of 164, 180 and 112 is 4.

(*h*) First find the HCF of 285 and 350.

$285\overline{)350}(1$
-285
$65\overline{)285}(4$
-260
$25\overline{)65}(2$
-50
$15\overline{)25}(1$
-15
$10\overline{)15}(1$
-10
$5\overline{)10}(2$
-10
0

$\therefore$ HCF of 285 and 300 = 5.

Now, we find the HFC of 5 and 1875.

$5\overline{)1875}(375$
-15
37
-35
25
-25
0

Thus, HCF of 285, 300 and 1875 is 5.

5. The greatest number of baskets, if each basket has the same number of apples and mangoes will be HFC of 1320 and 1480.

So, we have to find HFC of 1320 and 1480.

2	1320
2	660
2	330
3	165
5	55
11	11
	1

2	1480
2	740
2	370
5	185
37	37
	1

Factors of 1320 = $2 \times 2 \times 2 \times 3 \times 5 \times 11$

Factors of 1480 = $2 \times 2 \times 2 \times 5 \times 37$

The common factors of 1320 and 1480 are 2, 2, 2 and 5.

So, HCF of 1320 and 1480 = $2 \times 2 \times 2 \times 5 = 40$

Thus, the greatest number of baskets required is 40.

6. The greatest possible length of a stick which can be used to measure the exact number of times will be the HFC of 448, 560 and 920. So, we have to find the HFC of 448, 560 and 920.

2	448
2	224
2	112
2	56
2	28
2	14
7	7
	1

2	560
2	280
2	140
2	70
5	35
7	7
	1

2	920
2	460
2	230
5	115
23	23
	1

Factors of 448 = $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7$

Factors of 560 = $2 \times 2 \times 2 \times 2 \times 5 \times 7$

Factors of 920 = $2 \times 2 \times 2 \times 5 \times 23$

The common factors of 448, 560 and 920 are 2, 2 and 2.

So, HCF of 448, 560 and 920 = $2 \times 2 \times 2 = 8$

Thus, the largest possible length of a stick is 8 cm.

7. The capacity to take out the maximum amount of oil from both the drums at the same time will be the HFC of 220 and 336. So, we have to find the HCF of 220 and 336.

2	220
2	110
5	55
11	11
	1

2	336
2	168
2	84
2	42
3	21
7	7
	1

Factors of 220 = $2 \times 2 \times 5 \times 11$

Factors of 336 = $2 \times 2 \times 2 \times 2 \times 3 \times 7$

The common factors of 220 and 336 are 2 and 2.

So, HFC of 220 and 336 = $2 \times 2 = 4$

Thus, the capacity should the container to take out the maximum amount of oil from both the drums is 4 litres.

Practice Time 3F

1. (*a*) **Step 1.** Write some multiples of number 12.
Multiples of 12 are 12, 24, 36, 48, (60), 72, 84, 96, 108, (120), 132, 144, 156, 168, (180), ...

Step 2. Write some multiples of number 20.
Multiples of 20 are 20, 40, (60), 80, 100, (120), 140, 160, (180), ...

Step 3. List the common multiples of both the numbers..
Common multiples of 12 and 20 are (60), 120, 180, ...

(*b*) **Step 1.** Write some multiples of number 16.
Multiples of 16 are 16, 32, (48), 64, 80, (96), 112, 128, (144), ...

Step 2. Write some multiples of number 24.
Multiples of 24 are 24, (48), 72, (96), 120, (144), ...

Step 3. List the common multiples of both the numbers.
Common multiples of 16 and 24 are (48), 96, 144.

(*c*) **Step 1.** Write some multiples of number 14.
Multiples of 14 are 14, 28, (42), 56, 70, (84), 98, 112, (126), ...

Step 2. Write some multiples of number 21.
Multiples of 21 are 21, (42), 63, (84), 105, (126), ...

Step 3. List the common multiples of both the numbers..
Common multiples of 14 and 21 are (42), 84, 126.

(*d*) and (*e*) — (Same as above)

2. (*a*) **Step 1.** Write some multiples of number 21.
Multiples of 21 are 21, 42, 63, (84), 105, 126, 147, (168), 189, ...

Step 2. Write some multiples of number 28.
Multiples of 28 are 28, 56, (84), 112, 140, (168), 196, ...

Step 3. List the common multiples of both the numbers.
Common multiples of 21 and 28 are 84, 168, ...

Step 4. The smallest common multiple will be the required LCM.

Thus, the least common multiple (LCM) of 21 and 28 = 84.

(*b*) **Step 1.** Write some multiples of number 48.
Multiples of 48 are 48, 96, (144), 192, 240, (288), 336, 384, ...

Step 2. Write some multiples of number 72.
Multiples of 72 are 72, (144), 216, (288), 360, 432, ...

Step 3. List the common multiples of both the numbers.
Common multiples of 48 and 72 are (144), 288, ...

Step 4. The smallest common multiple will be the required LCM.

Thus, the least common multiple (LCM) of 48 and 72 = 144.

(*c*) **Step 1.** Write some multiples of number 22.
Multiples of 22 are 22, 44, 66, 88, (110), 132, 154, 176, 198, 220, 242, 264, 286, 308, (330), ...

Step 2. Write some multiples of number 110.
Multiples of 110 are (110), 220, (330), ...

Step 3. List the common multiples of both the numbers.
Common multiples of 22 and 100 are 110, 330, ...

Step 4. The smallest common multiple will be the required LCM.

Thus, the least common multiple (LCM) of 22 and 110 = 110.

(*d*) to (*f*) — (Same as above).

(*g*) **Step 1.** Write some multiples of number 12.
Multiples of 22 are 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144, 156, 168, (180), 192, 204, ..., (360), ...

Step 2. Write some multiples of number 15.
Multiples of 15 are 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, (180), 195, ..., (360), ...

Step 3. Write some multiples of number 18.
Multiples of 18 are 18, 36, 54, 72, 90, 108, 126, 144, 162, (180), 198, 216, ..., (360), ...

Step 4. List the common multiple of these numbers.

Common multiples of 12, 15 and 18 are 180, 360, ...

Step 5. The smallest common multiple will be the required LCM.

Thus, the least common multiple (LCM) of 12, 15 and 18 = 180.

(*h*) Multiple of 20 are 20, 40, 60, 80, ..., 280, 300, ..., 400, ..., 600, ...

Multiple of 30 are 30, 60, 90, ..., 300, ..., 450, ..., 600, ...

Multiple of 50 are 50, 100, 150, ..., 300, ..., 500, 550, 600, ...

Common multiples of 20, 30 and 50 are 300, 600, ...

The smallest common multiple will be the required LCM.

Thus, the least common multiple (LCM) of 20, 30 and 50 = 300.

(*i*) Multiple of 20 are 20, 40, 60, ..., 160, 180, ..., 300, 320, ...

Multiple 32 are 32, 64, ..., 160, ..., 288, 320, ...

Multiple of 40 are 40, 80, ..., 160, 200, ..., 280, 320, ...

Common multiples of 20, 32 and 40 are 160, 320, ...

Thus, the least common multiple (LCM) of 20, 32 and 40 = 160.

(*j*) (*l*) — (Same as above).

3. (*a*) We write the prime factorisation of each number.

$14 = 2 \times 7$

$17 = 1 \times 17$

Thus, LCM of 14 and 17 is $2 \times 7 \times 17 = 238$.

2 | 14
7 | 7
1 |

17 | 17
1 |

(*b*) We write the prime factorisation of each number.

$51 = 3 \times 17$

$54 = 2 \times 3 \times 3 \times 3$

Thus, LCM of 51 and 54 is $2 \times 3 \times 3 \times 3 \times 17 = 918$.

3 | 51
17 | 17
1 |

2 | 54
3 | 27
3 | 9
3 | 3
1 |

(*c*) We write the prime factorisation of each number.

$78 = 3 \times 3 \times 13$

$82 = 2 \times 41$

Thus, LCM of 78 and 82 is $2 \times 3 \times 13 \times 41 = 3198$.

2 | 82
3 | 39
13 | 13
1 |

2 | 82
41 | 41
1 |

(*d*) We write the prime factorisation of each number.

$25 = 5 \times 5$

$75 = 3 \times 5 \times 5$

Thus, LCM of 25 and 75 is $5 \times 5 \times 3 = 75$.

5 | 25
5 | 5
1 |

3 | 75
5 | 25
5 | 5
1 |

(*e*) (*f*) — (Same as above).

(*g*) We write the prime factorisation of each number.

$18 = 2 \times 3 \times 3$

$20 = 2 \times 2 \times 5$

$32 = 2 \times 2 \times 2 \times 2 \times 2$

Here, 2 appears maximum five times and 3 appears maximum 2 times and 5 appears maximum 1 time.

Thus, the LCM of 18, 20 and 32 is $2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 1440$.

2 | 18
3 | 9
3 | 3
1 |

2 | 20
2 | 10
5 | 5
1 |

2 | 32
2 | 16
2 | 8
2 | 4
2 | 2
1 |

(*h*) We write the prime factorisation of each number.

$12 = 2 \times 2 \times 3$

$16 = 2 \times 2 \times 2 \times 2$

$30 = 2 \times 3 \times 5$

Here, 2 appears maximum three times and 3 appears maximum one time and 5 appears maximum 1 time.

Thus, the LCM of 12, 16 and 30 = $2 \times 2 \times 2 \times 3 \times 5 = 240$.

2 | 12
2 | 6
3 | 3
1 |

2 | 16
2 | 8
2 | 4
2 | 2
1 |

2 | 30
3 | 15
5 | 5
1 |

(*i*) We write the prime factorisation of each number.

$21 = 3 \times 7$

$24 = 2 \times 2 \times 2 \times 3$

$36 = 2 \times 2 \times 3 \times 3$

3 | 21
7 | 7
1 |

2 | 24
2 | 12
2 | 6
3 | 3
1 |

2 | 36
3 | 18
3 | 9
3 | 3
1 |

Here, 2 appears maximum three time 3 appears maximum two time and 7 appears maximum 1 time.

Thus, the LCM of 21, 24 and 36

$= 2 \times 2 \times 2 \times 3 \times 3 \times 7$

$= 504.$

(*j*) to (*l*) — (Same as above).

4. (*a*) We have, 4, 24, 32.

2	4,	24,	32
2	2,	12,	16
2	1,	6,	8
2	1,	3,	4
2	1,	3,	2
3	1,	3,	1
	1,	1,	1

LCM = $2 \times 2 \times 2 \times 2 \times 2 \times 3 = 96$.

(*b*) We have, 24, 42, 72.

2	24,	42,	72
2	12,	21,	36
2	6,	21,	18
3	3,	21,	9
3	1,	7,	3
7	1,	7,	1
	1,	1,	1

LCM = $2 \times 2 \times 2 \times 3 \times 3 \times 7 = 504$.

(*c*) We have, 20, 60, 90.

2	20,	60,	90
2	10,	30,	45
3	5,	15,	45
3	5,	5,	15
5	5,	5,	5
	1,	1,	1

LCM = $2 \times 2 \times 3 \times 3 \times 5 = 180$.

(*d*) We have, 18, 36, 48.

2	18,	36,	48
2	9,	18,	24
2	9,	9,	12
2	9,	9,	6
3	9,	9,	3
3	3,	3,	1
	1,	1,	1

LCM = $2 \times 2 \times 2 \times 2 \times 3 \times 3 = 144$.

(*e*) We have, 9, 13, 26.

2	9,	13,	26
3	9,	13,	13
3	3,	13,	13
13	1,	13,	13
	1,	1,	1

LCM = $2 \times 3 \times 3 \times 13 = 234$.

(*f*) We have, 18, 9, 27.

2	18,	9,	27
3	9,	9,	27
3	3,	3,	9
3	1,	1,	3
	1,	1,	1

LCM = $2 \times 3 \times 3 \times 3 = 54$.

(*g*) We have, 32, 16, 50.

2	32,	16,	50
2	16,	8,	25
2	8,	4,	25
2	4,	2,	25
2	2,	1,	25
25	1,	1,	25
	1,	1,	1

LCM = $2 \times 2 \times 2 \times 2 \times 2 \times 25 = 800$.

(*h*) We have, 14, 35, 49.

2	14,	35,	49
5	7,	35,	49
7	7,	7,	49
7	1,	1,	7
	1,	1,	1

LCM = $2 \times 2 \times 7 \times 7 = 490$.

5. Given two bulbs flash at regular intervals of 42 seconds and 77 seconds respectively.

LCM of 42 and 77,

$42 = 2 \times 3 \times 7$

$77 = 7 \times 11$

LCM $= 2 \times 3 \times 7 \times 11 = 462$ seconds

$= \frac{462}{60}$ min = 7 min 42 seconds

= 7 min (approx)

They first time flash together at 10:45 p.m.

(*a*) Second time:

First time they flash together + 7 min

= 10:45 p.m. + 7 min

or 10:52 p.m

(*b*) Fifth time:

Second time they flash together

+ (3 × 7) min

[∵ Second time + 3 more times = 5 times]

= 10:52 p.m. + 21 min

or 11:13 p.m.

6. Number of hair bands = LCM of 4, 6 and 8.

2	4, 6, 8
2	2, 3, 4
2	1, 3, 2
3	1, 3, 1
	1, 1, 1

LCM = 2 × 2 × 2 × 3

LCM = 24

Thus, number of hair bands Sia has is 24.

7. Given two bells ring at intervals of 24 min and 36 min. LCM of 24 and 36:

2	24
2	12
2	6
3	3
	1

2	36
2	18
3	9
3	3
	1

24 = 2 × 2 × 2 × 3

36 = 2 × 2 × 3 × 3

LCM = 2 × 2 × 2 × 3 × 3

= 72 min

= (60 min + 12 min)

So, at (8:15 a.m. + 60 min + 12 min)

= 8 : 15 am + 1 h + 12 min

= 9:27 am

Thus, at 9:27 a.m. they will ring together.

Practice TIme 3G

1. (*a*) Given that, HCF = 12,

Product of two numbers = 324.

We know that,

HCF × LCM = Product of two numbers.

Here, 12 × LCM = 324

So, $\text{LCM} = \frac{324}{12} = 27.$

(*b*) Given that, HCF = 4, LCM = 252

We know that,

HCF × LCM = Product of two numbers.

Here, 4 × 252 = Product of two numbers.

So, Product of two numbers = 1008.

(*c*) Given, LCM = 72,

Product of two numbers = 864.

We know that,

HCF × LCM = Product of two numbers.

Here, HCF × 72 = 864.

So, $\text{HCF} = \frac{864}{72} = 12.$

(*d*) Given, HCF = 50, LCM = 300.

We know that,

HCF × LCM = Product of two numbers.

50 × 300 = Product of two numbers.

Product of two numbers = 15000.

2. Given that, Product of numbers = 225, HCF = 9.

We know that,

HCF × LCM = Product of two numbers.

Here, 9 × LCM = 225.

So, $\text{LCM} = \frac{225}{9} = 25.$

Thus, LCM = 25.

3. Given that, HCF = 15,

LCM = 45 and one number = 27.

We know that, HCF × LCM = 1st number × 2nd number.

Here, 15 × 45 = 27 × 2nd number.

So, 2nd number $= \frac{15 \times 45}{27} = \frac{675}{27}.$

2nd number = 25.

Thus, the other number is 25.

4. Given that, Product of two numbers = 450

HCF = 15.

We know that, HCF × LCM = Product of two numbers.

Here, 15 × LCM = 450

So, $\text{LCM} = \frac{450}{15} = 30$

Thus, LCM = 30

5. Given, LCM = 120,

Product of two numbers = 1800.

We know that, HCF × LCM = Product of two numbers.

Here, HCF × 120 = 1800.

So, $\text{HCF} = \frac{1800}{120} = 15.$

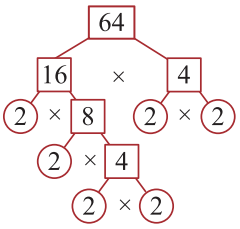
Mental Maths (Page 76)

1. (*a*) LCM of two co-prime numbers is their product.

2. (*b*) HCF of two co-prime numbers is 1.

3. (*a*) If a number is divisible by 2 and 3, then it will also be divisible by 6.

4. (*b*)



5. (*b*) There are 4 prime numbers between 1 and 50 having their ones digit as 3 are 3, 13, 23 and 43.

Chapter Assessment

1. (*a*) - (*iv*)

Since, LCM of 2, 4, 6, 8, 10 and 12 is 120. So, after each 120 seconds, they would toll together.

$$= \frac{30 \times 60}{120}$$

= 15 times.

But, according to question, they commence tolling together.

2	2,	4,	6,	8,	10,	12
2	1,	2,	3,	4,	5,	6
2	1,	1,	3,	2,	5,	3
3	1,	1,	3,	1,	5,	3
5	1,	1,	1,	1,	5,	1
	1,	1,	1,	1,	1,	1

LCM = 2 × 2 × 2 × 3 × 5 = 120.

So, they basically also toll at the beginning.

So, total tolls together = 15 + 1 = 16.

(*b*) - (*ii*)

LCM of 5, 6, 4 and 3 = 60.

On dividing 2497 by 60, the remainder = 37.

∴ Number to added = 60 – 37 = 23.

2	5,	6,	4,	3
2	5,	3,	2,	3
3	5,	3,	1,	3
5	5,	1,	1,	1
	1,	1,	1,	1

LCM = 2 × 2 × 3 × 5 = 60.

60)2497(13 ← Q
– 240↓
0097
– 60
37 ← R

(*c*) - (*iv*)

Reema completes his round in 308 seconds.

Neema completes his round in 198 seconds.

Siya completes his round in 252 seconds.

To meet again at starting point together, we need to find the LCM of 308, 198 and 252.

2	308,	198,	252
2	154,	99,	126
7	77,	99,	63
9	11,	99,	9
11	11,	11,	1
	1,	1,	1,

LCM = 2 × 2 × 7 × 9 × 11 = 2772.

∴ Required LCM = 2772 seconds = $\frac{2772}{60}$ min

= 46 min 12 second.

60)2772(46 ← min
– 240↓
0372
– 360
12 ← sec

Thus, they will meet again at the starting point after 46 min 12 second.

2. Number of cup cakes prepared in 4 different flavours = 72.

According to question, each flavour pastry are equal in number.

So, number of rows he can arrange to meet this requirement = 72 ÷ 4 = 18.

4)72(18
– 4↓
32
32
0

Thus, he can arrange them in 18 rows to meet the requirement.

3. Number of plants of four different varieties = 36.

Each row having the same type of plants.

∴ Number of plants will be planted in each row

= 36 ÷ 4 = 9.

Thus, 9 plants will be planted in each row.

Plants are important for the survival of living organisms as they absorb carbon dioxide and release oxygen.

4. Given number is 527253.

Change the position of two digits

527253 → 572253

Divisibility rule – If the difference of sum of digits at odd places and sum of digits at even places is 0 or divisible by 11, then the number is also divisible by 11.

Sum of odd places = 5 + 2 + 5 = 12

Sum of even places = 7 + 2 + 3 = 12.

12 – 12 = 0,

Which is divisible by 11.

Thus, 572253 is divisible by 11.

5. The measures of the steps of three children are 40 cm, 50 cm and 60 cm respectively.

We need to find the LCM to know the distance from the start to where the three children will step together again.

LCM of 40, 50, 60 = 2 × 2 × 2 × 3 × 5 × 5 = 600

A morning walk plays a major role in everyone's life. It leaves a positive impact on your mind and refreshes your brain.

6. Length of living room = 6 m 70 cm = 670 cm.

Breadth of living room = 3 m 50 cm = 350 cm.

Dimension of the largest square tile that can be fixed on the floor *i.e.*, HCF of 670 and 350 = 10.

```
350)670(1
  -350
  320)350(1
    -320
    30)320(10
      -30
      20)30(1
        -20
        10)20(2
          -20
           0
```

Thus, the largest square tile that can be fixed on the floor is of 10 cm.

7. The measure of the steps taken by the three women are 75 cm, 60 cm and 105 cm respectively. To know the minimum distance women should cover the distance in complete steps, we need to find the, LCM of 75, 60 and 105.

3	75,	60,	105
5	25,	20,	35
5	5,	4,	7
2	1,	4,	7
2	1,	2,	7
7	1,	1,	7
	1,	1,	1

∴ LCM = 3 × 5 × 5 × 2 × 2 × 7

= 2100 cm or 21 m.

8. Postal charges of three parcels are ₹30, ₹48 and ₹84. The greatest denomination of stamps she must buy to mail the three parcels *i.e.*, HCF of ₹30, ₹48 and ₹84.

First find the HCF of 30 and 48.

```
30)48(1
  -30
  18)30(1
    -18
    12)18(1
      -12
      6)12(2
        -12
         0
```

HCF of 30 and 48 = 6

Now, we find the HCF of 6 and 84.

```
6)84(14
 -6
 24
-24
 0
```

∴ HCF of 30, 48 and 84 = 6

Thus, Venkatesh must buy the stamp of ₹6 to mail the three parcels.

9. Traffic lights at three different road crossing change after every 1 min, 1 min 20 sec and 2 min. To know the time at which they will change again, we need to find the LCM of 1 min (60 sec), 1 min 20 sec (80 sec), 2 min (120 sec).

∴ LCM = 2 × 2 × 2 × 2 × 3 × 5

= 240 sec.

$= \frac{240}{60}$ min = 4 min.

2	60,	80,	120
2	30,	40,	60
2	15,	20,	30
2	15,	10,	15
3	15,	5,	15
5	5,	5,	5
	1,	1,	1

If they change simultaneously at 12 noon, then they will change simultaneously again at

= 12 noon + 4 min. = 12:04 p.m.

Thus, at 12:04 p.m. they will change simultaneously again.

10. Number of boys and girls are selected to participated in annual day function are 48 and 32 respectively.

The greatest number of teams that can participate in the function *i.e.,* HCF of 48 and 32.

HCF of 48 and 32 = 16

```
32)48(1
  -32
  16)32(2
    -32
     0
```

Number of boys in each team $= \frac{32}{16} = 2.$

Number of girls in each team $= \frac{48}{16} = 3$

Thus, 16 teams participate in the function and each team has 3 girls and 2 boys.

11. Given that, HCF = 44, LCM = 264,

First number = 2 × 44 + 0 = 88.

[∵ Dividend = Divisor]

We know that, HCF × LCM = First number × second number.

Here, 44 × 264 = 88 × 2nd number

So, 2nd number = $\frac{44 \times 264}{88}$ = 132.

Thus, second number is 132.

12. (*a*) HCF of 37 and 29

```
29)37(1
 -29
  8)29(3
   -24
    5)8(1
     -5
      3)5(1
       -3
        2)3(1
         -2
          1)2(1
           -2
            0
```

∴ HCF of 37 and 29 = 1.

LCM of 37 and 29.

29	37,	29
37	37,	1
	1,	1

∴ LCM of 37 and 29 = 29 × 37 = 1073.

HCF × LCM = Ist no. × IInd no.

1 × 1073 = 37 × 29

1073 = 1073.

Hence, verified

(*b*) HCF of 70 and 168

```
70)168(2
 -140
  28)70(2
   -56
    14)28(2
     -28
      0
```

∴ HCF of 70 and 168 = 14.

LCM of 70 and 168.

2	70,	168
2	35,	84
2	35,	42
3	35,	21
5	35,	7
7	7,	7
	1,	1

= 2 × 2 × 2 × 3 × 5 × 7 = 840

∴ LCM of 70 and 168 = 840.

We know that HCF × LCM = 1st number × 2nd number.

14 × 840 = 70 × 168

⇒ 11760 = 11760

Hence, verified

Brain Sizzlers (Page 79)

1. Let ones digit = 1

Given, ones and hundreds digits are interchanged.

Hundreds digit = 1

Sum of the digits = 5

∴ 1 + tens digit + 1 = 5

∴ Tens digit = 5 – 2 = 3

Thus, the required number is 131.

2. There are 360 erasers and 456 sharpeners. The greatest number of articles possible in each pile = HCF of 360 and 456.

```
360)456(1
 -360
  96)360(3
   -288
    72)96(1
     -72
      24)72(3
       -72
        0
```

∴ HCF of 360 and 456 is 24.

The number of piles formed = $\frac{360}{24} + \frac{456}{24}$

= 15 + 19 = 34 piles

Thus, the greatest number of articles possible in each pile is 24 and 34 piles are formed.

CHAPTER 4 : FRACTIONS

Let's Recall

1. (*a*) Three - fourth = $\frac{3}{4}$.

(*b*) One - fourth = $\frac{1}{4}$.

(*c*) Half = $\frac{1}{2}$.

2. Quantity of flour used = $\frac{3}{4}$ cup

Quantity of sugar used = $\frac{1}{2}$ cup

$\therefore \frac{3}{4} - \frac{1}{2} = \frac{3-2}{4} = \frac{1}{4}$ cup.

Thus, $\frac{1}{4}$ cup more quantity of flour was used than sugar to make the cookies.

3. Given numbers: $\frac{3}{4}$ and $\frac{1}{4}$

Cross multiply, $\frac{3}{4} \times \frac{1}{4}$, $12 > 4$

$\therefore \frac{3}{4}$ is greater than $\frac{1}{4}$.

Think and Answer (Page 85)

$\frac{3}{\square} = \frac{12}{20} = \frac{\square}{45}$

Cross multiplying, $\frac{3}{\square} \times \frac{12}{20}$

$\Rightarrow \quad 3 \times 20 = \square \times 12$

$\Rightarrow \quad 60 = \square \times 12$

$\Rightarrow \quad \square = \frac{\cancel{60}^{5}}{\cancel{12}}$

$\Rightarrow \quad \square = 5$

So, $\frac{3}{5} = \frac{12}{20} = \frac{\square}{45}$

Now, $\frac{12}{20} = \frac{\square}{45}$, on cross multiplying, $\frac{12}{20} \times \frac{\square}{45}$

$\Rightarrow \quad 12 \times 45 = 20 \times \square$

$\Rightarrow \quad \frac{12 \times 45}{20} = \square$

$\Rightarrow \quad \square = 27.$

Therefore, $\frac{3}{\boxed{5}} = \frac{12}{20} = \frac{\boxed{27}}{45}$.

Think and Answer (Page 85)

Yes. A unit fraction is always in its simplest form.

Practice Time 4A

1. $\because$ Fractions having numerator 1 are called unit fractions. So, unit fractions are:

$\frac{1}{8}, \frac{1}{5}, \frac{1}{10}$ and $\frac{1}{14}$.

2. Fractions having the same denominators are called like fractions.

And, Fractions having different denominators are called unlike fractions.

(*a*) Like fractions: $\frac{2}{5}, \frac{7}{5}$.

Unlike fractions: $\frac{5}{4}, \frac{1}{8}, \frac{3}{7}$.

(*b*) Like fractions: $\frac{3}{4}, \frac{1}{4}$.

Unlike fractions: $\frac{4}{5}, \frac{6}{7}, \frac{5}{9}$.

(*c*) Like fractions: $\frac{4}{7}, \frac{2}{7}$.

Unlike fractions: $\frac{4}{9}, \frac{3}{5}, \frac{7}{8}$.

3. [(*a*), (*c*), (*d*)]

Fractions having numerator less than the denominator are called proper fractions.

So, proper fractions are $\frac{2}{3}, \frac{5}{8}, \frac{9}{11}$

4. [(*b*), (*c*), (*d*)]

Fractions having numerator greater than the denominator are called improper fractions.

So, improper fractions are $\frac{9}{5}, \frac{11}{7}, \frac{9}{1}$

5. We have,

Mixed fraction

$= \frac{(\text{Denominator} \times \text{Whole number}) + \text{Numerator}}{\text{Denominator}}$

= Improper fraction

(*a*) $2\frac{3}{8} = \frac{(2 \times 8) + 3}{8} = \frac{16 + 3}{8} = \frac{19}{8}$

(*b*) $4\frac{1}{3} = \frac{(4 \times 3) + 1}{3} = \frac{12 + 1}{3} = \frac{13}{3}$

(*c*) $3\frac{2}{11} = \frac{(3 \times 11) + 2}{11} = \frac{33 + 2}{11} = \frac{35}{11}$

(*d*) $7\frac{3}{7} = \frac{(7 \times 7) + 3}{11} = \frac{49 + 3}{11} = \frac{52}{11}$

(*e*) $13\frac{7}{8} = \frac{(13 \times 8) + 7}{8} = \frac{104 + 7}{8} = \frac{111}{8}$

6. (*a*) Divide the numerator 17 by the denominator 4.

Here, quotient = 4 and remainder = 1.

$$\begin{array}{r} 4\overline{)17}(4 \\ -16 \\ \hline 1 \end{array}$$

Therefore, the required mixed fraction = $4\frac{1}{4}$

(*b*) Divide the numerator 19 by the denominator 4.

Here, quotient = 4 and remainder = 3.

$$\begin{array}{r} 4\overline{)19}(4 \\ -16 \\ \hline 3 \end{array}$$

Therefore, the required mixed fraction = $4\frac{3}{4}$.

(*c*) Divide the numerator 29 by the denominator 5.

Here, quotient = 5 and remainder = 4.

$$\begin{array}{r} 5\overline{)29}(5 \\ -25 \\ \hline 4 \end{array}$$

Therefore, the required mixed fraction = $5\frac{4}{5}$.

(*d*) Divide the numerator 26 by the denominator 8.

Here, quotient = 3 and remainder = 2.

$$\begin{array}{r} 8\overline{)26}(3 \\ -24 \\ \hline 2 \end{array}$$

Therefore, the required mixed fraction

$$= 3\frac{2}{4} = 3\frac{1}{4}.$$

(*e*) Divide the numerator 32 by the denominator 6.

Here, quotient = 5 and remainder = 2.

$$\begin{array}{r} 6\overline{)32}(5 \\ -30 \\ \hline 2 \end{array}$$

Therefore, the required mixed fraction

$$= 5\frac{2}{6} = 5\frac{1}{3}.$$

7. (*a*) We have,

$$\frac{1}{5} = \frac{1\times 2}{5\times 2} = \frac{2}{10};\ \frac{1}{5} = \frac{1\times 3}{5\times 3} = \frac{3}{15};$$

$$\frac{1}{5} = \frac{1\times 4}{5\times 4} = \frac{4}{20};\ \frac{1}{5} = \frac{1\times 5}{5\times 5} = \frac{5}{25}.$$

Hence, $\frac{1}{5}, \frac{2}{10}, \frac{3}{15}, \frac{4}{20}$ and $\frac{5}{25}$ are first five equivalent fractions of $\frac{1}{5}$.

(*b*) We have,

$$\frac{1}{4} = \frac{1\times 3}{4\times 3} = \frac{3}{12};\ \frac{1}{4} = \frac{1\times 4}{4\times 4} = \frac{4}{16};$$

$$\frac{1}{4} = \frac{1\times 5}{4\times 5} = \frac{5}{20}.$$

Hence, $\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}$ and $\frac{5}{20}$ are first five equivalent fractions of $\frac{1}{4}$.

(*c*) We have,

$$\frac{2}{7} = \frac{2\times 2}{7\times 2} = \frac{4}{14};\ \frac{2}{7} = \frac{2\times 3}{7\times 3} = \frac{6}{21};$$

$$\frac{2}{7} = \frac{2\times 4}{7\times 4} = \frac{8}{28};\ \frac{2}{7} = \frac{2\times 5}{7\times 5} = \frac{10}{35}.$$

Hence, $\frac{2}{7}, \frac{4}{14}, \frac{6}{21}, \frac{8}{28}$ and $\frac{10}{35}$ are first five equivalent fractions of $\frac{2}{7}$.

(*d*) We have,

$$\frac{8}{11} = \frac{8\times 2}{11\times 2} = \frac{16}{22};\ \frac{8}{11} = \frac{8\times 3}{11\times 3} = \frac{24}{33};$$

$$\frac{8}{11} = \frac{8\times 4}{11\times 4} = \frac{32}{44};\ \frac{8}{11} = \frac{8\times 5}{11\times 5} = \frac{40}{55};$$

Hence, $\frac{8}{11}, \frac{16}{22}, \frac{24}{33}, \frac{32}{44}$ and $\frac{40}{55}$ are first five equivalent fractions of $\frac{8}{11}$.

(*e*) We have,

$$\frac{2}{5} = \frac{2\times 2}{5\times 2} = \frac{4}{10};\ \frac{2}{5} = \frac{2\times 3}{5\times 3} = \frac{6}{15};$$

$$\frac{2}{5} = \frac{2\times 4}{5\times 4} = \frac{8}{20};\ \frac{2}{5} = \frac{2\times 5}{5\times 5} = \frac{10}{25};$$

Hence, $\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \frac{8}{20}$ and $\frac{10}{25}$ are first five equivalent fractions of $\frac{2}{5}$.

8. (*a*) $\frac{16}{80} \div \frac{2}{2} = \frac{\boxed{8}}{40} \div \frac{2}{2} = \frac{4}{\boxed{20}}$

(*b*) $\frac{12}{32} \div \frac{4}{4} = \frac{3}{\boxed{8}}$

(*c*) $\frac{3}{11} \times \frac{5}{5} = \frac{\boxed{15}}{55}$

(*d*) $\frac{4}{9} \times \frac{7}{7} = \frac{\boxed{28}}{63}$

(*e*) $\frac{12}{48} \div \frac{2}{2} = \frac{\boxed{6}}{24} \div \frac{3}{3} = \frac{\boxed{2}}{8} \times \frac{2}{2} = \frac{\boxed{4}}{16}$

(*f*) $\frac{15}{75} \div \frac{3}{3} = \frac{\boxed{5}}{25} \div \frac{5}{5} = \frac{1}{\boxed{5}} \times \frac{3}{3} = \frac{\boxed{3}}{15}$

(*g*) $\frac{36}{60} \div \frac{6}{6} = \frac{\boxed{6}}{10} \times \frac{2}{2} = \frac{12}{\boxed{20}} \div \frac{4}{4} = \frac{3}{\boxed{5}}$

9. (*a*) $\frac{5}{7} \times \frac{4}{4} = \frac{20}{28}$ (*b*) $\frac{5}{7} \times \frac{5}{5} = \frac{25}{35}$

(*c*) $\frac{5}{7} \times \frac{7}{7} = \frac{35}{49}$

10. (*a*) First, we find the HCF of the numerator 8 and the denominator 24.

2	8
2	4
2	2
	1

2	24
2	12
2	6
3	3
	1

Clearly, $8 = 2 \times 2 \times 2$ and $24 = 2 \times 2 \times 2 \times 3$.

Therefore, HCF of 8 and 24 $= 2 \times 2 \times 2 = 8$.

Now, $\frac{8}{24} = \frac{8 \div 8}{24 \div 8} = \frac{1}{3}$.

Thus, $\frac{1}{3}$ is the lowest form of $\frac{8}{24}$.

(*b*) First, we find the HCF of the numerator 15 and the denominator 20.

3	15
5	5
	1

2	20
2	10
5	5
	1

Clearly, $15 = 3 \times 5$ and $20 = 2 \times 2 \times 5$.

Therefore, HCF of 15 and 20 = 5.

Now, $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$.

Thus, $\frac{3}{4}$ is the lowest form of $\frac{15}{20}$.

(*c*) First, we find the HCF of the numerator 8 and the denominator 10.

2	8
2	4
2	2
	1

2	10
5	5
	1

Clearly, $8 = 2 \times 2 \times 2$ and $10 = 2 \times 5$.

Therefore, HCF of 8 and 10 = 2.

Now, $\frac{8}{10} = \frac{8 \div 2}{10 \div 2} = \frac{4}{5}$.

Thus, $\frac{4}{5}$ is the lowest form of $\frac{8}{10}$.

(*d*) First, we find the HCF of the numerator 12 and the denominator 15.

2	12
2	6
3	3
	1

3	15
5	5
	1

Clearly, $12 = 2 \times 2 \times 3$ and $15 = 3 \times 5$.

Therefore, HCF of 12 and 15 = 3.

Now, $\frac{12}{15} = \frac{12 \div 3}{15 \div 3} = \frac{4}{5}$.

Thus, $\frac{4}{5}$ is the lowest form of $\frac{12}{15}$.

(*e*) First, we find the HCF of the numerator 16 and the denominator 34.

2	16
2	8
2	4
2	2
	1

2	34
17	17
	1

Clearly, $16 = 2 \times 2 \times 2 \times 2$ and $34 = 2 \times 17$.

Therefore, HCF of 16 and 34 = 2.

Now, $\frac{16}{34} = \frac{16 \div 2}{34 \div 2} = \frac{8}{17}$.

Thus, $\frac{8}{17}$ is the lowest form of $\frac{16}{34}$.

(*f*) to (*i*) — (Same as above).

Think and Answer (Page 87)

Comparing the numerators of $\frac{2}{9}$ and $\frac{5}{9}$, we have $2 < 5$.

So, $\frac{2}{9} < \frac{5}{9}$

That is, Sia drank more amount of juice.

Practice Time 4B

1. (*a*) Given fractions are $\frac{4}{5}$ and $\frac{3}{7}$.

5	5, 7
7	1, 7
	1, 1,

LCM of 5 and $7 = 5 \times 7 = 35$.

Therefore, $\frac{4}{5} = \frac{4 \times 7}{5 \times 7} = \frac{28}{35}$ and

$\frac{3}{7} = \frac{3 \times 5}{7 \times 5} = \frac{15}{35}$.

Since, $28 > 15$. So, $\frac{28}{35} > \frac{15}{35}$

Thus, $\frac{4}{5} \boxed{>} \frac{3}{7}$

(*b*) Given fractions are $\frac{3}{11}$ and $\frac{3}{9}$.

3	9, 11
3	3, 11
11	1, 11
	1, 1,

LCM of 11 and $9 = 3 \times 3 \times 11 = 99$.

Therefore, $\frac{3}{11} = \frac{3 \times 9}{11 \times 9} = \frac{27}{99}$ and

$$\frac{3}{9} = \frac{3 \times 11}{9 \times 11} = \frac{33}{99}.$$

Since, $27 < 33$. So, $\frac{27}{99} < \frac{33}{99}$.

Thus, $\frac{3}{11} \boxed{<} \frac{3}{9}$.

(*c*) Given fractions are $\frac{3}{5}$ and $\frac{6}{10}$.

5	5, 10
2	1, 2
	1, 1,

LCM of 5 and $10 = 5 \times 2 = 10$.

Therefore, $\frac{3}{5} = \frac{3 \times 2}{5 \times 2} = \frac{6}{10}$ and

$$\frac{6}{10} = \frac{6 \times 1}{10 \times 1} = \frac{6}{10}.$$

Since, $6 = 6$. So, $\frac{6}{10} = \frac{6}{10}$.

Thus, $\frac{3}{5} \boxed{=} \frac{6}{10}$.

(*d*) Given mixed fractions are $2\frac{4}{7}$ and $3\frac{3}{5}$.

$2\frac{4}{7} = \frac{2 \times 7 + 4}{7} = \frac{18}{7}$ and $3\frac{3}{5} = \frac{3 \times 5 + 3}{5} = \frac{18}{5}$.

7	7, 5
5	1, 5
	1, 1,

LCM of 7 and $5 = 7 \times 5 = 35$.

Therefore, $\frac{18}{7} = \frac{18 \times 5}{7 \times 5} = \frac{90}{35}$ and

$$\frac{18}{5} = \frac{18 \times 7}{5 \times 7} = \frac{126}{35}.$$

Since, $90 < 126$. So, $\frac{90}{35} < \frac{126}{35}$.

Thus, $2\frac{4}{7} \boxed{<} 3\frac{3}{5}$.

(*e*) Given mixed fractions are $2\frac{4}{5}$ and $2\frac{4}{13}$.

$2\frac{4}{5} = \frac{2 \times 5 + 4}{5} = \frac{10 + 4}{5} = \frac{14}{5}$,

$2\frac{4}{13} = \frac{2 \times 13 + 4}{13} = \frac{30}{13}$.

5	5, 13
13	1, 13
	1, 1,

LCM of 5 and $13 = 5 \times 13 = 65$.

Therefore, $\frac{14}{5} = \frac{14 \times 13}{5 \times 13} = \frac{182}{65}$ and

$$\frac{30}{13} = \frac{30 \times 5}{13 \times 5} = \frac{150}{65}.$$

Since, $182 > 150$. So, $\frac{182}{65} > \frac{150}{65}$.

Thus, $2\frac{4}{5} \boxed{>} 2\frac{4}{13}$.

(*f*) Given mixed fractions are $5\frac{1}{6}$ and $5\frac{1}{4}$.

$5\frac{1}{6} = \frac{5 \times 6 + 1}{6} = \frac{31}{6}$ and

$5\frac{1}{4} = \frac{5 \times 4 + 1}{4} = \frac{21}{4}$.

2	6, 4
2	3, 2
3	3, 1
	1, 1

LCM of 6 and $4 = 2 \times 2 \times 3 = 12$.

Therefore, $\frac{31}{6} = \frac{31 \times 2}{6 \times 2} = \frac{62}{12}$ and

$$\frac{21}{4} = \frac{21 \times 3}{4 \times 3} = \frac{63}{12}.$$

Since, $62 < 63$. So, $\frac{62}{12} < \frac{63}{12}$.

Thus, $5\frac{1}{6} \boxed{<} 5\frac{1}{4}$

2. (*a*) Given fractions are $\frac{2}{4}$ and $\frac{3}{4}$.

Since, denominators are the same and $2 < 3$.

So, $\frac{2}{4} < \frac{3}{4}$. Thus, $\frac{3}{4}$ is greater.

(*b*) Given fractions are $\frac{3}{8}$ and $\frac{2}{8}$.

Since, denominators are the same and $3 > 2$.

So, $\frac{3}{8} > \frac{2}{8}$. Thus, $\frac{3}{8}$ is greater.

(*c*) and (*d*)—Same as above.

(*e*) Given fractions are $\frac{3}{8}$ and $\frac{3}{7}$.

Since, denominators are different.

So, first we make the denominators same.

LCM of 8 and 7 = 2 × 2 × 2 × 7 = 56.

2	8, 7
2	1, 7
2	4, 7
7	2, 7
	1, 1

Now, $\frac{3}{8} = \frac{3 \times 7}{8 \times 7} = \frac{21}{56}$ and

$\frac{3}{7} = \frac{3 \times 8}{7 \times 8} = \frac{24}{56}$.

Clearly, 21 < 24 . So, $\frac{21}{56} < \frac{24}{56}$.

$\therefore \frac{3}{8} < \frac{3}{7}$. Thus $\frac{3}{7}$ is the greater.

(*f*) Given fractions are $\frac{5}{9}$ and $\frac{4}{9}$.

Since, denominators are the same and 5 > 4.

So, $\frac{5}{9} > \frac{4}{9}$. Thus, $\frac{5}{9}$ is greater.

(*g*) Given fractions are $\frac{2}{13}$ or $\frac{4}{11}$.

Since, denominators are different.

So, first we make the denominators same.

LCM of 13 and 11 = 13 × 11

= 143.

11	13, 11
13	13, 11
	1, 1

Now, $\frac{2}{13} = \frac{2 \times 11}{13 \times 11} = \frac{22}{143}$ and

$\frac{4}{11} = \frac{4 \times 13}{11 \times 13} = \frac{52}{143}$.

Clearly, 22 < 52.

So, $\frac{22}{143} < \frac{52}{143}$ *i.e.*, $\frac{2}{13} < \frac{4}{11}$.

Thus, $\frac{4}{11}$ is greater.

(*h*) Given fractions are $\frac{5}{10}$ and $\frac{4}{20}$.

Since, denominators are different.

So, first we make the denominators same.

LCM of 10 and 20 = 2 × 2 × 5 = 20.

2	10, 20
2	5, 10
5	5, 5
	1, 1

Now, $\frac{5}{10} = \frac{5 \times 2}{10 \times 2} = \frac{10}{20}$ and

$\frac{4}{20} = \frac{4 \times 1}{20 \times 1} = \frac{4}{20}$.

Clearly, 10 > 4 *i.e.*, $\frac{5}{20} > \frac{4}{20}$.

Thus, $\frac{5}{20}$ is greater.

3. (*a*) Given fractions are

$\frac{9}{5}, \frac{4}{5}, \frac{14}{5}, 1\frac{2}{5}\left(= \frac{1 \times 5 + 2}{5}\right) = \frac{7}{5}$.

Since, 4 < 7 < 9 < 14.

Therefore, $\frac{4}{5} < \frac{7}{5} < \frac{9}{5} < \frac{14}{5}$.

Thus, $\frac{4}{5} < 1\frac{2}{5} < \frac{9}{5} < \frac{14}{5}$ are in ascending order.

(*b*) Given fractions are $\frac{44}{25}, 6\frac{6}{25}, 1\frac{20}{25}, \frac{65}{25}$.

$= \frac{44}{25}, \frac{6 \times 25 + 6}{25}, \frac{1 \times 25 + 20}{25}, \frac{65}{25}$.

$= \frac{44}{25}, \frac{156}{25}, \frac{45}{25}, \frac{65}{25}$.

Since, 44 < 45 < 65 < 156.

Therefore, $\frac{44}{25} < \frac{45}{25} < \frac{65}{25} < \frac{156}{25}$.

Thus, $\frac{44}{25} < 1\frac{20}{25} < \frac{65}{25} < 6\frac{6}{25}$ are in ascending order.

(*c*) Given fractions are $\frac{3}{4}, \frac{5}{6}, \frac{2}{3}, \frac{1}{2}$.

Since, denominators are different.

So, first we make the denominators same.

LCM of the denominators 4, 6, 3 and 2 is 12.

2	4, 6, 3, 2
2	2, 3, 3, 1
3	1, 3, 3, 1
	1, 1, 1, 1

Then, $\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$.

$\frac{5}{6} = \frac{5 \times 2}{6 \times 2} = \frac{10}{12}$.

$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$.

$\frac{1}{2} = \frac{1 \times 6}{2 \times 6} = \frac{6}{12}$.

Since, $6 < 8 < 9 < 10$.

Therefore, $\frac{6}{12} < \frac{8}{12} < \frac{9}{12} < \frac{10}{12}$

Thus, $\frac{1}{2} < \frac{2}{3} < \frac{3}{4} < \frac{5}{6}$ are in ascending order.

4. (*a*) Given fractions are $\frac{7}{9}, \frac{5}{6}, \frac{2}{3}, \frac{17}{27}$.

Since, denominators are different.

So, first we make the denominators same.

LCM of the denominators 9, 6, 3 and 27

$= 2 \times 3 \times 3 \times 3 = 54$.

2	9, 6, 3, 27
3	9, 3, 3, 27
3	3, 1, 1, 9
3	1, 1, 1, 3
	1, 1, 1, 1

Then, $\frac{7}{9} = \frac{7 \times 6}{9 \times 6} = \frac{42}{54}$.

$\frac{5}{6} = \frac{5 \times 9}{6 \times 9} = \frac{45}{54}$.

$\frac{2}{3} = \frac{2 \times 18}{3 \times 18} = \frac{36}{54}$.

$\frac{17}{27} = \frac{17 \times 2}{27 \times 2} = \frac{34}{54}$.

Therefore, $\frac{45}{54} > \frac{42}{54} > \frac{36}{54} > \frac{34}{54}$.

Thus, $\frac{5}{6} > \frac{7}{9} > \frac{2}{3} > \frac{17}{27}$ are in descending order.

(*b*) Given fractions are $\frac{7}{8}, \frac{5}{12}, \frac{15}{16}, \frac{17}{24}$.

Since, denominators are different.

So, first we make the denominators same.

LCM of the denominators 8, 12, 16 and 24

$= 2 \times 2 \times 2 \times 2 \times 3 = 48$.

2	8, 12, 16, 24
2	4, 6, 8, 12
2	2, 3, 4, 6
2	1, 3, 2, 3
3	1, 3, 1, 3
	1, 1, 1, 1

Then, $\frac{7}{8} = \frac{7 \times 6}{8 \times 6} = \frac{42}{48}$.

$\frac{5}{12} = \frac{5 \times 4}{12 \times 4} = \frac{20}{48}$.

$\frac{15}{16} = \frac{15 \times 3}{16 \times 3} = \frac{45}{48}$.

$\frac{17}{24} = \frac{17 \times 2}{24 \times 2} = \frac{34}{48}$.

Since, $45 > 42 > 34 > 20$.

Therefore, $\frac{45}{48} > \frac{42}{48} > \frac{34}{48} > \frac{20}{48}$.

Thus, $\frac{15}{16} > \frac{7}{8} > \frac{17}{24} > \frac{5}{12}$ are in descending order.

(*c*) Given fractions are $\frac{2}{5}, \frac{3}{10}, \frac{7}{15}, \frac{1}{2}$.

Since, denominators are different.

So, first we make the denominators same.

LCM of the denominators 5, 10, 15 and 2.

$= 2 \times 3 \times 5 = 30$.

2	5, 10, 15, 2
3	5, 5, 15, 1
5	5, 5, 5, 1
	1, 1, 1, 1

Then, $\frac{2}{5} = \frac{2 \times 6}{5 \times 6} = \frac{12}{30}$.

$\frac{3}{10} = \frac{3 \times 3}{10 \times 3} = \frac{9}{30}$.

$\frac{7}{15} = \frac{7 \times 2}{15 \times 2} = \frac{14}{30}$.

$\frac{1}{2} = \frac{1 \times 15}{2 \times 15} = \frac{15}{30}$

Therefore, $\frac{15}{30} > \frac{14}{30} > \frac{12}{30} > \frac{9}{30}$.

Thus, $\frac{1}{2} > \frac{7}{15} > \frac{2}{5} > \frac{3}{10}$ are in descending order.

Practice Time 4C

1. (*a*) $\frac{3}{7} + \frac{4}{7} = \frac{3+4}{7} = \frac{7}{7} = 1$.

(*b*) $\frac{7}{12} + \frac{11}{12} = \frac{7+11}{12} = \frac{18}{12}$.

$\frac{18}{12} = \frac{18 \div 6}{12 \div 6} = \frac{3}{2} = 1\frac{1}{2}$.

$$\begin{array}{r} 2\overline{)3}\,(1 \\ -2 \\ \hline 1 \end{array}$$

(*c*) $\frac{3}{10} + \frac{7}{20} + \frac{1}{5}$.

Here, LCM of 10, 20 and $5 = 2 \times 2 \times 5 = 20$.

Therefore, $\frac{3}{10} + \frac{7}{20} + \frac{1}{5}$.

2	10, 20, 5
2	5, 10, 5
5	5, 5, 5
	1, 1, 1

$= \frac{3 \times 2}{10 \times 2} + \frac{7 \times 1}{20 \times 1} + \frac{1 \times 4}{5 \times 4}$.

$= \frac{6}{20} + \frac{7}{20} + \frac{4}{20} = \frac{6+7+4}{20} = \frac{17}{20}$.

(*d*) $2\frac{3}{7} + 1\frac{5}{14} = \frac{2 \times 7 + 3}{7} + \frac{1 \times 14 + 5}{14}$

$= \frac{17}{7} + \frac{19}{14}$.

Here, LCM of 7 and $14 = 7 \times 2 = 14$.

7	7, 14
2	1, 2
	1, 1

Therefore, $\frac{17}{7} + \frac{19}{14} = \frac{17 \times 2}{7 \times 2} + \frac{19 \times 1}{14 \times 1}$

$= \frac{34}{14} + \frac{19}{14} = \frac{34 + 19}{14}$

$= \frac{53}{14} = 3\frac{11}{14}$.

$14\overline{)53}(3$
-42
11

(*e*) $2 + 1\frac{1}{6} + \frac{1}{8} = 2 + \frac{1 \times 6 + 1}{6} + \frac{1}{8}$

$= \frac{2}{1} + \frac{7}{6} + \frac{1}{8}$

Here, LCM of 6 and 8

$= 2 \times 2 \times 2 \times 3 = 24$

2	6, 8
2	3, 4
2	3, 2
3	3, 1
	1, 1

Therefore, $\frac{2}{1} + \frac{7}{6} + \frac{1}{8}$

$= \frac{2 \times 24}{1 \times 24} + \frac{7 \times 4}{6 \times 4} + \frac{1 \times 3}{8 \times 3}$

$= \frac{48}{24} + \frac{28}{24} + \frac{3}{24} = \frac{48 + 28 + 3}{24}$

$= \frac{79}{24} = 3\frac{7}{24}$.

$24\overline{)79}(3$
-72
7

(*f*) $2\frac{5}{6} + 1\frac{2}{3} + \frac{1}{4} = \frac{2 \times 6 + 5}{6} + \frac{1 \times 3 + 2}{3} + \frac{1}{4}$

$= \frac{17}{6} + \frac{5}{3} + \frac{1}{4}$.

Here, LCM of 6, 3 and 4 = $2 \times 2 \times 3 = 12$.

Therefore, $\frac{17}{6} + \frac{5}{3} + \frac{1}{4}$

2	6, 3, 4
2	3, 3, 2
3	3, 3, 1
	1, 1, 1

$= \frac{17 \times 2}{6 \times 2} + \frac{5 \times 4}{3 \times 4} + \frac{1 \times 3}{4 \times 3}$

$= \frac{34}{12} + \frac{20}{12} + \frac{3}{12} = \frac{34 + 20 + 3}{12} = \frac{57}{12}$

$= \frac{57 \div 3}{12 \div 3} = \frac{19}{4} = 4\frac{3}{4}$.

$4\overline{)19}(4$
-16
3

(*g*) $2\frac{1}{5} + 3 + 1\frac{4}{9} = \frac{2 \times 5 + 1}{5} + 3 + \frac{1 \times 9 \times 4}{9}$

$= \frac{11}{5} + \frac{3}{1} + \frac{13}{9}$.

Here, LCM of 5 and 9

$= 3 \times 3 \times 5 = 45$.

3	5, 9
3	5, 3
5	5, 1
	1, 1

Therefore, $\frac{11}{5} + \frac{3}{1} + \frac{13}{9}$

$= \frac{11 \times 9}{5 \times 9} + \frac{3 \times 45}{1 \times 45} + \frac{13 \times 5}{9 \times 5}$

$= \frac{99}{45} + \frac{135}{45} + \frac{65}{45} = \frac{99 + 135 + 65}{45}$

$= \frac{299}{45} = 6\frac{29}{45}$.

$45\overline{)299}(6$
-270
29

(*h*) $3\frac{7}{8} + 5\frac{5}{12} + 2\frac{3}{4}$

$= \frac{3 \times 8 \times 7}{8} + \frac{5 \times 12 \times 5}{12} + \frac{2 \times 4 + 3}{4}$

$= \frac{31}{8} + \frac{65}{12} + \frac{11}{4}$.

Here, LCM of 8, 12 and 4 = $2 \times 2 \times 2 \times 3 = 24$.

Therefore, $\frac{31}{8} + \frac{65}{12} + \frac{11}{4}$

2	8, 12, 4
2	4, 6, 2
2	2, 3, 1
3	1, 3, 1
	1, 1, 1

$= \frac{31 \times 3}{8 \times 3} + \frac{65 \times 2}{12 \times 2} + \frac{11 \times 6}{4 \times 6}$

$= \frac{93}{24} + \frac{130}{24} + \frac{66}{24}$

$= \frac{93 + 130 + 66}{24}$

$= \frac{289}{24} = 12\frac{1}{24}$.

$24\overline{)289}(12$
-24
49
-48
1

(*i*) $4\frac{7}{10} + 6\frac{3}{5} + 3\frac{1}{2}$

$= \frac{4 \times 10 + 7}{10} + \frac{6 \times 5 + 3}{5} + \frac{3 \times 2 + 1}{2}$

$= \frac{47}{10} + \frac{33}{5} + \frac{7}{2}$.

Here, LCM of 10, 5 and 2

$= 2 \times 5 = 10$.

2	10, 5, 2
5	5, 5, 1
	1, 1, 1

Therefore, $\frac{47}{10} + \frac{33}{5} + \frac{7}{2}$

$= \frac{47 \times 1}{10 \times 1} + \frac{33 \times 2}{5 \times 2} + \frac{7 \times 5}{2 \times 5}$

$= \frac{47}{10} + \frac{66}{10} + \frac{35}{10}$

$$= \frac{47 + 66 + 35}{10}$$

$$= \frac{148}{10} = \frac{74}{5} = 14\frac{4}{5}.$$

$5\overline{)74}(14$, -5, 24, -20, 4

(*j*) $5\frac{5}{6} + 1\frac{3}{8} + 4\frac{7}{12}$

$$= \frac{5 \times 6 + 5}{6} + \frac{1 \times 8 + 3}{8} + \frac{4 \times 12 + 7}{12}$$

$$= \frac{35}{6} + \frac{11}{8} + \frac{55}{12}.$$

2	6, 8, 12
2	3, 4, 6
2	3, 2, 3
3	3, 1, 3
	1, 1, 1

Here, LCM of 6, 8, 12
$= 2 \times 2 \times 2 \times 3 = 24.$

Therefore, $\frac{35}{6} + \frac{11}{8} + \frac{55}{12}$

$$= \frac{35 \times 4}{6 \times 4} + \frac{11 \times 3}{8 \times 3} + \frac{55 \times 2}{12 \times 2}$$

$$= \frac{140}{24} + \frac{33}{24} + \frac{110}{24}$$

$$= \frac{140 + 33 + 110}{24}$$

$$= \frac{283}{24} = 11\frac{19}{24}.$$

$24\overline{)283}(11$, -24, 43, -24, 19

(*k*) $12\frac{2}{5} + 13\frac{1}{5} + 2$

$$= \frac{12 \times 5 + 2}{5} + \frac{13 \times 5 + 1}{5} + \frac{2}{1}$$

$$= \frac{62}{5} + \frac{66}{5} + \frac{2}{1}.$$

Here, LCM of 1, 5 and 5 = 5.

Therefore, $\frac{62}{5} + \frac{66}{5} + \frac{2}{1} = \frac{62}{5} + \frac{66}{5} + \frac{2 \times 5}{1 \times 5}$

$$= \frac{62}{5} + \frac{66}{5} + \frac{10}{5}$$

$$= \frac{62 + 66 + 10}{5}$$

$$= \frac{138}{5} = 27\frac{3}{5}.$$

$5\overline{)138}(27$, -10, 38, -35, 3

(*l*) $1\frac{11}{14} + 3\frac{8}{21} + 1\frac{1}{7}$

$$= \frac{1 \times 14 + 11}{14} + \frac{3 \times 21 + 8}{21} + \frac{1 \times 7 + 1}{7}$$

$$= \frac{25}{14} + \frac{71}{21} + \frac{8}{7}.$$

Here, LCM of 14, 21 and 7
$= 3 \times 2 \times 7 = 42.$

3	14, 21, 7
2	14, 7, 7
7	7, 7, 7
	1, 1, 1

Therefore, $\frac{25}{14} + \frac{71}{21} + \frac{8}{7}.$

$$= \frac{25 \times 3}{14 \times 3} + \frac{71 \times 2}{21 \times 2} + \frac{8 \times 6}{7 \times 6}$$

$$= \frac{75}{42} + \frac{142}{42} + \frac{48}{42}$$

$$= \frac{262}{42} = 6\frac{13}{42}.$$

$42\overline{)265}(6$, -265, 13

2. (*a*) $\frac{17}{44} - \frac{2}{11}$

2	44, 11
2	22, 11
11	11, 11
	1, 1

Here, LCM of 44 and 11
$= 2 \times 2 \times 11 = 44.$

Therefore, $\frac{17}{44} - \frac{2}{11} = \frac{17}{44} - \frac{2 \times 4}{11 \times 4} = \frac{17}{44} - \frac{8}{44}$

$$= \frac{17 - 8}{44} = \frac{9}{44}.$$

(*b*) $\frac{17}{32} - \frac{25}{48}$

Here, LCM of 32 and 48
$= 2 \times 2 \times 2 \times 2 \times 2 \times 3 = 96.$

2	32, 48
2	16, 24
2	8, 12
2	4, 6
2	2, 3
3	1, 3
	1, 1

Therefore, $\frac{17}{32} - \frac{25}{48}$

$$= \frac{17 \times 3}{32 \times 3} - \frac{25 \times 2}{48 \times 2}$$

$$= \frac{51}{96} - \frac{50}{96} = \frac{51 - 50}{96} = \frac{1}{96}.$$

(*c*) $\frac{3}{4} - \frac{5}{12}$

Here, LCM of 4 and 12 $= 2 \times 2 \times 3 = 12.$

Therefore, $\frac{3}{4} - \frac{5}{12} = \frac{3 \times 3}{4 \times 3} - \frac{5 \times 1}{12 \times 1}$

2	4, 12
2	2, 6
3	1, 3
	1, 1

$$= \frac{9}{12} - \frac{5}{12}$$

$$= \frac{9 - 5}{12} = \frac{4}{12} = \frac{1}{3}.$$

(*d*) $3\frac{7}{22} - 2\frac{3}{11} = \frac{3 \times 22 + 7}{22} - \frac{2 \times 11 + 3}{11}$

$= \frac{73}{22} - \frac{25}{11}$.

2	22, 11
11	11, 11
	1, 1

Here, LCM of 22 and 11 $= 2 \times 11 = 22$

Therefore, $\frac{73}{22} - \frac{25}{11} = \frac{73}{22} - \frac{25 \times 2}{11 \times 2} = \frac{73}{22} - \frac{50}{22}$

$= \frac{73 - 50}{22} = \frac{23}{22}$

$22\overline{)23}\,(1$
$-\,22$
$\overline{\quad 1}$

$= 1\frac{1}{22}$.

(*e*) $18\frac{4}{5} - 7\frac{9}{10} = \frac{18 \times 5 + 4}{5} - \frac{7 \times 10 + 9}{10}$

$= \frac{94}{5} - \frac{79}{10}$.

2	5, 10
5	5, 5
	1, 1

Here, LCM of 5 and 10 $= 2 \times 5 = 10$

Therefore, $\frac{94}{5} - \frac{79}{10} = \frac{94 \times 2}{5 \times 2} - \frac{79 \times 1}{10 \times 1}$

$= \frac{188}{10} - \frac{79}{10}$

$22\overline{)109}\,(10$
$-\,10\downarrow$
$\overline{\quad 09}$

$= \frac{188 - 79}{10} = 10\frac{9}{10}$.

(*f*) $8\frac{3}{8} - 3\frac{1}{5} = \frac{8 \times 8 + 3}{8} - \frac{3 \times 5 + 1}{5}$

$= \frac{67}{8} - \frac{16}{5}$.

2	8, 5
2	4, 5
2	2, 5
5	1, 5
	1, 1

Here, LCM of 8 and 5 $= 8 \times 5 = 40$.

Therefore, $\frac{67}{8} - \frac{16}{5} = \frac{67 \times 5}{8 \times 5} - \frac{16 \times 8}{5 \times 8}$

$= \frac{335}{40} - \frac{128}{40} = \frac{335 - 128}{40}$

$= \frac{207}{40} = 5\frac{7}{40}$.

$40\overline{)207}\,(5$
$-\,20\downarrow$
$\overline{\quad 7}$

(*g*) and (*h*) — Same as above.

3. (*a*) $4\frac{3}{5} - \frac{2}{3} + \frac{3}{10} = \frac{4 \times 5 + 3}{5} - \frac{2}{3} + \frac{3}{10}$

$= \frac{23}{5} - \frac{2}{3} + \frac{3}{10}$.

2	5, 3, 10
3	5, 3, 5
5	5, 1, 5
	1, 1, 1

Here, LCM of 5, 3 and 10
$= 2 \times 3 \times 5 = 30$.

Therefore, $\frac{23}{5} - \frac{2}{3} + \frac{3}{10}$

$= \frac{23 \times 6}{5 \times 6} - \frac{2 \times 10}{3 \times 10} + \frac{3 \times 3}{10 \times 3}$

$= \frac{138}{30} - \frac{20}{30} + \frac{9}{30} = \frac{138 - 20 + 9}{30}$

$= \frac{138 + 9 - 20}{30} = \frac{147 - 20}{30}$

$= \frac{127}{30} = 4\frac{7}{30}$.

$30\overline{)127}\,(4$
$-\,120$
$\overline{\quad 7}$

(*b*) $6\frac{3}{4} + \frac{3}{5} - 1\frac{5}{6} = \frac{6 \times 4 + 3}{4} + \frac{3}{5} - \frac{1 \times 6 + 5}{6}$

$= \frac{27}{4} + \frac{3}{5} - \frac{11}{6}$.

2	4, 5, 6
2	2, 5, 3
3	1, 5, 3
5	1, 5, 1
	1, 1, 1

Here, LCM of 4, 5, 6
$= 2 \times 2 \times 3 \times 5 = 60$.

Therefore, $\frac{27}{4} + \frac{3}{5} - \frac{11}{6}$

$= \frac{27 \times 15}{4 \times 15} + \frac{3 \times 12}{5 \times 12} - \frac{11 \times 10}{6 \times 10}$

$= \frac{405}{60} + \frac{36}{60} - \frac{110}{60} = \frac{405 + 36 - 110}{60}$

$= \frac{441 - 110}{60} = \frac{331}{60} = 5\frac{31}{60}$.

$60\overline{)331}\,(5$
$-\,300$
$\overline{\quad 31}$

(*c*) $5\frac{7}{8} + 2\frac{2}{3} - \frac{11}{2} = \frac{5 \times 8 + 7}{8} + \frac{2 \times 3 + 2}{3} - \frac{11}{12}$

$= \frac{47}{8} + \frac{8}{3} - \frac{11}{12}$.

2	8, 3, 12
2	4, 3, 6
2	2, 3, 3
3	1, 3, 3
	1, 1, 1

Here, LCM of 8, 3 and 12
$= 2 \times 2 \times 2 \times 3 = 24$.

Therefore, $\frac{47}{8} + \frac{8}{3} - \frac{11}{12}$.

$= \frac{47 \times 3}{8 \times 3} + \frac{8 \times 8}{3 \times 8} - \frac{11 \times 2}{12 \times 2}$

$= \frac{141}{24} + \frac{64}{24} - \frac{22}{24} = \frac{141 + 64 - 22}{24}$

$= \frac{183}{24} = \frac{183 \div 3}{24 \div 3} = \frac{61}{8} = 7\frac{5}{8}$.

$8\overline{)61}\,(7$
$-\,56$
$\overline{\quad 5}$

(*d*) $4\frac{7}{21} - 1\frac{5}{6} - \frac{3}{4} = \frac{4 \times 21 + 7}{21} - \frac{1 \times 6 + 5}{6} - \frac{3}{4}$

$= \frac{91}{21} - \frac{11}{6} - \frac{3}{4}$.

2	21, 6, 4
2	21, 3, 2
3	21, 3, 1
7	7, 1, 1
	1, 1, 1

Here, LCM of 21, 6 and 4

$= 2 \times 2 \times 3 \times 7 = 84$.

Therefore, $\frac{91 \times 4}{21 \times 4} - \frac{11 \times 14}{6 \times 14} - \frac{3 \times 21}{4 \times 21}$

$= \frac{364}{84} - \frac{154}{84} - \frac{63}{84} = \frac{364 - 154 - 63}{84}$

$= \frac{364 - (154 + 63)}{84} = \frac{364 - 217}{84}$

$= \frac{147}{84} = 1\frac{63}{84}$.

$84\overline{)147}(1$
$-\ 84$
$\overline{63}$

(*e*) $7\frac{5}{6} - 1\frac{3}{4} - 1\frac{1}{2}$

$= \frac{7 \times 6 + 5}{6} - \frac{1 \times 4 + 3}{4} - \frac{1 \times 2 + 1}{2}$

$= \frac{47}{6} - \frac{7}{4} - \frac{3}{2}$

3	6, 4, 2
2	3, 2, 1
3	3, 1, 1
	1, 1, 1

Here, LCM of 6, 4 and 2

$= 2 \times 2 \times 3 = 12$.

Therefore, $\frac{47 \times 2}{6 \times 2} - \frac{7 \times 3}{4 \times 3} - \frac{3 \times 6}{2 \times 6}$

$= \frac{94}{12} - \frac{21}{12} - \frac{18}{12} = \frac{94 - 21 - 18}{12}$

$= \frac{94 - (21 + 18)}{12} = \frac{94 - 39}{12}$

$= \frac{55}{12} = 4\frac{7}{12}$.

$22\overline{)55}(4$
$-\ 48$
$\overline{7}$

(*f*) $8\frac{1}{3} - 2\frac{3}{5} + 2\frac{1}{2} - \frac{1}{2}$

$= \frac{8 \times 3 + 1}{3} - \frac{2 \times 5 + 3}{5} - \frac{2 \times 2 + 1}{2} - \frac{1}{2}$

$= \frac{25}{3} - \frac{13}{5} + \frac{5}{2} - \frac{1}{2}$

2	3, 5, 2, 2
3	3, 5, 1, 1
5	1, 5, 1, 1
	1, 1, 1, 1

Here, LCM of 3, 5, 2 and 2

$= 2 \times 3 \times 5 = 30$.

Therefore, $\frac{25 \times 10}{3 \times 10} - \frac{13 \times 6}{5 \times 6} + \frac{5 \times 15}{2 \times 15} - \frac{1 \times 15}{2 \times 15}$

$= \frac{250}{30} - \frac{78}{30} + \frac{75}{30} - \frac{15}{30}$

$= \frac{250 - 78 + 75 - 15}{30}$

$15\overline{)116}(7$
$-\ 105$
$\overline{11}$

$= \frac{250 + 75 - (78 + 15)}{30} = \frac{325 - 93}{30}$

$= \frac{232}{30} = \frac{232 \div 2}{30 \div 2} = \frac{116}{15} = 7\frac{11}{15}$

4. Weight of an empty basket = $1\frac{4}{5}$ kg

$= \frac{1 \times 5 + 4}{5} = \frac{9}{5}$ kg.

Weight of apples = $2\frac{1}{3}$ kg = $\frac{7}{3}$ kg.

Total weight of basket with apples = $\frac{9}{5} + \frac{7}{3}$

Here, LCM of 5 and 3 = $3 \times 5 = 15$.

3	5, 3
5	5, 1
	1, 1

Therefore, $\frac{9}{5} + \frac{7}{3} = \frac{9 \times 3}{5 \times 3} + \frac{7 \times 5}{3 \times 5}$

$= \frac{27}{15} + \frac{35}{15} = \frac{27 + 35}{15}$

$= \frac{62}{15} = 4\frac{2}{15}$ kg.

Thus, the total weight of the basket with apples together is $4\frac{2}{15}$ kg.

$15\overline{)62}(4$
$-\ 60$
$\overline{2}$

5. Rohan's father purchased cloth for his trouser = $1\frac{1}{2}$ m.

Cloth purchased by him for his younger brother's trouser = $1\frac{2}{3}$ m.

Total length of cloth Rohan's father purchased

$= 1\frac{1}{2}$ m + $1\frac{2}{3}$ m = $\frac{3}{2}$ m + $\frac{5}{3}$ m

2	2, 3
3	1, 3
	1, 1

$\because$ LCM of 2 and 3 = $2 \times 3 = 6$

$\therefore \frac{3\times3}{2\times3}+\frac{5\times2}{3\times2}=\frac{9}{6}+\frac{20}{6}$

$=\frac{9+10}{6}\text{ m}=\frac{19}{6}\text{ m}=3\frac{1}{6}\text{ m}.$

$3\overline{)19(6}$
-18
1

Thus, Rohan's father purchases $3\frac{1}{6}$ m of cloth.

6. Thickness of one board $=3\frac{5}{16}$ cm.

Thickness of another board $=4\frac{3}{8}$ cm.

2	8, 16
2	4, 8
2	2, 4
2	1, 2
	1, 1

Combined thickness of the board

$=3\frac{5}{16}\text{ cm}+4\frac{3}{8}\text{ cm}=\frac{53}{16}+\frac{35}{8}\text{ cm}.$

LCM of 16 and 8 is 16

$=\frac{53+70}{16}\text{ cm}=\frac{123}{16}\text{ cm}=7\frac{11}{16}\text{ cm}.$

$16\overline{)123(7}$
-112
11

7. Quantity of milk in a vessel $=\frac{4}{8}$ L

Quantity of milk Viban drank from the vessel

$=\frac{1}{12}$ L.

2	8, 12
2	4, 6
2	2, 3
3	1, 3
	1, 1

Milk left in the vessel $=\frac{4}{8}\text{ L}-\frac{1}{12}\text{ L}.$

LCM of 8 and $12=2\times2\times2\times3=24.$

$=\frac{12-2}{24}\text{ L}=\frac{10}{24}\text{ L}=\frac{5}{12}\text{ L}.$

Thus, $\frac{5}{12}$ litres of milk was left in the vessel.

8. Arun jumped: $2\frac{7}{8}$ m.

Varun jumped: $2\frac{7}{8}\text{ m}-\frac{2}{3}\text{ m}=\frac{23}{8}\text{ m}-\frac{2}{3}\text{ m}.$

LCM of 8 and $3=2\times2\times2\times3=24$

8	8, 3
3	1, 3
	1, 1

$\frac{23}{8}-\frac{2}{3}=\frac{69-16}{24}=\frac{53}{24}=2\frac{5}{24}\text{ m}.$

Thus, Varun's jump was $2\frac{5}{24}$ m long.

9. Quantity of sugar used by Riya for puddings

$=1\frac{1}{2}$ kg.

Quantity of sugar used for ice-cream $=\frac{3}{4}$ kg.

Quantity used of sugar for cup cake $=\frac{1}{8}$ kg.

Total weight of sugar used

$=1\frac{1}{2}\text{ kg}+\frac{3}{4}\text{ kg}+\frac{1}{8}\text{ kg}.$

2	2, 4, 8
2	1, 2, 4
2	1, 1, 2
	1, 1, 1

$=\frac{3}{2}\text{ kg}+\frac{3}{4}\text{ kg}+\frac{1}{8}\text{ kg}.$

LCM of 2, 4 and $8=2\times2\times2=8$

$=\frac{12+6+1}{8}\text{ kg}=\frac{19}{8}\text{ kg}=2\frac{3}{8}\text{ kg}.$

Thus, $2\frac{3}{8}$ kg sugar was used by Riya in total.

Practice Time 4D

1. (*a*) $\frac{3}{8}$ by $5=\frac{3}{8}\times5=\frac{3\times5}{8}=\frac{15}{8}=1\frac{7}{8}.$

$8\overline{)15(1}$
-8
7

(*b*) $\frac{4}{7}$ by $5=\frac{4}{7}\times5=\frac{4\times5}{7}=\frac{20}{7}$

$7\overline{)20(2}$
-14
6

$=2\frac{6}{7}.$

(*c*) $\frac{20}{25}$ by $5=\frac{20}{25}\times5=\frac{20\times5}{25}=\frac{100}{25}$

$=\frac{100\div25}{25\div25}=\frac{4}{1}=1$

(*d*) $\frac{7}{20}$ by $12=\frac{7}{20}\times12=\frac{7\times12}{20}=\frac{84}{20}$

$=\frac{84\div4}{20\div4}=\frac{21}{5}=4\frac{1}{5}.$

$5\overline{)21(4}$
-20
1

2. (*a*) $\frac{2}{6}$ of $\frac{3}{5}=\frac{\cancel{2}^{1}}{\cancel{6}_{\cancel{2}_{1}}}\times\frac{\cancel{3}^{1}}{5}=\frac{1\times1}{1\times5}=\frac{1}{5}.$

(*b*) $\frac{6}{9}$ of $\frac{3}{8}=\frac{\cancel{6}^{3}}{\cancel{9}_{3}}\times\frac{\cancel{3}^{1}}{\cancel{8}_{4}}=\frac{\cancel{3}^{1}\times1}{\cancel{3}_{1}\times4}=\frac{1\times1}{1\times4}=\frac{1}{4}.$

(*c*) $\frac{\cancel{10}^{\cancel{5}^{1}}}{\cancel{15}_{3}}\times\frac{\cancel{1}^{1}}{\cancel{6}_{3}}=\frac{1\times1}{3\times3}=\frac{1}{9}.$

(*d*) $\frac{\cancel{7}^{1}}{\cancel{9}_{3}}\times\frac{\cancel{3}^{1}}{\cancel{28}_{4}}=\frac{1\times1}{3\times4}=\frac{1}{12}.$

(*e*) $\frac{\cancel{3}^{1}}{\cancel{4}_{2}}\times\frac{5}{\cancel{6}_{2}}\times\frac{\cancel{2}^{1}}{3}=\frac{1\times5\times1}{2\times2\times3}=\frac{5}{12}.$

(*f*) $\frac{\cancel{3}^{1}}{5} \times \frac{2}{\cancel{6}_{2_1}} \times \frac{\cancel{2}^{1}}{9} = \frac{1 \times 2 \times 1}{5 \times 1 \times 9} = \frac{2}{45}$.

(*g*) $\frac{3}{5} \times \frac{1}{\cancel{4}_{2}} \times \frac{\cancel{6}^{3}}{8} = \frac{3 \times 1 \times 3}{5 \times 2 \times 8} = \frac{9}{80}$.

(*h*) $\frac{\cancel{2}^{1}}{\cancel{4}_{2}} \times \frac{1}{5} \times \frac{7}{9} = \frac{1 \times 1 \times 7}{2 \times 5 \times 9} = \frac{7}{90}$.

3. (*a*) $\frac{5}{8}$ of 48 km $= \frac{5}{\cancel{8}_{1}} \times \cancel{48}^{6}$ km $= \frac{5 \times 6}{1}$ km

$= 30$ km.

(*b*) $\frac{4}{9}$ of 81 kg $= \frac{4}{\cancel{9}_{1}} \times \cancel{81}^{9}$ kg $= \frac{4 \times 9}{1}$ kg

$= 36$ kg.

(*c*) $\frac{5}{7}$ of $\frac{7}{30} = \frac{\cancel{5}^{1}}{\cancel{7}_{1}} \times \frac{\cancel{7}^{1}}{\cancel{30}_{6}} = \frac{1 \times 1}{1 \times 6} = \frac{1}{6}$.

(*d*) $\frac{7}{20}$ of 4 hours $= \frac{7}{\cancel{20}_{5}} \times \cancel{4}^{1}$ hours $= \frac{7}{5}$ hours

$= 1\frac{2}{5}$ hours.

$5\overline{)7(1}$
-5
$\underline{2}$

4. Quantity of milk Rajat purchases daily $= 2\frac{1}{2}$ L

Therefore, quantity of milk he will purchase in a week

$= 7 \times 2\frac{1}{2}$ L $= 7 \times \frac{5}{2}$ L $= \frac{7 \times 5}{2}$ L

$= \frac{35}{2} = 17\frac{1}{2}$ L.

$2\overline{)35(17}$
$-2\downarrow$
$\overline{15}$
-14
$\underline{1}$

Thus, Rajat will purchase $17\frac{1}{2}$ L of milk in a week.

5. Work finished by Seema in 1 hour $= \frac{1}{3}$ part.

Therefore, work finished by her in $2\frac{1}{5}$ hours

$= \frac{1}{3} \times 2\frac{1}{5}$ part $= \frac{1}{3} \times \frac{11}{5}$ part $= \frac{11}{15}$ part.

Thus, $\frac{11}{15}$ part of the work she will finish in $2\frac{1}{5}$ hours.

6. Part of pizza Nidhi ate $= \frac{1}{8}$.

Part of pizza Kajal ate $= \frac{1}{8}$.

Part of pizza Sonal ate $= \frac{1}{8}$.

Part of pizza Payal ate $= \frac{1}{8}$.

Part of pizza they eat all together

$= \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{1+1+1+1}{8} = \frac{\cancel{4}^{1}}{\cancel{8}_{2}} = \frac{1}{2}$.

Thus, they eat $\frac{1}{2}$ of pizza all together.

7. Weight of an object on Earth = 6 × weight of the object on Moon.

Given:

Weight of an object on Moon $= 5\frac{3}{5}$ kg.

It's weight on Earth $= 6 \times 5\frac{3}{5}$ kg $= 6 \times \frac{28}{5}$

$= \frac{168}{5} = 33\frac{3}{5}$.

$5\overline{)168(33}$
$-15\downarrow$
$\overline{18}$
-15
$\underline{3}$

Thus, the object's weight is $33\frac{3}{5}$ kg on Earth.

Practice Time 4E

1. (*a*) We can write 11 as $\frac{11}{1}$.

So, multiplicative inverse of $\frac{11}{1} = \frac{1}{11}$.

(*b*) Multiplicative inverse of $\frac{3}{7} = \frac{7}{3}$.

(*c*) Multiplicative inverse of $\frac{3}{5} = \frac{5}{3}$.

(*d*) Multiplicative inverse of $\frac{4}{9} = \frac{9}{4}$.

(*e*) Multiplicative inverse of $\frac{14}{19} = \frac{19}{14}$.

(*f*) Multiplicative inverse of $\frac{18}{40}\left(= \frac{9}{20}\right) = \frac{20}{9}$.

(*g*) Multiplicative inverse of $\frac{2}{9} = \frac{9}{2}$.

(*h*) Multiplicative inverse of $\frac{24}{30}\left(=\frac{4}{5}\right)=\frac{5}{4}$.

(*i*) Multiplicative inverse of $\frac{44}{33}\left(=\frac{4}{3}\right)=\frac{3}{4}$.

(*j*) Multiplicative inverse of $\frac{20}{5}\left(\frac{4}{1}\right)=\frac{1}{4}$.

2. (*a*) $\frac{3}{6}\div 6=\frac{3}{6}\times$ Reciprocal of 6.

$=\frac{\cancel{3}^{1}}{6}\times\frac{1}{\cancel{6}_{2}}=\frac{1\times 1}{6\times 2}=\frac{1}{12}$.

(*b*) $\frac{6}{10}\div 12=\frac{6}{10}\times$ Reciprocal of 12.

$=\frac{\cancel{6}^{\,1}}{10}\times\frac{1}{\cancel{12}_{\,2}}=\frac{1\times 1}{10\times 2}=\frac{1}{20}$.

(*c*) $\frac{16}{20}\div 8=\frac{16}{20}\times$ Reciprocal of 8.

$=\frac{\cancel{16}^{\,2^{1}}}{\cancel{20}_{10}}\times\frac{1}{\cancel{8}_{1}}=\frac{1\times 1}{10\times 1}=\frac{1}{10}$.

(*d*) $\frac{8}{9}\div 10=\frac{8}{9}\times$ Reciprocal of 10

$=\frac{\cancel{8}^{4}}{9}\times\frac{1}{\cancel{10}_{5}}=\frac{4\times 1}{9\times 5}=\frac{4}{45}$.

(*e*) $3\div\frac{5}{7}=3\times$ Reciprocal of $\frac{5}{7}$

$=3\times\frac{7}{5}=\frac{3\times 7}{5}=\frac{21}{5}=4\frac{1}{5}$.

(*f*) $7\div\frac{9}{11}=7\times$ Reciprocal of $\frac{9}{11}$

$=7\times\frac{11}{9}=\frac{77}{9}=8\frac{5}{9}$.

(*g*) $8\div\frac{4}{9}=8\times$ Reciprocal of $\frac{4}{9}$

$=\cancel{8}^{2}\times\frac{9}{\cancel{4}_{1}}=\frac{2\times 9}{1}=18$.

(*h*) $15\div\frac{3}{5}=15\times$ Reciprocal of $\frac{3}{5}$

$=\cancel{15}^{5}\times\frac{5}{\cancel{3}_{1}}=\frac{5\times 5}{1}=25$.

3. (*a*) $\frac{3}{7}\div\frac{1}{7}=\frac{3}{7}\times$ Reciprocal of $\frac{1}{7}$

$=\frac{3}{\cancel{7}_{1}}\times\cancel{7}^{1}=3\times 1=3$.

(*b*) $\frac{4}{9}\div\frac{1}{9}=\frac{4}{9}\times$ Reciprocal of $\frac{1}{9}$

$=\frac{4}{\cancel{9}_{1}}\times\cancel{9}^{1}=4\times 1=4$.

(*c*) $\frac{2}{5}\div\frac{3}{5}=\frac{2}{5}\times$ Reciprocal of $\frac{3}{5}$

$=\frac{2}{\cancel{5}_{1}}\times\frac{\cancel{5}^{1}}{3}=\frac{2\times 1}{1\times 3}=\frac{2}{3}$.

(*d*) $\frac{3}{10}\div\frac{6}{10}=\frac{3}{10}\times$ Reciprocal of $\frac{6}{10}$

$=\frac{\cancel{3}^{1}}{\cancel{10}_{1}}\times\frac{\cancel{10}^{1}}{\cancel{6}_{2}}=\frac{1\times 1}{1\times 2}=\frac{1}{2}$.

(*e*) $\frac{3}{8}\div\frac{2}{15}=\frac{3}{8}\times$ Reciprocal of $\frac{2}{15}$

$=\frac{3}{8}\times\frac{15}{2}=\frac{3\times 15}{8\times 2}$

$=\frac{45}{16}=2\frac{13}{16}$.

$16\overline{)45}(2$
$-\underline{32}$
$\underline{13}$

(*f*) $3\frac{1}{3}\div 2\frac{1}{10}=\frac{3\times 3+1}{3}\div\frac{2\times 10+1}{10}$

$=\frac{10}{3}\div\frac{21}{10}=\frac{10}{3}\times$ Reciprocal of $\frac{21}{10}$

$=\frac{10}{3}\times\frac{10}{21}=\frac{100}{63}=1\frac{37}{63}$.

$63\overline{)100}(1$
$-\underline{63}$
$\underline{37}$

(*g*) $5\frac{1}{3}\div 5\frac{1}{5}=\frac{5\times 3+1}{3}\div\frac{5\times 5+1}{5}$

$=\frac{16}{3}\div\frac{26}{5}=\frac{\cancel{16}^{8}}{3}\times\frac{5}{\cancel{26}_{13}}$

$=\frac{40}{39}=1\frac{1}{39}$.

$39\overline{)40}(1$
$-\underline{39}$
$\underline{1}$

(*h*) $1\frac{4}{10}\div 2\frac{5}{8}=\frac{1\times 10+4}{10}\div\frac{2\times 8+5}{8}$

$=\frac{14}{10}\div\frac{21}{8}$

$=\frac{14}{10}\times$ Reciprocal of $\frac{21}{8}$

$=\frac{\cancel{14}^{2}}{\cancel{10}_{5}}\times\frac{\cancel{8}^{4}}{\cancel{21}_{3}}=\frac{2\times 4}{5\times 3}=\frac{8}{15}$.

4. To find the length of each piece of rope, we need to divide $8\frac{1}{3}$ m by 15.

The multiplicative inverse of 15 is $\frac{1}{15}$.

So, $8\frac{1}{3} \div 15 = \frac{\cancel{25}^{5}}{3} \times \frac{1}{\cancel{15}_{3}}$ m

$= \frac{5 \times 1}{3 \times 3}$ m $= \frac{5}{9}$ m.

5. Length of long ribbon Aanaya had $= 3\frac{1}{2}$ m.

Number of friends equally divided = 3.

Length of long ribbon each one get

$= 3\frac{1}{2}$ m $\div 3 = \frac{7}{2}$ m $\div 3$

$= \frac{7}{2}$ m $\times$ Multiplicative inverse of 3

$= \frac{7}{2}$ m $\times \frac{1}{3} = \frac{7}{6}$ m $= 1\frac{1}{6}$ m.

$6\overline{)7(1}$
$-\frac{6}{1}$

Thus, each one will get $1\frac{1}{6}$ m ribbon.

6. The cost of $5\frac{2}{3}$ kg of apples is ₹680.

So, cost of 1 kg apples

$= ₹680 \div 5\frac{2}{3}$ kg $= ₹680 \div \frac{17}{3}$

$= ₹680 \times$ Multiplicative inverse of $\frac{17}{3}$

$= \cancel{680}^{40} \times \frac{3}{\cancel{17}_{1}} = ₹40 \times 3 = ₹120.$

Thus, the cost 1 kg of apples is ₹120.

7. To find the number of boxes of chocolates, we need to divide $1\frac{3}{5}$ kg by $\frac{1}{5}$ kg

$= 1\frac{3}{5}$ kg $\div \frac{1}{5} = \frac{8}{5}$ kg $\times$ Reciprocal of $\frac{1}{5}$ kg

$= \frac{8}{\cancel{5}_{1}} \times \frac{\cancel{5}^{1}}{1} = 8.$

Thus, 8 chocolate boxes can be made.

Mental Maths (Page 98)

1. The product of a proper fraction and an improper fraction is lesser than the improper fraction.

2. The two fractions whose product is 1 are called the reciprocal of each other.

3. The product of two fractions = 12.

i.e., 1st fraction × 2nd fraction = 12

1st fraction $= \frac{3}{4}$

$\therefore \frac{3}{4} \times$ 2nd fraction = 12

$\Rightarrow$ 2nd fraction $= 12 \div \frac{3}{4}$

$= 12 \times$ Reciprocal of $\frac{3}{4}$.

$= \cancel{12}^{4} \times \frac{4}{\cancel{3}_{1}} = 4 \times 4 = 16$

4. The product of two proper fractions is less than each of the fractions.

Brain Sizzlers (Page 99)

1. Since $\frac{1}{4}$ th of the herd of deer have gone to the forest and $\frac{1}{3}$ rd for grazing, the remaining part of the herd

$= 1 - \left(\frac{1}{4} + \frac{1}{3}\right) = 1 - \frac{3+4}{12} = \frac{12-7}{12} = \frac{5}{12}.$

We are given that the number of remaining deer is 25.

Therefor,

$\frac{5}{12}$ part of the herd = 25 deer

$\Rightarrow$ Whole herd $= 25 \div \frac{5}{12} = 25 \times \frac{12}{5}$

$= 5 \times 12 = 60$ deer

Thus, there were 60 deer in the herd.

2. Fraction $= 4\frac{1}{2} \times 6 + \frac{6}{7} = \frac{4 \times 2 + 1}{2} \times 6 + \frac{6}{7}$

$= \frac{9}{\cancel{2}_{1}} \times \cancel{6}^{3} + \frac{6}{7} = \frac{27}{1} + \frac{6}{7}$

$= \frac{27 \times 7 + 6}{7} = \frac{189 + 6}{7} = \frac{195}{7} = 27\frac{6}{7}.$

Chapter Assessment

1. Mary earned in May = ₹12460

Mary earned in June = $\frac{5}{7}$ of ₹12460.

$= \frac{5}{\cancel{7}_{1}} \times \cancel{12460}^{1780}$

$= ₹5 \times 1780 = ₹8900.$

Thus, she earned ₹8900 in June.

2. Pranshu ate $2\frac{1}{2}$ pizza

Sam ate $3\frac{3}{4}$ pizza

∴ Total pizza they eat in 2-week period time

$= 2\frac{1}{2} + 3\frac{3}{4} = \frac{5}{2} + \frac{15}{4} = \frac{5 \times 2 + 15 \times 1}{4}$

$= \frac{10 + 15}{4} = \frac{25}{4} = 6\frac{1}{4}$

$4\overline{)25}(6$
$-\underline{24}$
1

Thus, they eat $6\frac{1}{4}$ pizza in that time.

3. Jay sold t-shirts in a day of ₹720.

Alen sold t-shirts of this in a day of

$= ₹\left(\frac{5}{\cancel{8}_{1}} \times \cancel{720}^{90}\right) = ₹(5 \times 90) = ₹450$

Thus, Alen makes ₹450 in a day.

4. Number of pies Hem ate = $1\frac{3}{4}$.

Number of pies Sally ate = $1\frac{3}{4}$

Number of pies Jash ate = $1\frac{3}{4}$

Number of pies they ate altogether

$= 3 \times 1\frac{3}{4} = 3 \times \frac{7}{4} = \frac{21}{4} = 5\frac{1}{4}.$

$4\overline{)21}(5$
$-\underline{20}$
1

5. Total number of cookies in a packet = 48

Number of cookies he gave to his brother

$= \frac{1}{3}$ of 48

∴ $= \frac{1}{\cancel{3}} \times \cancel{48}^{16} = 16.$

Thus, his brother gets 16 cookies.

6. Nimit earned in May = ₹18760

Sally made $\frac{7}{8}$ of this amount.

∴ Amount of money Sally earned

$= ₹\left(\frac{\cancel{7}}{\cancel{8}} \times \cancel{18760}^{2345}\right) = ₹(7 \times 2345) = ₹16415.$

Thus, Sally earned ₹16415.

7. Length of rectangle = $5\frac{3}{4}$ cm = $\frac{23}{4}$ cm.

Breadth of rectangle = 3 cm

Area of rectangle = length × breadth

$= \frac{23}{4}$ cm $\times$ 3 cm

$= \frac{69}{4}$ cm^2 $= 17\frac{1}{4}$ cm^2.

$4\overline{)69}(17$
$-\underline{4}\downarrow$
29
$-\underline{28}$
1

Thus, area of rectangle is $17\frac{1}{4}$ sq. cm.

8. Number of rectangular paper sheets

$= 3\frac{1}{2} = \frac{7}{2}.$

Each strip of the paper = $\frac{1}{12}$ of the paper.

So, number of sheet Siya cut from the paper

$= \frac{7}{2} \div \frac{1}{12} = \frac{7}{\cancel{2}_{1}} \times \frac{\cancel{12}^{6}}{1} = 42.$

Thus, Siya cuts 42 sheets from the paper.

9. Number of notebooks to put covers = 24.

Number of notebooks on which Samar puts covers on Monday = $\frac{1}{4} \times 24 = 6.$

Number of notebooks on which he puts covers on Tuesday = $\frac{2}{\cancel{3}_{1}} \times \cancel{24}^{8} = 16.$

Total number of notebooks covered on both the days = 6 + 16 = 22.

Remaining notebooks on which he puts covers on Wednesday = 24 – 22 = 2

Fractions = $\frac{2}{24} = \frac{1}{12}$

Thus, $\frac{1}{12}$ of the covers he puts on the notebooks on Wednesday.

10. Weight of drum full with rice $= 40\frac{1}{6}$ kg.

Weight of empty drum $= 13\frac{3}{4}$ kg.

Weight of rice in the drum

$= 40\frac{1}{6} - 13\frac{3}{4}$ kg.

$= \frac{241}{6} - \frac{55}{4}$ kg.

$= \frac{482 - 165}{12}$ kg.

$= \frac{317}{12}$ kg. $= 26\frac{5}{12}$ kg.

2	6, 4
2	3, 2
3	3, 1
	1, 1

$\therefore$ LCM 6 and 4
$= 2 \times 2 \times 3 = 12$

$12\overline{)317}(26$
$-24\downarrow$
77
-72
05

Thus, weight of rice in the drum $= 26\frac{5}{12}$ kg.

11. Distance travelled in one day

$= 47\frac{1}{2}$ km $= \frac{95}{2}$ km.

Distance covered by bus $= 29\frac{1}{2}$ km $= \frac{59}{2}$ km.

Distance covered by horse - cart

$= 8\frac{5}{6}$ km $= \frac{53}{6}$ km.

Distance covered on foot $= \frac{95}{2}$ km $- \left(\frac{59}{2} + \frac{53}{6}\right)$ km

$= \frac{95}{2}$ km $- \left(\frac{177 + 53}{6}\right) = \frac{95}{2}$ km $- \frac{230}{6}$ km

$= \frac{95 \times 3 - 230}{6}$ km

[$\because$ LCM of 2 and 6 = 6]

$= \frac{285 - 230}{6}$ km $= \frac{55}{6}$ km

$= 9\frac{1}{6}$ km.

$6\overline{)55}(9$
-54
1

Thus, he traveled $9\frac{1}{6}$ km on foot.

12. To find the total quantity of water purchased by Ram, we need to multiply 12 by $3\frac{7}{9}$ L.

$= 12 \times 3\frac{7}{9}$ L $= \cancel{12}^{4} \times \frac{34}{\cancel{9}_{3}}$ L

$= \frac{136}{3}$ L $= 45\frac{1}{3}$ L.

Thus, $45\frac{1}{3}$ litres of water purchased by Ram.

13. Total distance from home to her school

$= 15\frac{3}{5}$ km $= \frac{78}{5}$ km.

She travelled $\frac{2}{5}$ part of total distance. i.e.,

$\frac{2}{5} \times \frac{78}{5}$ km $= \frac{156}{25}$ km

Distance left to travel $= \frac{78}{5} - \frac{156}{25}$ km

$= \frac{78 \times 5 - 156}{25}$ km [$\because$ LCM of 5 and 25 = 25]

$= \frac{390 - 156}{25}$ km $= \frac{234}{25}$ km

$= 9\frac{9}{25}$ km.

$25\overline{)234}(9$
-225
9

Maths Fun (Page 101)

$\frac{8}{3}$	×	$\frac{1}{5}$	=	$\frac{8}{15}$
×		×		×
$\frac{7}{4}$	×	$1\frac{7}{21}$	=	$\frac{7}{3}$
=		=		=
$\frac{14}{3}$	×	$\frac{4}{15}$	=	$\frac{56}{45}$

CHAPTER 5: DECIMALS

Let's Recall

1. (*a*) 3.15 m = Three point one five metres.

(*b*) 3.52 m = Three point five two metres.

(*c*) 3.66 m = Three point six six metres.

2. Given number = 3.52

Place value of digit 5 = five-tenths

Place value of digit 2 = Two-hundredths

Think and Answer (Page 107)

1. $54.89 = 50 + 4 + \frac{8}{\boxed{10}} + \frac{9}{\boxed{100}}$

2. $125.382 = 100 + \boxed{20} + 5 + \frac{3}{\boxed{10}} + \frac{\boxed{8}}{100} + \frac{\boxed{2}}{1000}$

Practice Time 5A

1. (*a*) $\frac{5}{10} = 0.5$ (*b*) $\frac{68}{100} = 0.68$

(*c*) $\frac{143}{100} = 1.43$

2.

	Decimals	Decimals in words
(*a*)	0.38	**Zero point three eight**
(*b*)	**1.032**	One point zero three two
(*c*)	1.532	**One point five three two**
(*d*)	**0.006**	Zero point zero zero six
(*e*)	2.037	**Two point zero three seven**
(*f*)	**5.68**	Five point six eight

3. (*a*) Here, 1 zero is in the denominator. So, put the decimal point after one digit from the right in the numerator.

$\frac{8}{10} = 0.8$

(*b*) Here, 1 zero is in the denominator. So, put the decimal point after one digit from the right in the numerator.

$\frac{29}{10} = 2.9$

(*c*) Here, 2 zeros are there in the denominator. So put the decimal point after two digits from the right in the numerator.

$\frac{372}{100} = 3.72$

(*d*) $\frac{3}{100} = 0.03$ (*e*) $\frac{58}{100} = 0.58$

(*f*) $\frac{118}{100} = 1.18$ (*g*) $\frac{2236}{100} = 22.36$

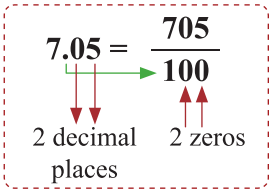
(*h*) Here, 3 zeros are there in the denominator. So, put the decimal point after three digits from the right in the numerator.

$\frac{1390}{1000} = 1.390$

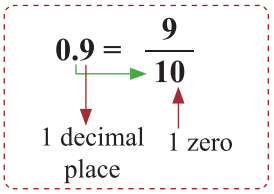
(*i*) $2\frac{18}{1000} = \frac{2\times1000+18}{1000} = \frac{2018}{1000} = 2.018$

(*j*) $1\frac{368}{1000} = \frac{1\times1000+368}{1000} = \frac{1368}{1000} = 1.368$

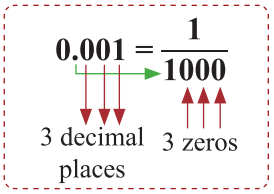
4. (*a*) $7.05 = \frac{705}{100}$



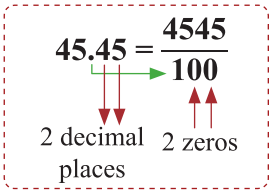
(*b*) $0.9 = \frac{9}{10}$



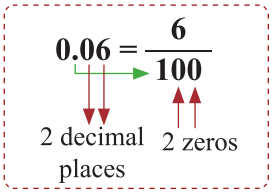
(*c*) $0.001 = \frac{1}{1000}$



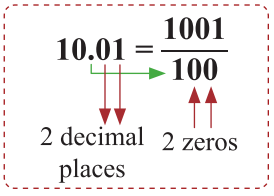
(*d*) $45.45 = \frac{4545}{100}$



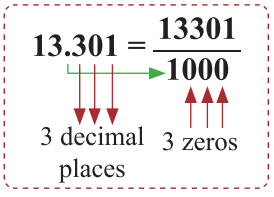
(*e*) $0.06 = \frac{6}{100}$



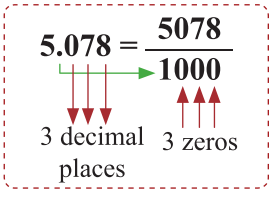
(*f*) $10.01 = \frac{1001}{100}$



(*g*) $13.301 = \frac{13301}{1000}$



(*h*) $5.078 = \frac{5078}{1000}$



(*i*) $0.125 = \frac{125}{1000}$

$0.125 = \frac{125}{1000}$ — 3 decimal places; 3 zeros

(*j*) $0.09 = \frac{9}{100}$

$0.09 = \frac{9}{100}$ — 2 decimal places; 2 zeros

5. **Decimal Place Value Chart**

	Number	Hundreds (100)	Tens (10)	Ones (1)	Decimal point	Tenths $\left(\frac{1}{10}\right)$	Hundredths $\left(\frac{1}{100}\right)$	Thousandths $\left(\frac{1}{1000}\right)$
(*a*)	37.05		3	7	•	0	5	
(*b*)	15.263		1	5	•	2	6	3
(*c*)	226.266	2	2	6	•	2	6	6
(*d*)	724.264	7	2	4	•	2	6	4

6. (*a*) Seven point three four seven = 7.347

(*b*) Zero point zero seven zero = 0.070

(*c*) Twenty-nine point nine zero nine = 29.909

(*d*) Forty-four point nine nine five = 44.995

(*e*) Eight hundred one point one zero nine = 801.109

(*f*) Ninety-nine point nine nine = 99.99

7. (*a*) 8.32 = 8 ones + 3 tenths + 2 hundredths

$= 8 + \frac{3}{10} + \frac{2}{100} = 8 + 0.3 + 0.02$

(*b*) 16.247 = 1 ten + 6 ones + 2 tenths + 4 hundredths + 7 thousandths

$= 10 + 6 + \frac{2}{10} + \frac{4}{100} + \frac{7}{1000}$

$= 10 + 6 + 0.2 + 0.04 + 0.007$

(*c*) 81.459 = 8 tens + 1 one + 4 tenths + 5 hundredths + 9 thousandths

$= 80 + 1 + \frac{4}{10} + \frac{5}{100} + \frac{9}{1000}$

$= 80 + 1 + 0.4 + 0.05 + 0.009$

(*d*) 326.47 = 3 hundreds + 2 tens + 6 ones + 4 tenths + 7 hundredths

$= 300 + 20 + 6 + \frac{4}{10} + \frac{7}{100}$

$= 300 + 20 + 6 + 0.4 + 0.07$

(*e*) 728.032 = 7 hundreds + 2 tens + 8 ones + 0 tenths + 3 hundredths + 2 thousandths

$= 700 + 20 + 8 + \frac{0}{10} + \frac{3}{100} + \frac{2}{1000}$

$= 700 + 20 + 8 + 0.03 + 0.002$

8. (*a*) $30 + 2 + \frac{1}{10} + \frac{2}{100} + \frac{3}{1000}$

$= 30 + 2 + 0.1 + 0.02 + 0.003 = 32.123$

(*b*) $5000 + 80 + \frac{16}{100}$

$= 5000 + 80 + 0.16 = 5080.16$

(*c*) $700 + 4 + \frac{2}{100} + \frac{8}{1000}$

$= 700 + 4 + 0.02 + 0.008 = 704.028$

(*d*) $5000 + 80 + 5 + \frac{3}{10} + \frac{4}{100} + \frac{8}{1000}$

$= 5000 + 80 + 5 + 0.3 + 0.04 + 0.008$

$= 5085.348$

(*e*) $4000 + 800 + \frac{7}{100} + \frac{8}{1000}$

$= 4000 + 800 + 0.07 + 0.008 = 4800.078$

(*f*) 9 hundreds + 8 ones + 9 tenths + 3 hundredths

$= 900 + 8 + \frac{9}{10} + \frac{3}{100}$

$= 900 + 8 + 0.9 + 0.03 = 908.93$

(*g*) 6 thousands + 8 tens + 3 ones + 9 thousandths

$= 6000 + 80 + 3 + \frac{9}{1000}$

$= 6000 + 80 + 3 + 0.009 = 6083.009$

Practice Time 5B

1. (*a*) 0.49, 0.09, 3.06, 15.68 have 2 decimal places. So, it is a group of like decimals.

(*b*) 38.09, 3.806, 4.06, 30.6 don't have the same decimal places. So, it is not a groups of like decimals.

(*c*) 0.656, 2.001, 15.905, 215.812 have 3 decimal places. So, it is a group of like decimals.

(*d*) 5.8, 0.81, 235.056, 45.625 don't have the same decimal places. So, it is not a groups of like decimals.

Hence, (*a*) and (*c*) are group of like decimals.

2. (*a*) 5.45, 3.51, 16.96, 3.62 have 2 decimal places. So, it is not a group of unlike decimals.

(*b*) 0.32, 0.456, 17.4, 617.561 are unlike decimals as they have different number of decimal places. So, it is a group of unlike decimals.

(*c*) 116.31, 86.3, 70.09, 78.05 are unlike decimals as they have different number of decimal places. So, it is a group of unlike decimals.

(*d*) 0.56, 0.605, 12.1, 270.01 are unlike decimals as they have different number of decimal places. So, it is group of unlike decimals. Hence, (*b*), (*c*) and (*d*) are group of unlike decimals.

3. (*a*) 7.1, 31.4, 10.1 are like decimals as they have 1 decimal place. Similarly, 0.97 and 8.89 are like decimal as they have 2 decimal places

(*b*) 21.470, 3.001, 0.098 are like decimals as they have 3 decimal places. Similarly, 24.0 and 0.1 are like decimals.

4. (*a*) 0.3 = 0.30 = 0.300

(*b*) 2.5 = 2.50 = 2.500

(*c*) 41.7 = 41.70 = 41.700

(*d*) 6.40 = 6.4 = 6.400

(*e*) 9.700 = 9.7 = 9.70

(*f*) 5.300 = 5.3 = 5.30

5. (*a*) 1.264 has 3 decimal places which is largest. So, every decimal number must have 3 decimal places. So, add zeros at the right side of the decimal part of each decimal.

Unlike decimals:	2.3	6.87	2.63	43.6	1.264
	↓	↓	↓	↓	↓
Like decimals:	2.300	6.870	2.630	43.600	1.264

(*b*) Clearly, 100.143 has 3 decimal places which is the largest.

So, every decimal number must have 3 decimal places. So, add zeros at the right side of the decimal part of each decimal.

Unlike decimals:	5.1	5.01	5.001	40.4	48.26	100.143
	↓	↓	↓	↓	↓	↓
Like decimals:	5.100	5.010	5.001	40.400	48.260	100.143

Practice Time 5C

1. (*a*) 55.5 and 46.30 are unlike decimals.

So, converting the unlike decimals into like decimals, we get 55.50 and 46.30.

Comparing the whole number part, we observe that 55 > 46

So, 55.50 > 46.30

Thus, 55.5 > 46.30

T	O	•	t	h
5	5	•	5	
4	6	•	3	0

5 > 4

(*b*) 2.710 < 2.802

O	•	t	h	th
2	•	7	1	0
2	•	8	0	2

Same; 7 < 8

(*c*) 7.6 > 7.09

O	•	t	h
7	•	6	0
7	•	0	9

Same; 6 > 0

(*d*) 4.630 = 4.63

O	•	t	h	th
4	•	6	3	0
4	•	6	3	

Same

(*e*) 11.406 > 11.278

T	O	•	t	h	th
1	1	•	4	0	6
1	1	•	2	7	8

Same; 4 > 2

(*f*) to (*i*) same as above.

2. (a) 0.035, 0.123, 0.608, 1.708 are like decimals. Now, comparing the whole number part, we observe that 1 is the greatest number.

Thus, 1.708 is the greatest decimal number.

(*b*) 4.121, 50.8, 0.077, 43.0004 are unlike decimals. So, converting the unlike decimals into like decimals, we get

4.121, 50.800, 0.077 and 43.004

Now, comparing the whole number part, we observe that 50 is the greatest number.

Therefore, 50.800 is the greatest decimal number.

Thus, 50.8 is the greatest decimal number.

(*c*) and (*d*) same as above.

3. (*a*) 0.62, 25.131, 368.147, 199.09 are unlike decimals. So, converting the unlike decimals into like decimals, we get

0.620, 25.131, 368.147 and 199.090.

Now, comparing the whole number part, we observe that 0 is the smallest number.

So, 0.620 is the smallest decimal number.

Thus, 0.62 is the smallest decimal number.

(*b*) 40.12, 2.364, 60.45, 2.803 are unlike decimals. So, converting the unlike decimals into like decimals, we get

40.120, 2.364, 60.450 and 2.803

Now, comparing the whole number part, we observe that, 2 is the smallest number.

Now, again comparing decimal parts, we observe .364 < .803

Thus, 2.364 is the smallest decimal number.

(*c*) and (*d*) same as above.

4. (*a*) 0.09 and 0.1 are unlike decimals. So, converting unlike decimals into like decimals, we have 0.09 and 0.10. Whole number parts of both decimals are same.

So, we compare decimal parts. On comparing tenth place, we get

0 < 1 *i.e.*, 0.10 > 0.09

Thus, 0.1 is greater.

(*b*) 17.981 and 17.957 are like decimals. Whole number parts of both decimals are same. Tenth digits are also same. On comparing hundredths digit, we get 8 > 5

So, 17.981 > 17.957

Thus, 17.981 is greater.

(*c*) and (*d*) same as above.

5. (*a*) Converting unlike decimals into like decimals, we have,

3.600, 36.600, 366.600, 3.006

The ascending order of the decimals are

3.006 < 3.600 < 36.600 < 366.600

or 3.006 < 3.6 < 36.6 < 366.6

(*b*) Converting unlike decimals into like decimals, we have 0.800, 0.880, 80.000, 0.888, 88.000

The ascending order of the decimals are

0.800 < 0.880 < 0.888 < 80.000 < 88.000

or 0.8 < 0.88 < 0.888 < 80 < 88

(*c*) and (*d*) same as above.

6. (*a*) Converting unlike decimals into like decimals, we have,

2.003, 20.030, 200.300, 0.203

The descending order of the decimals are

200.300 > 20.030 > 2.003 > 0.203

or 200.3 > 20.03 > 2.003 > 0.203

(*b*) Converting unlike decimals into like decimals, we have,

10.010, 10.032, 10.020, 10.045

The descending order of the decimals are

10.045 > 10.032 > 10.020 > 10.010

or 10.045 > 10.032 > 10.02 > 10.01

(*c*) and (*d*) same as above.

Think and Answer (Page 114)

The get the required number, we subtract 2.964 from 12.67.

Arrange the numbers in columns and subtract as shown here.

Thus, 9.706 added to 2.964 make it equal to 12.67.

```
    11
  0 1   16 6 10
  1 2 • 6 7 0
−   2 • 9 6 4
    9 • 7 0 6
```

Practice Time 5D

1. (*a*) Here, 23.21 and 13.57 are like decimals.

We write the addends one below the other so that the decimal point are in the same column and then add them.

Thus, 23.21 + 13.57 = 36.78.

```
  2 3 • 2 1
+ 1 3 • 5 7
  3 6 • 7 8
```

(*b*) Here, 57.21 and 1.8 are unlike decimals.

So, converting unlike decimals into like decimals, we get 57.21 and 1.80.

We write the addends one below the other so that the decimal point are in the same column and then add them.

Thus, 57.21 + 1.8 = 59.01.

```
    1
  5 7 • 2 1
+   1 • 8 0
  5 9 • 0 1
```

(*c*) Converting unlike decimals into like decimals, we get 15.200 and 0.049.

Now, we add 15.200 and 0.049 as shown here.

Thus, 15.2 + 0.049 = 15.249

```
  1 5 • 2 0 0
+   0 • 0 4 9
  1 5 • 2 4 9
```

(*d*) Converting unlike decimals into like decimals, we get 1.00, 7.61 and 10.00

Now, we add 1.00, 7.61 and 10.00 as shown here.

Thus, 1.0 + 7.61 + 10 = 18.61.

```
    1 • 0 0
    7 • 6 1
+ 1 0 • 0 0
  1 8 • 6 1
```

(*e*) Converting unlike decimals into like decimals, we get 256.900, 2.596 and 72.360.

Now, we add 256.900, 2.596 and 72.360 as shown here.

Thus, 256.9 + 72.36 + 2.596 = 331.856.

$$\begin{array}{r} {\scriptstyle 1\,1\,1\;\;1} \\ 256.900 \\ 72.360 \\ +\quad 2.596 \\ \hline 331.856 \end{array}$$

(*f*) Converting unlike decimals into like decimals, we get 28.750, 19.320 and 6.562.

Now, we add 28.750, 19.320 and 6.562.

Thus, 28.75 + 19.32 + 6.562 = 54.632.

$$\begin{array}{r} {\scriptstyle 2\,1\;\;1} \\ 28.750 \\ 19.320 \\ +\quad 6.562 \\ \hline 54.632 \end{array}$$

2. Arrange the decimal numbers in columns add them.

(*a*) $\begin{array}{r} {\scriptstyle 1} \\ 25.90 \\ +\,16.07 \\ \hline 41.97 \end{array}$

(*b*) $\begin{array}{r} {\scriptstyle 1\,1\;\;2} \\ 27.09 \\ 14.87 \\ +\,21.25 \\ \hline 63.21 \end{array}$

(*c*) $\begin{array}{r} {\scriptstyle 1} \\ 26.50\ \text{kg} \\ +\,72.85\ \text{kg} \\ \hline 99.35\ \text{kg} \end{array}$

(*d*) $\begin{array}{r} {\scriptstyle 1} \\ ₹\ 82.76 \\ +\,₹\ \ 0.82 \\ \hline ₹\ 83.58 \end{array}$

(*e*) $\begin{array}{r} 7.076\ \text{L} \\ +\,1.500\ \text{L} \\ \hline 8.576\ \text{L} \end{array}$

(*f*) $\begin{array}{r} 25.250\ \text{cm} \\ +\quad 0.605\ \text{cm} \\ \hline 25.855\ \text{cm} \end{array}$

3. (*a*) 5.6 and 7.3 are like decimals.

Now, we subtract 5.6 from 7.3 as shown here.

Thus, 7.3 – 5.6 = 1.7

$$\begin{array}{r} {\scriptstyle 6\;\;13} \\ \cancel{7}.\,3 \\ -\,5.\,6 \\ \hline 1.\,7 \end{array}$$

(*b*) Converting unlike decimals into like decimals, we get 3.100 and 3.456.

Now, we subtract 3.100 from 3.456 as shown here.

Thus, 3.456 – 3.1 = 0.356.

$$\begin{array}{r} 3.456 \\ -\,3.100 \\ \hline 0.356 \end{array}$$

(*c*) 1.979 and 20.876 are like decimals.

Now, we subtract 1.979 from 20.876 as shown here.

Thus, 20.876 – 1.979 = 18.897.

$$\begin{array}{r} {\scriptstyle 9\;\;17\,16} \\ {\scriptstyle 1\,10\;\;7\;\;6\;\;16} \\ \cancel{2}\,\cancel{0}.\,\cancel{8}\,\cancel{7}\,\cancel{6} \\ -\quad 1.\,9\,7\,9 \\ \hline 18.897 \end{array}$$

(*d*) Converting unlike decimals into like decimals, we get 2.9567 and 15.2000.

Now, we subtract 2.9567 from 15.2000 as shown here.

Thus, 15.2 – 2.9567 = 12.2433.

$$\begin{array}{r} {\scriptstyle 11\;\;9\;\;9} \\ {\scriptstyle 4\;\;\cancel{1}\,10\,10\,10} \\ 1\,\cancel{5}.\,\cancel{2}\,\cancel{0}\,\cancel{0}\,0 \\ -\quad 2.\,9\,5\,6\,7 \\ \hline 12.\,2\,4\,3\,3 \end{array}$$

(*e*) 235.992 and 345.607 are like decimals.

Now, we subtract 235.992 from 345.607 as shown here.

Thus, 345.607 – 235.992 = 109.615.

$$\begin{array}{r} {\scriptstyle 14\;\;15} \\ {\scriptstyle 3\,\cancel{4}\;\;\cancel{5}\,10} \\ 3\,\cancel{4}\,\cancel{5}.\,\cancel{6}\,\cancel{0}\,7 \\ -\,2\,3\,5.\,9\,9\,2 \\ \hline 109.\,6\,1\,5 \end{array}$$

(*f*) to (*i*) same as above.

4. (*a*) First arrange the decimal numbers in columns and then subtract as shown here.

Thus, 12.99 – 3.75 = 9.24.

$$\begin{array}{r} {\scriptstyle 0\;\;12} \\ \cancel{1}\,\cancel{2}.\,99 \\ -\quad 3.\,75 \\ \hline 9.\,24 \end{array}$$

(*b*) First arrange the decimal numbers in columns and then subtract as shown here.

Thus, 5.38 – 5.19 = 0.19

$$\begin{array}{r} {\scriptstyle 2\;\;18} \\ 5.\,\cancel{3}\,\cancel{8} \\ -\,5.\,1\,9 \\ \hline 0.\,1\,9 \end{array}$$

(*c*) Converting unlike decimals into like decimals, we get 20.654 and 16.590.

Arrange the decimal numbers in columns and then subtract as shown here.

Thus, 20.654 – 16.59 = 4.064

$$\begin{array}{r} {\scriptstyle 1\;\;10\;\;5\;\;15} \\ \cancel{2}\,\cancel{0}.\,\cancel{6}\,\cancel{5}\,4 \\ -\,1\,6.\,5\,9\,0 \\ \hline 0\,4.\,0\,6\,4 \end{array}$$

(*d*) First arrange the decimal numbers in columns and then subtract as shown here

Thus, 19.325 km – 0.273 km = 19.052 km

$$\begin{array}{r} {\scriptstyle 2\;\;12} \\ 19.\,\cancel{3}\,\cancel{2}\,5\ \text{km} \\ -\quad 0.\,2\,7\,3\ \text{km} \\ \hline 19.\,0\,5\,2\ \text{km} \end{array}$$

(*e*) Converting unlike decimals into like decimals, we get 6.267 mL and 5.450 mL.

Arrange the decimal numbers in columns and then subtract as shown here.

Thus, 6.267 mL – 5.450 mL = 0.817 mL.

$$\begin{array}{r} {\scriptstyle 5\;\;12} \\ \cancel{6}.\,\cancel{2}\;6\;7\ \text{mL} \\ -\,5.\,4\,5\,0\ \text{mL} \\ \hline 0.\,8\,1\,7\ \text{mL} \end{array}$$

(*f*) Converting unlike decimals into like decimals, we get 536.275 and 364.200.

Arrange the decimal numbers in columns and then subtract as shown here.

Thus, 536.275 kg – 364.20 kg = 172.075 kg

$$\begin{array}{r} {\scriptstyle 4\;\;13} \\ \cancel{5}\,\cancel{3}\,\cancel{6}.\,2\,7\,5 \\ -\,3\;\;6\;\;4.\,2\,0\,0 \\ \hline 1\;\;7\;\;2.\,0\,7\,5 \end{array}$$

(*g*) and (*h*) same as above.

5. First find the sum of 8.36 and 8.07 as shown here. So, 8.36 + 8.07 = 16.43.

Now, subtract 16.43 from 16.85 as shown here.

Thus, the required result = 0.42.

$$\begin{array}{r} {\scriptstyle 1} \\ 8.\,3\,6 \\ +\,8.\,0\,7 \\ \hline 16.\,4\,3 \end{array}$$

$$\begin{array}{r} 16.\,8\,5 \\ -\,16.\,4\,3 \\ \hline 0.\,4\,2 \end{array}$$

6. First, find the sum of 68.01 and 6.9 as shown here.

So, 68.01 + 6.90 = 74.91

Now, the difference of 68.01 and 6.90 is shown here.

So, 68.01 – 6.90 = 61.11.

Now, subtract 61.11 from 74.91

Thus, the required difference is 13.80.

7. First, the difference of 65.650 and 5.556 is shown here.

So, 65.650 – 5.556 = 60.094.

Now, the sum of 65.650 and 5.556 is shown here.

So, 65.650 + 5.556 = 71.206

Now, the sum of 60.094 and 71.206 is shown here.

Thus, the required sum is 131.300.

8.

Cost of a toothpaste =	₹ 31.75
Cost of a soap =	₹ 41.25
Cost of a shoe polish =	+ ₹ 52.00
Total cost of these items =	₹ 125.00

He gave to shopkeeper =	₹ 200.00
Total cost of the items =	– ₹ 125.00
	₹ 075.00

Thus, he got ₹75 in return.

9. To find the total length of cloth left, we will find the difference between decimal numbers 78.66 m and 15.76 m as shown here.

Thus, the total length of cloth left is 62.90 m.

10.

Weight of the rice in the first bag =	80.00 kg
Weight of the rice in the second bag =	+ 13.76 kg
Total weight of the rice in the two bags =	93.76 kg

Thus, 93.76 kg is the total weight of the rice in the two bags.

11.

Weight of the first boy =	36.97 kg
Weight of the second boy =	+ 41.03 kg
Total weight of two boys =	78.00 kg
Total weight of three boys =	98.05 kg
And weight of two boys =	– 78.00 kg
Weight of the third boy =	20.05 kg

Thus, the weight of the third boy is 20.05 kg.

Practice Time 5E

1. (*a*) When we multiply a decimal number by 10, the decimal point in the product moves towards the right by one place.

∴ 0.8 × 10 = 8.0 = 8

(*b*) 7.6 × 10 = 76.0 = 76

(*c*) 13.8 × 10 = 138.0 = 138

(*d*) 15.75 × 10 = 157.5

(*e*) 4.567 × 100 = 456.7

When we multiply a decimal number by 100, the decimal point in the product moves towards the right by two places.

(*f*) 0.457 × 100 = 45.7

(*g*) 6.543 × 1000 = 6543.0 = 6543

When we multiply a decimal number by 1000, the decimal point in the product moves towards the right by three places.

(*h*) 6.56 × 1000 = 6560.0 = 6560

(*i*) 27.006 × 1000 = 27006.0 = 27006

2. (*a*) 648 × 6 = 3888 → 64.8 × 6 = 388.8 (One decimal place)

Thus, 64.8 × 6 = 388.8

(*b*) 5608 × 5 = 28040 → 56.08 × 5 = 280.40 (Two decimal place)

Thus, 56.08 × 5 = 280.4

(*c*) $9999 \times 9 = 89991$ → $99.99 \times 9 = 899.91$ (Two decimal place)

(*d*)
$$\begin{array}{r} 687 \\ \times\ 15 \\ \hline 3435 \leftarrow \text{Multiplication by 5} \\ +6870 \leftarrow \text{Multiplication by 10} \\ \hline 10305 \end{array} \longrightarrow \times \begin{array}{r} 0.687 \\ 15 \\ \hline 10.305 \end{array}$$
Three decimal place

Thus, $0.687 \times 15 = 10.305$

(*e*)
$$\begin{array}{r} 3546 \\ \times\ 29 \\ \hline 31914 \leftarrow \text{Multiplication by 9} \\ +70920 \leftarrow \text{Multiplication by 20} \\ \hline 102834 \end{array} \longrightarrow \times \begin{array}{r} 354.6 \\ 29 \\ \hline 10283.4 \end{array}$$
One decimal place

Thus, $354.6 \times 29 = 10283.4$

(*f*)
$$\begin{array}{r} 62552 \\ \times\ 70 \\ \hline 00000 \leftarrow \text{Multiplication by 0} \\ +4378640 \leftarrow \text{Multiplication by 70} \\ \hline 4378640 \end{array} \longrightarrow \times \begin{array}{r} 625.52 \\ 70 \\ \hline 43786.40 \end{array}$$
Two decimal place

Thus, $625.52 \times 70 = 43786.4$

(*g*) Same as above.

(*h*)
$$\begin{array}{r} 4043 \\ \times\ 125 \\ \hline 20215 \leftarrow \text{Multiplication by 5} \\ 80860 \leftarrow \text{Multiplication by 20} \\ +404300 \leftarrow \text{Multiplication by 100} \\ \hline 505375 \end{array} \longrightarrow \times \begin{array}{r} 40.43 \\ 125 \\ \hline 5053.75 \end{array}$$
Two decimal place

Thus, $40.43 \times 125 = 5053.75$

(*i*) to (*l*) Same as above.

3. (*a*) Multiply 1.8×0.3

Step 1. Multiply the two given decimal numbers as we multiply two whole numbers.
$$\begin{array}{r} 18 \\ \times\ 3 \\ \hline 54 \end{array}$$

Step 2. Count the number of decimal places in the given numbers. In 1.8, number of decimal place = 1.
In 0.3, number of decimal place = 1.
So, total number of decimal places = 1 + 1 = 2.

Step 3. Count from the right so that the number of decimal places in the product is equal to the sum of decimal places in the given decimal numbers and put the decimal point.

1.8	×	0.3	=	0.54
↓		↓		↓
1 decimal place		1 decimal place		2 decimal places

Thus, $1.8 \times 0.3 = 0.54$.

(*b*) Multiply: 5.3×1.2

In 5.3, number of decimal place = 1
In 1.2, number of decimal place = 1
So, total number of decimal places = 1 + 1 = 2
$$\begin{array}{r} 53 \\ \times\ 12 \\ \hline 106 \\ +530 \\ \hline 636 \end{array}$$

5.3	×	1.2	=	6.36
↓		↓		↓
1 decimal place		1 decimal place		2 decimal places

Thus, $5.3 \times 1.2 = 6.36$

(*c*) Multiply: 28.6×1.6

$28.6 \times 1.6 = 45.76$
$$\begin{array}{r} 286 \\ \times\ 16 \\ \hline 1716 \\ +2860 \\ \hline 4576 \end{array}$$

28.6	×	1.6	=	45.76
↓		↓		↓
1 decimal place		1 decimal place		2 decimal places

Thus, $28.6 \times 1.6 = 45.76$

(*d*) Multiply: 200.5×2.1

$200.5 \times 2.1 = 421.05$
$$\begin{array}{r} 2005 \\ \times\ 21 \\ \hline 2005 \\ +4010\,0 \\ \hline 42105 \end{array}$$

200.5	×	2.1	=	421.05
↓		↓		↓
1 decimal place		1 decimal place		2 decimal places

(*e*) Multiply: 420.06×0.02
$$\begin{array}{r} 42006 \\ \times\ 2 \\ \hline 84012 \end{array}$$

420.06	×	0.02	=	8.4012
↓		↓		↓
2 decimal places		2 decimal places		4 decimal places

Thus, $420.06 \times 0.02 = 8.4012$

(*f*) to (*h*) Same as above.

4. (*i*) Cost of 1 notebook = ₹35.50
So, cost of 4 notebooks = ₹35.50 × 4 = ₹142.00
$$\begin{array}{r} 3550 \\ \times\ 4 \\ \hline 14200 \end{array}$$
Thus, cost of 4 notebooks = ₹142

(*ii*) Cost of each pack of crayons = ₹81.50
So, cost of 2 packs of crayons = ₹81.50 × 2 = ₹163.00
$$\begin{array}{r} 8150 \\ \times\ 2 \\ \hline 16300 \end{array}$$
Thus, cost of 2 packs of crayons is ₹163.

(*iii*) Total cost of both the items = ₹142 + ₹163 = ₹305

The note given to the shopkeeper = ₹ 5 0 0 • 0 0

And cost of both the items = − ₹ 3 0 5 • 0 0

A mount she get in return = ₹ 1 9 5 • 0 0

Thus, she gets ₹195 in return from the shopkeeper.

5. Cost of 1 metre ribbon = ₹12.50

Cost of 8.5 metres ribbon = ₹12.50 × 8.5

₹12.50 × 8.5 = ₹106.250 = ₹106.25

$$\begin{array}{r} 1\,2\,5\,0 \\ \times \quad\quad 8\,5 \\ \hline 6\,2\,5\,0 \\ +\,1\,0\,0\,0\,0\,0 \\ \hline 1\,0\,6\,2\,5\,0 \end{array}$$

Thus, cost of 8.5 metres of ribbon is ₹106.25

Think and Answer (Page 119)

Number ÷ 28 = 75 ÷ 0.21

or $\frac{\text{Number}}{28} = \frac{75}{0.21} = \frac{7500}{21}$

So, the required number

$= \frac{28 \times 7500}{21}$

$= 4 \times 2500$

$= 10000$

Practice Time 5F

1. (*a*) 5.64 ÷ 10 = 0.564

When we divide a decimal number by 10, the decimal point shifts to the left by one place.

(*b*) 53.6 ÷ 10 = 5.36

(*c*) 635.4 ÷ 10 = 63.54

(*d*) 0.56 ÷ 10 = 0.056

(*e*) 12.3 ÷ 100 = 0.123

When we divide a decimal number by 100, the decimal point shifts to the left by two places.

(*f*) 354.5 ÷ 100 = 3.545

(*g*) 0.5 ÷ 100 = 0.005

(*h*) 235.4 ÷ 100 = 2.354

(*i*) 364.0 ÷ 1000 = 0.364

When we divide a decimal number by 1000, the decimal point shifts to the left by three places.

(*j*) 87.0 ÷ 1000 = 0.087

(*k*) 3.5 ÷ 1000 = 0.0035

(*l*) 0.5 ÷ 1000 = 0.0005

2. (*a*) 3.72 ÷ 4

$$\begin{array}{r} 0.93 \\ 4\overline{)3.72} \\ -3\,6 \\ \hline 12 \\ -12 \\ \hline 00 \end{array}$$

Thus, 3.72 ÷ 4 = 0.93

(*b*) 0.985 ÷ 5

$$\begin{array}{r} 0.197 \\ 5\overline{)0.985} \\ -\ 5 \\ \hline 48 \\ -45 \\ \hline 35 \\ -\ 35 \\ \hline 00 \end{array}$$

Thus, 0.985 ÷ 5 = 0.197

(*c*) There are 1 decimal place in 4.9 and 1 decimal place in 0.7. Shift the decimal point 1 place towards the right (→). Then divide as whole numbers.

$4.9 \div 0.7 = \frac{\cancel{49}^{7}}{\cancel{7}_{1}} = 7.$

(*d*) 10.8 ÷ 0.9

There are 1 decimal place in 10.8 and 1 decimal place in 0.9. Shift the decimal point 1 place towards the right (→). Then divide as whole numbers.

$10.8 \div 0.9 = \frac{108}{9} = 12$

$$\begin{array}{r} 12 \\ 9\overline{)108} \\ -\ 9 \\ \hline 18 \\ -18 \\ \hline 00 \end{array}$$

(*e*) 3.638 ÷ 17

$$\begin{array}{r} 0.214 \\ 17\overline{)3.638} \\ -3\,4 \\ \hline 23 \\ -17 \\ \hline 68 \\ -\ 68 \\ \hline 00 \end{array}$$

Thus, 3.638 ÷ 17 = 0.214

(*f*) 3511.20 ÷ 35

$$\begin{array}{r} 100.32 \\ 35\overline{)3511.20} \\ -35 \\ \hline 112 \\ -105 \\ \hline 70 \\ -\ 70 \\ \hline 00 \end{array}$$

Thus, 3511.20 ÷ 35 = 100.32

(*g*) 426.448 ÷ 1.6

There are 3 decimal places in 426.448 and 1 decimal place in 1.6. So, we have to add 2 zero at the right side in number 1.6 to make the same number of digit after decimal point. And shift the decimal 3 places towards the right (→). Then divide as whole numbers.

$$426.448 \div 1.6 = \frac{426448}{1600}$$

```
      266.53
1600)426448(
   −3200
    10644
   −9600
     10448
    −9600
      8480
     −8000
       4800
      − 4800
         0
```

Thus, 426.448 ÷ 1.6 = 266.53

(*h*) 37.6 ÷ 20

```
     1.88
20)37.6(
  −20
   17 6
  −16 0
    1 60
   −1 60
      0
```

Thus, 37.6 ÷ 20 = 1.88

3. Weight of potatoes in 6 sacks = 224.600 kg

Weight of potatoes in 1 sacks

$$= \frac{224.600}{6} \text{ kg}$$

```
      37.433
6)224.600(
  −18
   44
  −42
    26
   −24
     20
    − 18
      20
     − 18
       2
```

= 37.433 kg

Thus, each sack weigh 37.433 kg.

4. Total length of rope = 33.68 m

It is divided into 5 equal parts.

∴ Length of each part = 33.68 ÷ 5

```
     6.736
5)33.68(
  −30
   3 6
  − 3 5
    18
   − 15
     30
    − 30
      0
```

Thus, length of each part of the rope is 6.736 m.

5. Quantity of laddoos distributed by a teacher = 3.25 kg

Number of children to whom laddoos are to be distributed = 12

∴ Weight of laddoos each child get = 3.25 ÷ 12

```
     0.2708
12)3.25(
  −2 4
    85
   − 84
     100
    −96
      4
```

Thus, 0.2708 kg laddoos each child got.

Brain Sizzlers (Page 120)

Let the last digit be at thousandth place *i.e.*, 4.

Number at tenths place = 2 less than the other place digit = 4 – 2 = 2.

Number at hundredth place = 3 + number at tenths place = 3 + 2 = 5

O	•	t	h	th
	•	4 – 2	3 + 2	4
0	•	2	5	4

Thus, the required decimal number is 0.254.

Mental Maths (Page 122)

1. (*a*) 825 paise = $\frac{825}{100}$ rupees = 8.25

[∵ 1 paise = 100]

2. (*a*) 28 ÷ 1000 = 0.028

3. (*c*) The place value of 8 in 5.083 = $\frac{8}{100}$

= 8 hundredths

4. (*c*) 46.25 × 100 = 4625.0 = 4625

5. (*a*) 546 ÷ 10 = 54.6

So, 5.46 × 10 = 54.6

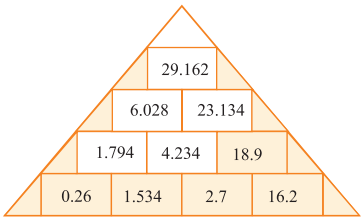
Maths Fun (Page 122)

$\frac{34}{100} = \frac{0.34}{Y}$	$\frac{2}{10} = \frac{0.2}{C}$	$\frac{61}{100} = \frac{0.61}{E}$
$\frac{5}{10} = \frac{0.5}{H}$	$\frac{8}{10} = \frac{0.8}{D}$	$\frac{5}{100} = \frac{0.05}{K}$
$\frac{1}{10} = \frac{0.1}{F}$	$\frac{17}{100} = \frac{0.17}{A}$	$\frac{4}{10} = \frac{0.4}{O}$
$\frac{1}{100} = \frac{0.01}{M}$	$\frac{99}{100} = \frac{0.99}{G}$	$\frac{74}{100} = \frac{0.74}{N}$

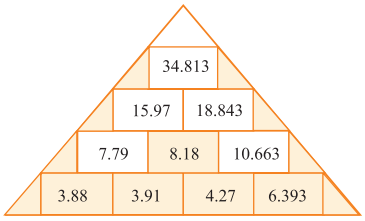
A		C	O	M	E	D	Y		
0.17		0.2	0.4	0.01	0.61	0.8	0.34		
H	E	N							
0.5	0.61	0.74							

Puzzle (Page 122)

(*a*)



(*b*)



Chapter Assessment

1. (*a*) (*iii*) In 17.0852, the digit 5 is in the thousandths place.

(*b*) (*i*) Equivalent decimals of 24.5 = 24.50

(*c*) (*ii*) $\frac{0.1}{100} = 0.001$

So, the scale will be 1.1, 1.101. 1.102, ..., 1.2

Thus, 1.123 can be measured using the scale.

(*d*) (*iv*) To find the required decimal number, we will solved in the reverse order. The decimal number is 10.5.

Step 1. Subtract 0.15 from 10.5

= 10.5 – 0.15 = 10.35

$$\begin{array}{r} 10.50 \\ -\ 0.15 \\ \hline 10.35 \end{array}$$

Step 2. Divide 10.35 by 3

10.35 ÷ 3 = 3.45

$$\begin{array}{r} 3.45 \\ 3\overline{)10.35} \\ -9 \\ \hline 13 \\ -12 \\ \hline 15 \\ -15 \\ \hline 0 \end{array}$$

Step 3. Add 3.45 and 2.9

3.45 + 2.9 = 6.35

$$\begin{array}{r} 3.45 \\ +\ 2.90 \\ \hline 6.35 \end{array}$$

Thus, the required decimal number is 6.35.

2. Quantity of milk Ammu needs daily = 23 litres

Quantity of milk Ammu got in the morning = 15.250 litres

Quantity of milk Ammu got in the evening = 3.045 litres

Total milk she got one day = $\begin{array}{r} 15.250\text{ L} \\ +\ 3.045\text{ L} \\ \hline 18.295\text{ L} \end{array}$

Total requirements of milk per day = 23.000 L

Total milk got in one day = $-\ \begin{array}{r} 18.295\text{ L} \\ \hline 4.705\text{ L} \end{array}$

Thus, she needs 4.705 L more milk to fulfill requirement of milk in the canteen.

3. Weight of grapes used in making fruit Jam = 2.75 kg

Weight of apples = 1.45 kg

Weight of sugar = 3 kg

Total weight of these items

= 2.75 kg + 1.45 kg + 3 kg = 7.2 kg

Weight of jam in a bottle = 0.6 kg

Number of bottles required to share all the jam

$= 7.2 \text{ kg} \div 0.6 \text{ kg} = \frac{72}{6} = 12$

[∵ The decimal places is same]

Thus, 12 bottles are required to store all the jam.

4. Capacity of bottle A = 35.4__5 mL

Capacity of bottle B = 35.5 mL = 35.500 mL

[∵ To make decimal places same]

Digit in A is missing at hundredth digit place.

It we place the greatest digit 9 at the hundredth place, then the capacity of bottle A = 35.495 mL

Since, the capacity of bottle B is greater than the capacity of liquid chemical in bottle A. So, we can easily transfer the entire liquid chemical of bottle A into bottle B.

5. Sum of 2nd diagonal = 1.0 + 1.1 + 1.2 = 3.3

$\therefore$ Missing decimal number in 3rd row

= 3.3 – (1.0 + 1.4) = 3.3 – 2.4 = 0.9

$\therefore$ Missing decimal number in 3rd column

= 3.3 – (1.2 + 1.4) = 0.7

$\therefore$ Missing decimal number in 2rd row

= 3.3 – (1.1 + 0.7) = 1.5

$\therefore$ Missing decimal number in 1st row

= 3.3 – (1.5 + 1.0) and 3.3 – (1.1 + 0.9)

= 3.3 – 2.5 and 3.3 – 2 = 0.8 and 1.3

Hence, the complete magic square is

0.8	**1.3**	1.2
1.5	1.1	**0.7**
1.0	**0.9**	1.4

6. At the time of birth, weight of baby elephant

= 278.88 kg

In the first year, weight of baby elephant

= 278.88 kg + 68.45 kg = 347.33 kg

In the second year, weight of baby elephant

= 347.33 kg – 23.05 kg = 324.28 kg

Thus, the baby elephant weigh 324.28 kg by the end of the second year.

7. As, Sameer scored 345 marks out of 500,

$\therefore$ In decimal $\frac{345}{500} = 0.69$

Gaurav scored 600 marks out of 1000,

$\therefore$ In decimal $\frac{600}{1000} = 0.6 = 0.60$

Since 0.69 > 0.60

Thus, Sameer performed better.

8. Total distance covered by Shrishti in the morning

= 4.350 km

Total distance covered during the day

= 10.04 km

$\therefore$ Distance covered after the morning

= 10.04 km – 4.350 km = 5.69 km

Since 5.69 – 4.35 = 1.34, she covered 1.34 km more distance during the day than that was covered in the morning walk.

CHAPTER 6: GEOMETRY

Let's Recall

1. Edge of a pencil, edge of a mobile phone, edge of blackboard, edge of a book.

2. Pizza slices, traffic signs, sandwich slices, nachos.

3. Blackboard, top of a table, ruler, playing card.

4. Bangles, coins, whole pizza, dart board.

Practice Time 6A

1. (*a*) (*i*) A line has no end points.

(*b*) (*iii*) A ray has one end point only.

(*c*) (*ii*) A line segment has two end points.

2. (*a*) A point has no length, breadth and thickness.

(*b*) A ray can be extended in one direction.

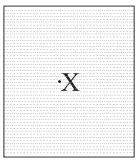
(*c*) A line can be extended in both directions.

(*d*) A line segment has two end points.

(*e*) Interesting lines interest each other at a point.

(*f*) Parallel lines never meets.

3. (*a*)



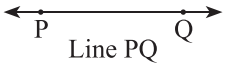
Point X

(*b*)



Line Segment AB

(*c*)



Line PQ

(*d*)



Ray XY

(*e*)



Straight Line AB



Straight Line PQ

4. (*a*) Line AB or $\overleftrightarrow{AB}$ (*b*) Line QP or $\overleftrightarrow{QP}$

(*c*) Line segment ST or $\overline{ST}$

(*d*) Line EF or $\overline{EF}$

(*e*) Interesting lines AB and CD

(*f*) Parallel lines l and m or l || m

(*g*) Interesting lines p and q

(*h*) Parallel lines s and t or s || t

5. (*a*) Points: A, P, B, Q

(*b*) Line: AB

(*c*) Line segment: None

(*d*) Rays: $\overrightarrow{PA}$, $\overrightarrow{PB}$ and $\overrightarrow{PQ}$

6.

	Line segments	Types of line segments
(*a*)	$\overline{AE}$ and $\overline{BF}$	Parallel
(*b*)	$\overline{AD}$ and $\overline{BC}$	Parallel

(*c*)	$\overline{CG}$ and $\overline{GF}$	Perpendicular
(*d*)	$\overline{DH}$ and $\overline{CD}$	Perpendicular
(*e*)	$\overline{AB}$ and $\overline{BC}$	Perpendicular
(*f*)	$\overline{BF}$ and $\overline{FB}$	Coinciding

7. $\overrightarrow{XY}$, $\overrightarrow{XZ}$ and $\overrightarrow{YZ}$

Practice Time 6B

1. (*b*) and (*d*)
2. (*a*) ∠PQR or ∠RQP (*b*) ∠XYZ or ∠ZYX
   (*c*) ∠LMN or ∠NML (*d*) ∠EFG or ∠GFE
3.

	Arms	Vertex	Name of the angle
(*a*)	$\overrightarrow{OP}$, $\overrightarrow{OT}$	O	∠POT or ∠TOP
(*b*)	$\overrightarrow{US}$, $\overrightarrow{UN}$	U	∠SUN or ∠NUS
(*c*)	$\overrightarrow{OT}$, $\overrightarrow{OP}$	O	∠TOP or ∠POT

4. (*a*) ∠AOB, ∠BOC and ∠AOC
   (*b*) ∠RPS, ∠RPT, ∠RPQ, ∠SPT, ∠SPQ and ∠TPQ
5. (*a*) Points A, E, B, F, G and C lies on the angle.
   (*b*) Points H and I lie in the interior of the angle.
   (*c*) Points K and J lie in the exterior of the angle.

Practice Time 6C

1. (*a*) 25° (*b*) 60°
   (*c*) 140° (*d*) 165°
   (*e*) 220° (*f*) 90°
2. (*a*) 65° (*b*) 110°
   (*c*) 90° (*d*) 105°

Quick Check (Page 136)

1. Clock 'A' shows an angle less than 90°. So, it is an acute angle.
2. Clock 'B' shows an angle equal to 90°. So, it is a right angle.
3. Clock 'C' shows an angle more than 90°. So, it is an obtuse angle.
4. Clock 'D' shows an angle equal to 180°. So, it is a straight angle.
5. Clock 'E' shows an angle more than 180°. So, it is a reflex angle.

Practice Time 6D

1. (*a*) Acute angle (*b*) Right angle
   (*c*) Obtuse angle (*d*) Straight angle
2. (*a*) 30° – Acute angle (*b*) 95° – Obtuse angle
   (*c*) 108° – Obtuse angle (*d*) 180° – Straight angle
   (*e*) 90° – Right angle (*f*) 360°–Complete angle
   (*g*) 80° – Acute angle (*h*) 125°–Obtuse angle
   (*i*) 25°–Acute angle (*j*) 265°–Reflex angle
3. (*a*) Complete angle (*b*) Right angle
   (*c*) Straight angle (*d*) Reflex angle
   (*e*) Acute angle (*f*) Reflex angle
   (*g*) Right angle (*h*) Acute angle
4. (*a*) ∠DEF: Acute angle
   (*b*) ∠ABC: Straight angle
   (*c*) ∠XYZ: Right angle
   (*d*) ∠MNO: Reflex angle

Think and Answer (Page 139)

1. A triangle can have 3 acute angles.
2. A triangle can have only one right angle.
3. A triangle can only have only one obtuse angle.

Practice Time 6E

1. (*a*) (*iii*) A triangle has 6 parts.
   (*b*) (*ii*) A right-angled triangle can have 1 right angle.
   (*c*) (*iv*) The maximum number of acute angles a triangle can have is 3.
   (*d*) (*ii*) Number of obtuse angles a triangle can have is 1.
   (*e*) (*ii*) An equilateral triangle is also an acute-angled triangle.
2. (*a*) Vertices: A, B and C
   (*b*) Angles: ∠ABC or ∠CBA or ∠B; ∠BAC or ∠CAB or ∠A; ∠ACB or ∠BCA or ∠C
   (*c*) Sides: AB, BC and CA
3. (*a*) PQ = 2 cm, QR = 6 cm, PR = 3 cm *i.e.*, scalene triangle
   (*b*) DE = EF = DF = 4 cm *i.e.*, Equilateral triangle
   (*c*) TU = UV = 4 cm *i.e.*, Isosceles triangle
   (*d*) ∠XYZ = 60°, ∠YZX = 25°, ∠ZXY = 95° *i.e.*, obtuse-angled triangle
   (*e*) ∠PQR = 90°, ∠QRP = 45°, ∠RPQ = 45° *i.e.*, Right angled triangle.
   (*f*) ∠ABC = 125°, ∠BCA = 30°, ∠CAB = 25° *i.e.*, obtuse-angled triangle

4. To verify the angle sum property for a group of three angles, we need to sum all the angles and check if the result equals 180°.

(a) The given angles are 30°, 90° and 60°.

$\because$ $30° + 90° + 60° = 180°$

The angles satisfy the angle sum property.

(b) Given angles are 65°, 35° and 90°

$\because$ $65° + 35° + 90° = 190° \neq 180°$

The angles do not satisfy the angle sum property.

(c) Given angles are: 80°, 75° and 35°

$\because$ $80° + 75° + 35° = 190° \neq 180$

The angles do not satisfy the angle sum property.

(d), (e) and (f) Same as above parts.

5. (a) Sides of a triangle are: 4 cm, 3 cm and 7 cm

The property states that the sum of measures of any two sides of a triangle is always greater than the measure of the third side.

$4 \text{ cm} + 3 \text{ cm} = 7 \text{ cm} \not> 7 \text{ cm}$

Hence, these do not satisfy the inequality property of the sides of a triangle.

(b) Sides of a triangle are 4.5 cm, 2 cm and 4.5 cm

The property states that the sum of measures of any two sides of a triangle is always greater than the measure of the third side.

$4.5 \text{ cm} + 2 \text{ cm} = 6.5 \text{ cm} > 4.5 \text{ cm}$

$4.5 \text{ cm} + 4.5 \text{ cm} = 9 \text{ cm} > 4.5 \text{ cm}$

Hence, these satisfy property of sum of the sides of a triangle.

(c) Sides of a triangle are 5 cm, 6 cm and 8 cm

The property states that the sum of measures of any two sides of a triangle is always greater than the measure of the third side.

$5 \text{ cm} + 6 \text{ cm} = 11 \text{ cm} > 8 \text{ cm}$

$8 \text{ cm} + 6 \text{ cm} = 14 \text{ cm} > 5 \text{ cm}$

$8 \text{ cm} + 5 \text{ cm} = 13 \text{ cm} > 6 \text{ cm}$

Hence, these satisfy the property of sum of the sides of a triangle.

(d), (e) and (f) same as above.

Practice Time 6F

1. (a) The centre of the circle is O.

(b) The diameter of the circle is AB.

(c) OA, OB and OP are the radii of the circle.

(d) The chords of the circle are CD and AB.

(e) The points A, P, D, B and C are on the circle.

(f) The points R and Q lie on the exterior of the circle.

(g) The points M, N and O lie in the interior of the circle.

(h) $AB = 2 \times OP$

(i) CD is a chord of the circle.

(j) The longest chord of the circle is diameter AB.

2. (a) The radius of a circle is double the diameter. False.

(b) We can draw many diameters, radii and chords on a circle. True

(c) A circle can have many centres. False

(d) Every diameter of a circle is its chord. True

(e) Every chord of a circle is its diameter. False

(f) The circumference of a circle depends on its radius. True.

3. (a) Radius = 2.5 cm (given)

We have, diameter = 2 × radius

Therefore, diameter = 2 × 2.5 cm = 5 cm

(b) Radius = 3 cm (given)

We have, diameter = 2 × radius

Therefore, diameter = 2 × 3 cm = 6 cm

(c) Radius = 11 mm (given)

We have, diameter = 2 × radius

Therefore, diameter = 2 × 11 mm = 22 mm

(d) Radius = 8 cm (given)

We have, diameter = 2 × radius

Therefore, diameter = 2 × 8 cm = 16 cm

4. (a) Diameter = 6 cm (given)

We have, $\text{radius} = \dfrac{\text{Diameter}}{2}$

Therefore, $\text{radius} = \dfrac{6}{2} \text{ cm} = 3 \text{ cm}$

(b) Diameter = 9 cm (given)

We have, $\text{radius} = \dfrac{\text{Diameter}}{2}$

Therefore, $\text{radius} = \dfrac{9}{2} \text{ cm} = 4.5 \text{ cm}$

(*c*) Diameter = 23 mm (given)

We have, radius = $\frac{\text{Diameter}}{2}$

Therefore, radius = $\frac{23}{2}$ mm = 11.5 mm

(*d*) Diameter = 16 mm

We have, radius = $\frac{\text{Diameter}}{2}$

Therefore, radius = $\frac{16}{2}$ mm = 8 mm

Mental Maths (Page144)

$\angle ABC = 45°$, $\angle PQR = 30°$, $\angle STU = 255°$, $\angle RST = 120°$ and $\angle DEF = 90°$.

$30° < 45° < 90° < 120° < 255°$

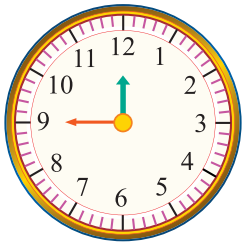
Ascending order: $\angle PQR < \angle ABC < \angle DEF < \angle RST < \angle STU$

Brain Sizzlers (Page 144)

1. The angle between two consecutive spokes will be given by the total degrees (360°) divided by the number of spokes.

The angle between a pair of two consecutive spokes = $\frac{360°}{48} = \left(\frac{15}{2}\right)^{\circ} = \left(7\frac{1}{2}\right)^{\circ}$ or 7.5°.

2. The hour hand of a clock makes 3 right angles to reach 9 if it starts from 12.



Chapter Assessment

1. (*a*) (*iii*) Reflex angle is greater than a straight angle.

(*b*) (*iv*) 360°, the minute hand of a clock turn thorugh in one hour.

(*c*) (*iv*) 2 complete angles = 360° × 2 = 720°

$\frac{720°}{90°} = 8.$

Hence, 2 complete angles have 8 right angles.

(*d*) (*i*) The maximum number of points of intersection of two non-parallel lines is 1.

2. (*a*) Five points are A, B, C, D and O.

(*b*) Three rays are $\overrightarrow{OA}$, $\overrightarrow{OB}$ and $\overrightarrow{OC}$.

(*c*) Four line segments are $\overline{AB}$, $\overline{BC}$, $\overline{CD}$ and $\overline{DA}$.

(*d*) Two lines are $\overleftrightarrow{BD}$ and $\overleftrightarrow{AC}$.

3. Five line segments in the give figure are $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, $\overline{DE}$ and $\overline{AC}$. (Answer may vary)

4. (*a*) All pairs of interesting lines are $\vec{a}$ and $\vec{b}$; $\vec{a}$ and $\vec{c}$; $\vec{a}$ and $\vec{r}$; $\vec{a}$ and $\vec{p}$, $\vec{a}$ and $\vec{q}$; $\vec{b}$ and $\vec{r}$; $\vec{b}$ and $\vec{p}$; $\vec{b}$ and $\vec{q}$; $\vec{c}$ and $\vec{p}$; $\vec{c}$ and $\vec{q}$; $\vec{c}$ and $\vec{r}$.

(*b*) All pairs of parallel lines are $\vec{b} \parallel \vec{c}$ and $\vec{p} \parallel \vec{q}$.

5. $\angle 1 = \angle AOB$ (Given)

(*a*) $\angle 1 + \angle 2 = \angle AOB + \angle BOC = \angle AOC$

(*b*) $\angle 1 + \angle 3 = \angle AOB + \angle COD$

(*c*) $\angle 2 + \angle 3 = \angle BOC + \angle COD = \angle BOD$

(*d*) $\angle 1 + \angle 2 + \angle 3 = \angle AOB + \angle BOC + \angle COD = \angle AOD$

6. (*a*) Parallel lines: $\vec{l} \parallel \vec{n}$, $\vec{l} \parallel \vec{m}$, $\vec{m} \parallel \vec{n}$, $\vec{p} \parallel \vec{q}$

Interesting lines: $\vec{l}$ and $\vec{p}$; $\vec{n}$ and $\vec{p}$; $\vec{m}$ and $\vec{p}$; $\vec{l}$ and $\vec{q}$; $\vec{m}$ and $\vec{q}$; $\vec{n}$ and $\vec{q}$

(*b*) Parallel lines: $\vec{q} \parallel \vec{r}$, Interesting lines: $\vec{p}$ and $\vec{q}$, $\vec{r}$ and $\vec{s}$, $\vec{p}$ and $\vec{s}$, $\vec{q}$ and $\vec{s}$, $\vec{p}$ and $\vec{r}$

(*c*) Parallel lines: $\vec{a} \parallel \vec{b}$, Interesting lines: $\vec{a}$ and $\vec{c}$, $\vec{b}$ and $\vec{c}$.

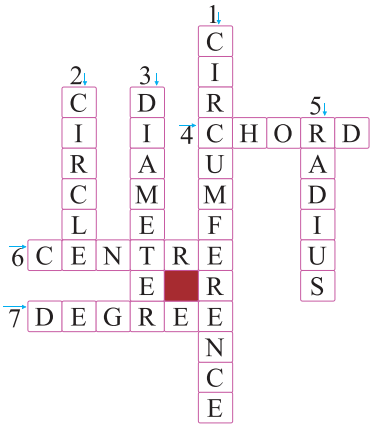
7. (*a*) Three triangles are: ΔPQS, ΔQSR and ΔPQR.

(*b*) Seven angles are: $\angle PQR$, $\angle PQS$, $\angle SQR$, $\angle SRQ$, $\angle PSQ$, $\angle RPQ$, $\angle RSQ$.

(*c*) Six line segments are: $\overline{PQ}, \overline{QS}, \overline{QR}, \overline{SR}, \overline{PS}, \overline{PR}$

(*d*) ΔPSQ and ΔQSR have $\angle S$ as common.

Maths Fun (Page 146)



MODEL TEST PAPER - 1

A.

1. (*b*) Smallest 6-digit number = 100000.
Greatest 5-digit number = 99999.
Difference = 100000 – 99999 = 1.

2. (*d*) The greatest factor of a number is the number itself.

3. (*b*) A ray has 1 end point.

4. (*c*) Predecessor of smallest 5-digit number
= 10000 – 1 = 9999.

5. (*a*) Face value and place value of each 0 in 410304 is always 0.

6. (*b*) 2, 3, 4 are factors of 12.

7. (*d*) 30000000 + 4000 + 50 + 8 = 30004058.

8. (*c*) The smallest 7-digit number using the digits 3, 2, 1, 5 and 0 is 1000235.

9. (*b*) The product of a fraction and its reciprocal is 1.

B.

1. An obtuse angle is more than 90° but less than 180°.

2. An equilateral triangle has three sides of equal length.

3. A circle has infinite number of symmetry.

4. 11.11 × 1.11

11.11 × 1.11 = 12.3321

Two decimal places, 2 decimal places, 4 decimal places

$$\begin{array}{r} 11.11 \\ \times\ 1.11 \\ \hline 1111 \\ 11110 \\ 111100 \\ \hline 12.3321 \end{array}$$

Thus, 11.11 × 1.11 = 12.3321.

5. 50 – 48 ÷ 6 × 4 + 5
= 50 – 8 × 4 + 5 (Division: 48 ÷ 6)
= 50 – 32 + 5 (Multiplication: 8 × 4)
= 50 + 5 – 32
= 55 – 32 (Addition: 50 + 5)
= 23 (subtraction: 55 – 32)

C.

1. The number of zeroes in 100 millions are eight. **True.**

2. 36972 is divisible by 11. **False.**

$$\begin{array}{r} 11\overline{)36972}(3361 \\ -33 \\ \hline 39 \\ -33 \\ \hline 67 \\ -66 \\ \hline 12 \\ -11 \\ \hline 1 \end{array}$$

3. Successor of 422 is CDXXIII.
CDXXIII = 400 + 20 + 3 = 423. **True.**

4. The HCF of two prime numbers is always 0. **False.**

5. To divide a fraction by another fraction, we multiply the dividend by the reciprocal of the divisor. **True.**

D.

1. (*a*) Least populous state in this list is Lakshadweep
(*b*) 1055450 – Ten lakh fifty-five thousand four hundred fifty.
(*c*) Population of Arunachal Pradesh = 1382611
Place value of 3 in 1382611 = 300000.
(*d*) Population of Puducherry = 12444464.
Expanded form = 10000000 + 2000000 + 400000 + 40000 + 4000 + 400 + 60 + 4.
(*e*) Mizoram - 1,091,014; Puducherry - 12,444,464; Arunachal Pradesh - 1,382,611; Goa - 1,457,723; Nagaland - 1,980,602.
(*f*) Mizoram
(*g*) Population of Chandigarh = 1055450.
Sum of place values of three 5s = 50000 + 5000 + 50 = 55050.

2. $2\frac{1}{2}+1\frac{1}{2}-\frac{2}{3}\times\frac{1}{3}\div 9$

$=\frac{5}{2}+\frac{3}{2}-\frac{2}{3}\times\frac{1}{3}\times\frac{1}{9}\left(\text{Division: }\frac{1}{3}\div 9\right)$

$=\frac{5}{2}+\frac{3}{2}-\frac{2}{3}\times\frac{1}{27}\left(\text{Multiplication:}\frac{1}{3}\times\frac{1}{9}\right)$

$=\frac{5}{2}+\frac{3}{2}-\frac{2}{81}\left(\text{Multiplication:}\frac{2}{3}\times\frac{1}{27}\right)$

$=\frac{5+3}{2}-\frac{2}{81}\left(\text{Addition }\frac{5}{2}+\frac{3}{2}\right)$

$=\frac{8}{2}-\frac{2}{81}=4-\frac{2}{81}=\frac{324-2}{81}$

[∵ LCM of 1 and 81 = 81]

$=\frac{322}{81}\left(\text{Subtraction: }4-\frac{2}{81}\right)=3\frac{79}{81}.$

$$\begin{array}{r} 81\overline{)322}(3 \\ -243 \\ \hline 79 \end{array}$$

3. Product = 108, LCM = 36 (Given)

We know that,

HCF × LCM = Product of two numbers.

HCF × 36 = 108

$$\text{HCF} = \frac{108}{36} = 3.$$

5.

$$\begin{array}{r} 3\ 8\ 6 \\ 126\overline{)4\ 8\ 7\ 3\ 0} \\ -\ 3\ 7\ 8\downarrow\ \ \ \\ \hline 1\ 0\ 9\ 3\ \ \\ -\ 1\ 0\ 0\ 8\ \ \\ \hline 8\ 5\ 0\ \\ -\ 7\ 5\ 6\ \\ \hline 9\ 4 \end{array}$$

6. Capacity of 8 water bottles = 12.8 L

So, capacity of 1 water bottle = $\frac{12.8}{8}$.

Therefore, capacity of 12 water bottles

$= \frac{12.8}{8} \times 12 = \frac{153.6}{8} = 19.2$ L.

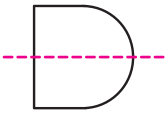
7. (*a*) AN is a ray (*b*) LC is a line

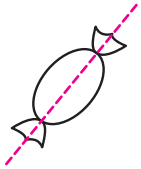
(c) EJ is a ray (*d*) DK is a line segment

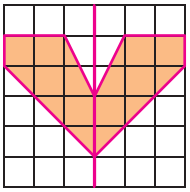
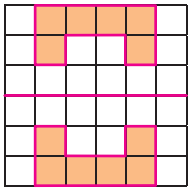
(e) BC is a ray (f) LB is a ray

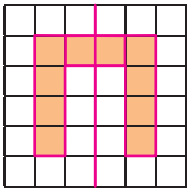
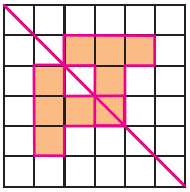
CHAPTER 7 : SYMMETRY AND PATTERNS

Let's Recall

1. (*a*)  (*b*) 

(*c*)  (*d*) 

2. (*a*)  (*b*) 

(*c*)  (*d*) 

3. (*a*) 12, 17, 22, 27, 32, 37, 42, 47.

(*b*) 55, 52, 49, 46, 43, 40, 37, 34.

4. (*a*)

1	12	12	9	19	23	5	12	12
A	L	L	I	S	W	E	L	L

ALL IS WELL.

(*b*)

23	15	18	11	8	1	18	4
W	O	R	K	H	A	R	D

WORK HARD.

Think and Answer (Page 151)

The five letters of english alphabet that have no line of symmetry are F, G, J, L, P.

Practice Time 7A

1. (*a*) An isosceles triangle has one line of symmetry.

(*b*) A rectangle has two lines of symmetry.

(*c*) An equilateral triangle has three lines of symmetry.

(*d*) A circle has infinite lines of symmetry.

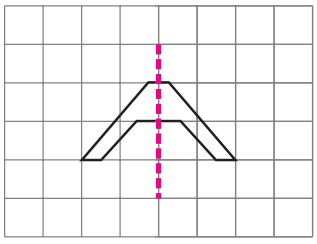
(*e*) A letter 'H' has two lines of symmetry.

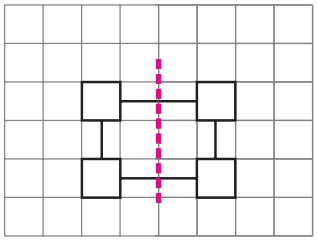
3. (*a*) one (*b*) two

(*c*) five (*d*) six

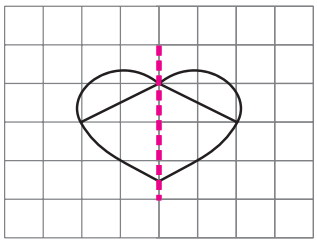
(*e*) infinite (*f*) two

(*g*) six (*h*) two

4. (*a*) 

(*b*) 

(*c*)



5. (*a*) Horizontal line of symmetry – B, C, D, E.
(*b*) Vertical line of symmetry – A, M, T, U, V, W, Y.
(*c*) Both horizontal and vertical lines of symmetry – H, I, O, X.

Think and Answer (Page 155)

1. $\frac{1}{4}$ turn = $\frac{1}{4} \times 360° = 90°$. *i.e.*, 11:00

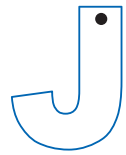
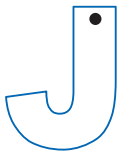
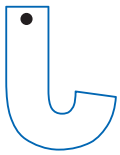
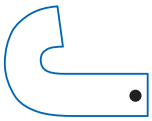
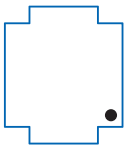
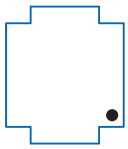
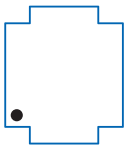
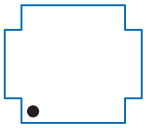
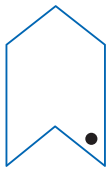
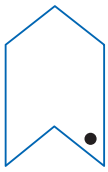
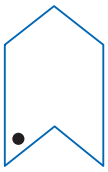
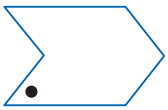
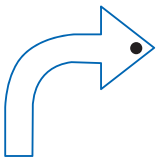
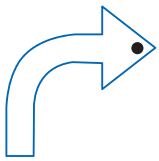
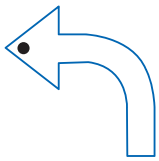
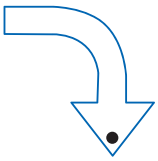
2. $\frac{1}{2}$ turn = $\frac{1}{2} \times 360° = 180°$. *i.e.*, 11:15

Practice Time 7B

1. (*a*) Flip (*b*) Turn (*c*) Slide
(*d*) Turn (*e*) Turn (*f*) Flip

2. (*a*) Turn (*b*) Slide (*c*) Flip, Turn.

3.

	Shape	Slide	Flip	Turn one-fourth $\left(\frac{1}{4}\right)$
(*a*)				
(*b*)				
(*c*)				
(*d*)				

4. (*b*) and (*c*)

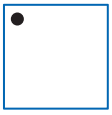
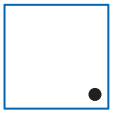
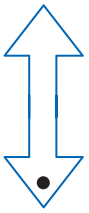
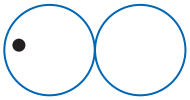
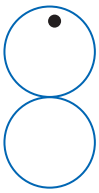
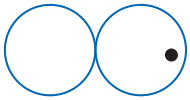
5. (*a*), (*c*), (*d*)

6. (*a*) None (*b*) H, I, N, O, S, X and Z.

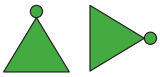
7. (*a*) $\frac{1}{4}$ turn clockwise or $\frac{3}{4}$ turn (anti-clockwise).

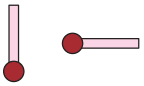
(*b*) $\frac{1}{4}$ trun (anti-clockwise) or $\frac{3}{4}$ turn clockwise.

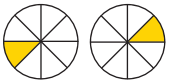
4.

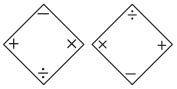
	Shape	On $\frac{1}{4}$ turn	On $\frac{1}{2}$ turn
(*a*)			
(*b*)			
(*c*)			
(*d*)			

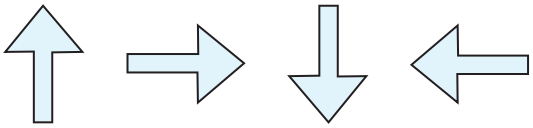
Practice Time 7C

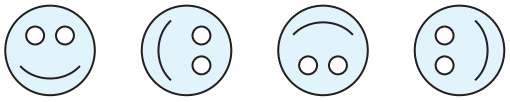
1. (*a*)  Pattern made with $\frac{1}{4}$ turn.

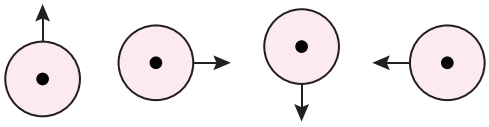
(*b*)  Pattern made with $\frac{1}{4}$ turn.

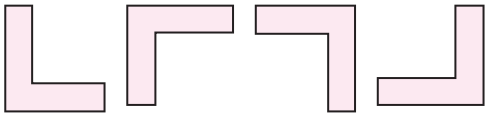
(*c*)  Pattern made with $\frac{1}{2}$ turn.

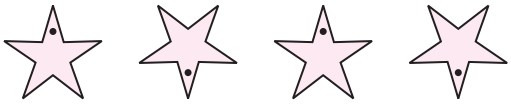
(*d*)  Pattern made with $\frac{1}{2}$ turn.

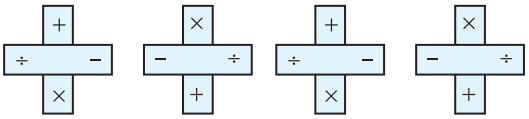
2. (*a*) 

(*b*) 

(*c*) 

(*d*) 

3. (*a*) 

(*b*) 

4. (*a*) $98765 \times 9 + 3 = 888888$.

$987654 \times 9 + 2 = 8888888$.

(*b*) $1 + 3 + 5 + 7 + 9 + 11 = 36 = 6 \times 6$.

$1 + 3 + 5 + 7 + 9 + 11 + 13 = 49 = 7 \times 7$.

$1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 = 64 = 8 \times 8$.

(*c*) 37 × 12 = 444; 37 × 15 = 555.

(*d*) $77762223 \div 7777 = 9999$.

$7777622223 \div 77777 = 99999$.

(*e*) $1234321 \div 1111 = 1111$;

$123454321 \div 11111 = 11111$.

5. (*a*) 1, 3, 6, 10, 15, 21, 28, 36, 45, 55.

(*b*) 4, 7, 10, 13, 16, 19, 22, 25, 28.

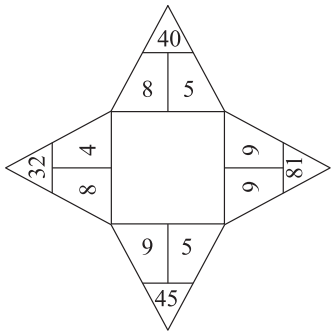
(*c*) 6, 11, 21, 36, 56, 81, 111, 146, 186.

(*d*) 81, 72, 63, 54, 45, 36, 27, 18.

(*e*) 2 + 1, 2 + 5, 2 + 9, 2 + 13, 2 + 17, 2+ 21, 2 + 25.

(*f*) 1 + 2, 1 + 3, 1 + 5, 1 + 7, 1 + 11, 1 + 13, 1 + 17.

Mental Math (Page 161)



$8 \times 5 = 40$

$4 \times 8 = 32$

$9 \times 9 = 81$

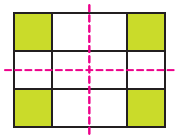
Chapter Assessment (Page 163)

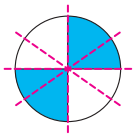
1. (*a*) - (*i*) The number of line (s) of symmetry in digit '3' is 1.

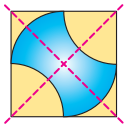
(*b*) - (*iii*) Letter 'Z' does not have any line of symmetry.

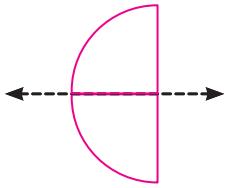
(*c*) - (*iii*) 8, 15, 22, 29, 36, 43.

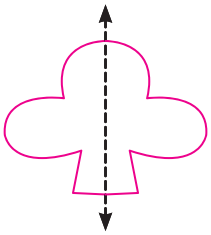
(*d*) - (*ii*)

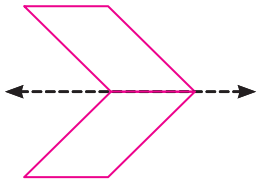
2. (*a*) 

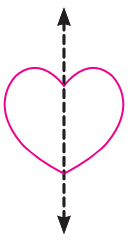
(*b*) 

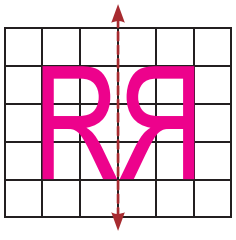
(*c*) 

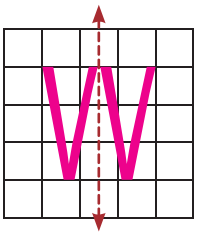
3. (*a*) 

(*b*) 

(*c*) 

(*d*) 

4. (*a*) 

(*a*) 

5. The rotational symmetry of a shape describes how an object's shape remains the same when rotated on its own axis.

Since, T is rotated through a fixed point clockwise with 360°, then it will get its original position.

Thus, the angle of rotation will be 360°.

6. CODE, DECIDE, CHOICE, BOX, ICE (Answer may vary)

9. (*a*) $4 + 5 + 6 = 15$, $5 + 6 + 7 = 18$.

(*b*) $(9876 - 4) \div 8 = 1234$, $(98765 - 5) \div 8 = 12345$.

(*c*) $6666 \times 6666 = 44435556$, $66666 \times 66666 = 4444355556$.

(*d*) 29, 24, 19, 14, 9, 4

(*e*) 15, 30, 45, 60, 75, 90.

(*f*) 107, 98, 89, 80, 71, 62.

10. (*a*) 11th square number = 121.

(*b*) 9th triangular number = 45.

11. 1 and 36 are both square and triangular numbers.

CHAPTER 8 : MEASUREMENTS

Let's Recall

1. 3 m 5 cm = 3 × 100 cm + 5 cm
= 300 cm + 5 cm = 305 cm

2. 225 kg = (225 × 1000)g = 225000 g

3. 4 L 45 mL = 4 × 1000 mL + 45 mL
= (4000 + 45)mL

$= 4045 \text{ mL} = \frac{4045}{10} \text{ cL} = 404.5 \text{ cL}$

4. 32 m 75 cm + 8 m 25 cm = 41 m 00 cm

	m	cm
	① ①	①
	3 2	7 5
+	8	2 5
	4 1	0 0

5. 440 kg 430 g – 275 kg 288 g = 165 kg 142 g

	kg		g	
		⑬		⑫
	③	④ ⑩	③	④ ⑩
	~~4~~	~~4~~ ~~0~~	~~4~~	~~3~~ ~~0~~
–	2	7 5	2	8 8
	1	6 5	1	4 2

6. The amount of milk left
= 11 L 500 mL – 8 L
= 3 L 500 mL = 3500 mL

	L		mL	
	⓪	⑪		
	✗	1	5	0	0
–		8	0	0	0
		3	5	0	0

Practice Time 8A

1. (*a*) 7.3 km = 7.3 × 1000 m = 7300.0 m = 7300 m

(*b*) 18.2 cm = 18.2 × 10 mm = 182.00 mm
= 182 mm

(*c*) 3.975 km = 3.975 × 1000 m = 3975.000 m
= 3975 m

(*d*) $650 \text{ m} = \frac{650}{100} \text{ hm} = \frac{65}{10} \text{ hm} = 6.5 \text{ hm}$

(*e*) 5.324 kg = 5.324 × 1000 g = 5324.000 g
= 5324 g

(*f*) 0.450 kg = 0.450 × 100 dag = 45.000 dag
= 45 dag

(*g*) $3260 \text{ g} = \frac{3260}{100} \text{ hg} = \frac{326}{10} \text{ hg} = 32.6 \text{ hg}$

(*h*) $1465 \text{ mL} = \frac{1465}{100} \text{ dL} = 14.65 \text{ dL}$

(*i*) $38 \text{ L} = \frac{38}{1000} \text{ kL} = 0.038 \text{ kL}$

2.

(*a*)	**5.156 km**	51.56 hm	**51560 dm**
(*b*)	8.234 g	**8234 mg**	**0.8234 dag**
(*c*)	**21.1 L**	2110 cL	**21100 mL**
(*d*)	**0.24408 hL**	24.408 L	**244.08 dL**
(*e*)	**0.005487 kg**	**54.87 dg**	5487 mg

3. (*a*) 17 km = 17 × 100 dam = 1700 dam

(*b*) 44 dam = 44 × 10000 mm = 440000 mm

(*c*) 77.5 dm = 77.5 × 100 mm = 7750 mm

(*d*) $3000 \text{ mm} = \frac{3000}{10000} \text{ dam} = \frac{3}{10} \text{ dam} = 0.3 \text{ dam}$

(*e*) $2700 \text{ cm} = \frac{2700}{1000} \text{ dam} = \frac{27}{10} \text{ dam} = 2.7 \text{ dam}$

(*f*) 25 dag = 25 × 100 dg = 2500 dg

(*g*) 172 dg = 172 × 100 mg = 17200 mg

(*h*) 86 dag = 86 × 10 g = 860 g

(*i*) $4326 \text{ dg} = \frac{4326}{1000} \text{ hg} = 4.326 \text{ hg}$

(*j*) $2114 \text{ cg} = \frac{2114}{1000} \text{ dag} = 2.114 \text{ dag}$

(*k*) $1340 \text{ cL} = \frac{1340}{1000} \text{ daL} = \frac{134}{100} \text{ daL} = 1.34 \text{ daL}$

(*l*) $8000 \text{ L} = \frac{8000}{1000} \text{ kL} = 8 \text{ kL}$

(*m*) $355 \text{ cL} = \frac{355}{100} \text{ L} = 3.55 \text{ L}$

(*n*) $260 \text{ cL} = \frac{260}{10} \text{ dL} = 26 \text{ dL}$

(*o*) 326 hL = 326 × 100000 mL = 32600000 mL

Think and Answer (Page 174)

Distance covered in 1200 steps = 1 km
∴ Distance covered in 10000 steps in a day

$= \frac{10000}{1200} \text{ km} = \frac{100}{12} = 8.33 \text{ km}$

Practice Time 8B

1. (*a*)

	m	dm	cm	mm
	②	①	①	
	3	4	5	7
	4	8	7	1
+	2	7	3	4
	1	1	0	6	2

Thus, 3 m 4 dm 5 cm 7 mm + 4 m 8 dm 7 cm 1 mm + 2 m 7 dm 3 cm 4 mm
= 11 m 0 dm 6 cm 2 mm
= 1 dam 1 m 0 dm 6 cm 2 mm

(*b*)

	kg	hg	dag	g
	②	①		
	4	5	7	2
	3	8	2	3
+	5	8	2	3
	1	4	2	1	8

Thus, 4 kg 5 hg 7 dag 2 g + 3 kg 8 hg 2 dag 3 g + 5 kg 8 hg 2 dag 3 g = 14 kg 2 hg 1 dag 8 g

(*c*)

	kL	hL	daL	L
	①	①	①	
	8	3	7	5
	3	6	5	2
+	3	5	6	4
	1	5	5	9	1

Thus, 8 kL 3 hL 7 daL 5 L + 3 kL 6 hL 5 daL 2 L + 3 kL 5 hL 6 daL 4 L
= 15 kL 5 hL 9 daL 1 L

(*d*)

km	m	
	① ①	
5	2 4 8	
1 1	5 5	
+ 3	6	
1 9	3 0 9	

Thus, 5 km 248 m + 11 km 55 m + 3 km 6 m = 19 km 309 m

(*e*)

g	mg	
①	① ①	
1 8	2 5 0	
1 0	5 7	
+ 6	5 8 9	
3 4	8 9 6	

Thus, 18 g 250 mg + 10 g 57 mg + 6 g 589 mg = 34 g 896 mg.

(*f*)

L	mL	
	①	
6	2 9 2	
+ 7	3 8 5	
1 3	6 7 7	

Thus, 6 L 292 mL + 7 L 385 mL = 13 L 677 mL

2. (*a*)

kL	hL	daL	L	
		⑬		
	⑧	~~③~~	⑫	
7 1	~~9~~	~~4~~	~~2~~	
− 1 0	2	6	4	
6 1	6	7	8	

Thus, 71 kL 9 hL 4 daL 2 L − 10 kL 2 hL 6 daL 4 L = 61 kL 6 hL 7 daL 8 L

(*b*)

m	dm	cm	mm	
	④	⑭		
6	~~5~~	~~4~~	9	
− 3	4	8	2	
3	0	6	7	

Thus, 6 m 5 dm 4 cm 9 mm − 3 m 4 dm 8 cm 2 mm = 3 m 0 dm 6 cm 7 mm

(*c*)

kg	hg	dag	g	
	⑯	⑪		
④	~~⑥~~	~~①~~	⑯	
~~5~~	~~7~~	~~2~~	~~6~~	
− 3	8	5	9	
1	8	6	7	

Thus, 5 kg 7 hg 2 dag 6 g − 3 kg 8 hg 5 dag 9 g = 1 kg 8 hg 6 dag 7 g

(*d*)

m	cm	
② ⑫		
~~3~~ ~~2~~	7 5	
− 1 4	2 5	
1 8	5 0	

Thus, 32 m 75 cm − 14 m 25 cm = 18 m 50 cm

(*e*)

g		mg	
	⑩		
~~1~~	~~0~~ 9	3 7 9	
−	5 5	3 1 2	
	5 4	0 6 7	

Thus, 109 g 379 mg − 55 g 312 mg = 54 g 67 mg

(*f*)

⑪	⑭	
⑥ ~~⑦~~	~~④~~ ⑩	
~~7~~ ~~2~~ . ~~5~~ ~~0~~ 0		mL
− 6 5 . 6 5 0		mL
0 6 . 8 5 0		mL

Thus, 72.5 mL − 65.650 mL = 6.85 mL

3. (*a*)

m	cm	
④ ①	④	
2 5 . 1 5		
×	9	
2 2 6 . 3 5		

Thus, 25 m 15 cm × 9 = 226 m 35 cm

(*b*) 57 kg 275 g = 57.275 kg

5 7 · 2 7 5	
×	1 3
1 7 1 8 2 5	
+ 5 7 2 7 5 0	
7 4 4 · 5 7 5	

Thus, 57 kg 275 g × 13 = 744 kg 575 g

(*c*) 5 kg 7 hg 6 dag 9 g = 5.769 kg

5 . 7 6 9	
×	1 4
2 3 0 7 6	
+ 5 7 6 9 0	
8 0 . 7 6 6	

Thus, 5.769 × 14 kg = 80.766 kg = 80 kg 7 hg 6 dag 6 g

(*d*) 6 km 5 hm 3 dam 4 m = 6.534 km

6 . 5 3 4	
×	1 2
1 3 0 6 8	
+ 6 5 3 4 0	
7 8 . 4 0 8	

Thus, 6 km 5 hm 3 dam 4 m × 12 = 78 km 4 hm 0 dam 8 m.

(*e*) 25 L 175 mL × 15 = 25.175 L

2 5 . 1 7 5	
×	1 5
1 2 5 8 7 5	
+ 2 5 1 7 5 0	
3 7 7 . 6 2 5	

Thus, 25 L 175 mL = 377 L 625 mL

(*f*) 7 kL 546 L = 7.546 kL

7 . 5 4 6	
×	8
6 0 . 3 6 8	

Thus, 7 kL 546 L × 8 = 60 kL 368 L

4. (*a*) 9 g 6 dg 5 cg 1 mg = 9.651 g

9.651 g ÷ 7 = 1.3787 g

Thus, 9 g 6 dg 5 cg 1 mg ÷ 7 = 1.3787 g

```
1.3787
7)9.651(
 −7
 26
 −21
  55
 −49
  61
 − 56
  50
 − 49
   1
```

(*b*) 56 kg 349 g = 56.349 kg

56.349 kg ÷ 9 = 6.261 kg

Thus, 56 kg 349 g ÷ 9 = 6.261 kg

```
6.261
9)56.349(
 −54
  23
 −18
  54
 −54
  09
 − 9
  0
```

(*c*) 5 m 8 dm 4 cm 8 mm = 5.848 m

5.848 ÷ 8 = 0.731 m

Thus, 5 m 8 dm 4 cm 8 mm ÷ 8 = 0.731 m

```
0.731
8)5.848(
 −56
  24
 − 24
  08
 − 8
  0
```

(*d*) 9 km 5 hm 6 dam 4 m = 9.564 km

9.564 km ÷ 12 = 0.797 km

Thus, 9 km 5 hm 6 dam 4 m ÷ 12 = 0.797 km

```
0.797
12)9.564(
 −84
  116
 −108
   84
  − 84
    0
```

(*e*) 5 kL 2 hL 7 daL 8 L = 5.278 kL

5.278 kL ÷ 13 = 0.406 kL

Thus, 5 kL 2 hL 7 daL 8 L ÷ 13 = 0.406 kL

```
0.406
13)5.278(
 −52
  078
 − 78
   0
```

(*f*) 9 L 562 mL = 9.562 L

9.562 L ÷ 14 = 0.683 L

Thus, 9 L 562 mL ÷ 14 = 0.683 L

```
0.683
14)9.562(
 −84
  116
 −112
   42
  − 42
    0
```

5. The length of one piece of rope = 13.25 m

The length of another piece of ribbon = 18.85 m

Length of resultant piece of ribbon

= 13.25 m + 18.85 m = 32.1 m

Thus, the length of resultant piece of ribbon is 32.1 m

6. Atul weights = 48 kg 250 g

Siya weights 8 kg 125 g less than Atul

Weight of Siya

= 48 kg 250 g – 8 kg 125 g

= 40 kg 125 g

Thus, weight of Siya = 40 kg 125 g

kg	g
	④ ⑩
4 8	2 ~~5~~ ~~0~~
− 8	1 2 5
4 0	1 2 5

7. Capacity of one bucket = 18 L 350 mL

Capacity of other bucket

= 16 L 755 mL

Total capacity of both the buckets

= 18 L 350 mL + 16 L 755 mL

= 35 L 105 mL = 35.105 L

L	mL
① ①	①
1 8	3 5 0
+ 1 6	7 5 5
3 5	1 0 5

8. Capacity of 25 glasses

= 8 L 205 mL = 8.205 L

Capacity of 1 glass

= 8.205 ÷ 25 = 0.3282 L

Capacity of 5 glasses

= 0.3282 L × 5 = 1.6410 L

Thus, capacity 5 glasses of Juice is 1 L 641 mL

```
0.3282
25)8.205(
 −75
  70
 −50
  205
 −200
  0050
 −050
   0
```

```
0.3282
×     5
1.6410
```

Think and Answer (Page 177)

1. Distance travelled by car = 260 km

Time taken by the car to travel 260 km = 4 hours

So, Speed = $\frac{\text{Distance}}{\text{Time}} = \left(\frac{260}{4}\right)$ km/h = 65 km/h

Thus, the speed of car is 65 km per hour or 65 km/h.

2. Speed = 85 km per hour

Time = 3 hours

We know that,

Distance = Speed × Time

= 85 × 3 m = 255 km

Thus, the train covered 255 km in 3 hours.

Chapter Assessment

1. (*a*) (*iii*) Approximate quantity of juice in the glass is 0.25 L

(*b*) (*iii*) My weight of myself in the morning = 46 kg

My weight with the book in my hand = 46.20 kg

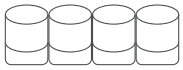
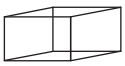
(*c*) (*iii*) 13 dg = 130 mg which is wrong statement.

Since 1 dg = 100 mg So, 13 dg = 13 × 100 = 1300 mg

Thus, 13 dg = 130 mg is the incorrect.

(*d*) (*iii*)  = 3 L (Given)

 = 6 litres

So,  = 

= 6 × 4 L = 24 L.

2. Tina's books weigh = 2.5 kg; Her pencil box weighs = 0.257 kg. Her lunch box weigh = 480 g

$= \frac{480}{1000}$ kg $= \frac{48}{100}$ kg = 0.48 kg

(*a*) Total weight of these items

= 2.5 kg + 0.257 kg + 480 g =3.237 kg

```
  ①  ①
  2 . 5 0 0 kg
  0 . 2 5 7 kg
+ 0 . 4 8 0 kg
  3 . 2 3 7 kg
```

(*b*) Least weight among the three items is of pencil box .Weight of Pencil box = 0.257 kg

= 0.257 × 1000 g = 257 g

3. Venu's weight = 56.89 kg

So, Siya's weight

= 56.89 kg – 13.782 kg

Thus, the weight of Siya is 43.108 kg.

```
      ⑧⑩
  5 6 . 8 9 0 kg
– 1 3 . 7 8 2 kg
  4 3 . 1 0 8 kg
```

4. Quantity of a medicinal syrup in a bottle = 125 mL

Quantity of syrup in 15 bottles

= 125 mL × 15 = 1875 mL = 1.875 L

Thus, quantity of syrup in 15 bottles is 1.875 L

5. Capacity of one container of water = 1.5 dL

1.5 dL $= \frac{1.5}{10}$ L = 0.15 L

Number of containers used to fill a jar of capacity

9L $= \frac{9}{0.15}$ = 60.

Thus, 60 containers of capacity 1.5 dL will be used to fill a jar of capacity 9L.

6. Total distance between Delhi and Jaipur = 310 km 400 m.

Speed of first car in 1 hour = 75 km 250 m

Speed of second car in 1 hour = 82 km 100 m

Distance between both the cars after one hour

= 82 km 100 m – 75 km 250 m = 6 km 850 m

```
   km      m
     ⑪   ⑩
  ⑦①   0⑩
  8 2   1 0 0
– 7 5   2 5 0
  0 6   8 5 0
```

Thus, distance between both the cars after one hour is 6 km 850 m

7. Height of ceiling of a room = 6 m = 600 cm

Height of Rahul = 160 cm

Height of the chair = 55 cm

Height of his stretched arm = 50 cm

Total height = 160 cm + 55 cm + 50 cm = 265 cm

Length of the stick he needs to reach the ceiling = 600 cm – 265 cm = 335 cm

Thus, required length of the stick he needs to reach the ceiling is 335 cm.

8. Side of square park = 200 m

Perimeter of square park = 4 × side = 4 × 200 m = 800 m

Total distance Rohit covered = 2.4 km = 2.4 × 1000 m = 2400 m

Number of rounds of the park to covered the total distance $= \frac{2400}{800}$ = 3 rounds

Thus, he takes 3 rounds of the park to cover a total distance of 2.4 km.

Mental Maths (Page 179)

1. 17 cm + 20 mm

= 17 × 10 mm + 20 mm

= 170 mm + 20 mm = 190 mm

2. 12 km – 600 m = 12 km – $\frac{600}{1000}$ km

= 12 km – 0.6 km = 11.400 km

$$\begin{array}{r} \overset{①}{1}\,\overset{⑩}{\cancel{2}}\,.\,\cancel{0}\,0\,0\text{ km} \\ -\quad 0\,.\,6\,0\,0\text{ km} \\ \hline 1\,1\,.\,4\,0\,0\text{ km} \\ \hline \end{array}$$

3. 10 kg + 5 g = 10 × 1000 g + 5 g

= 10000 g + 5 g = 10005 g

4. 7400 g – 600 g = 6800 g

= $\frac{6800}{1000}$ kg = 6.800 kg

5. 12 L – 70 mL = 12 × 1000 mL – 70 mL

= 12000 mL – 70 mL = 11930 mL

6. 4 L – 700 mL = 4L – $\frac{700}{1000}$ L = 4 L – 0.7 L = 3.300 L

Brain Sizzlers (Page 179)

Distance covered by Riya in 30 paces = 18.750 m

Distance covered by Riya in 1 pace = $\frac{18.750}{30}$ m

= 0.625 m

Distance covered by Riya 10000 paces

= 0.625 × 10000 m = 6250 m = 6.250 km

Thus, she walked 6.250 km after taking 10,000 paces.

CHAPTER 9 : TIME AND TEMPERATURE

Let's Recall

1. Super fast train

Departure time = 5:10 p.m.

Arrival time = 9:20 p.m.

Total time taken by the train form Lucknow to Varanasi = 4 hours 10 minutes

Express train

Departure time = 1730 p.m. = 5:30 p.m.

Arrival time = 2400 p.m. = 12:00 p.m.

Total time taken by the train form Lucknow to Varanasi = 6 hours 30 minutes.

Different between their timings

= 6 hours 30 minutes – 4 hours 10 minutes

= 2 hours 20 minutes

Thus express train takes 2 hours 20 minutes more as compared to Super Fast train.

Practice Time 9A

1. (*a*) (*i*) 9:15 p.m. = 2115 hours (∵ 1200 hours + 915 hours = 2115)

(*b*) (*iii*) Here, 2155 hours > 1200 hours.

Therefore, 2155 hours = 2155 hours – 1200 hours.

955 hours = 9:55 p.m.

2. (*a*) 0320 hours

Here, 0320 hours < 1200 hours.

Therefore, 0320 hours = 3:20 a.m.

(*b*) 0428 hours

Here, 0428 hours < 1200 hours.

Therefore, 0428 hours = 4:28 a.m.

(*c*) 0937 hours

Here, 0937 hours < 1200 hours.

Therefore, 0937 hours = 9:37 a.m.

(*d*) 1429 hours

Here, 1429 hours > 1200 hours.

Therefore, 1429 hours – 1200 hours = 2:29 p.m.

(*e*) 1330 hours

Here, 1330 hours > 1200 hours.

Therefore, 1330 hours – 1200 hours = 1:30 p.m.

(*f*) 1740 hours

Here, 1740 hours > 1200 hours.

Therefore, 1740 hours – 1200 hours = 5:40 p.m.

(*g*) 1825 hours

Here, 1825 hours > 1200 hours.

Therefore, 1825 hours – 1200 hours = 6:25 p.m.

(*h*) 0000 hours

Here, 0000 hours = 2400 hours.

0000 hours = 2400 hours – 1200 hours.

= 12:00 a.m. (midnight)

(*i*) 2222 hours

Here, 2222 hours > 1200 hours.

Therefore, 2222 hours – 1200 hours = 10:22 p.m.

(*j*) 2138 hours

Here, 2138 hours > 1200 hours.

Therefore, 2138 hours – 1200 hours = 9:38 p.m.

(*k*) 1348 hours

Here, 1348 hours > 1200 hours.

Therefore, 1348 hours – 1200 hours = 1:48 p.m.

(*l*) 2000 hours

Here, 2000 hours > 1200 hours.

Therefore, 2000 hours – 1200 hours = 8:00 p.m.

3. (*a*) 1:40 a.m.

1:40 a.m. = 0140 hours

(∵ 0140 hours < 1200 hours

∴ 1:40 a.m. = 0140 hours)

(*b*) 4:57 a.m.

4:57 a.m. = 0457 hours

(∵ 0457 hours < 1200 hours

∴ 4:57 a.m. = 0457 hours)

(*c*) 12:06 a.m.

12:06 a.m. = 0006 hours

(∵ 1206 hours > 1200 hours

∴ 1206 hours –1200 hours

= 0006 hours)

(*d*) 6:05 a.m.

6:05 a.m. = 0605 hours

(∵ 0605 hours < 1200 hours

∴ 6:05 a.m. = 0605 hours)

(*e*) 10:24 a.m.

10:24 a.m. = 1024 hours

(∵ 1024 hours < 1200 hours

∴ 10:24 a.m. = 1024 hours)

(*f*) 7:36 p.m.

7:36 p.m. = 1936 hours

(∵ 1200 hours + 736 hours = 1936 hours)

(*g*) 12:15 p.m.

12:15 p.m. = 1215 hours.

(*h*) 2:17 p.m.

2:17 p.m. = 1417 hours

(∵ 1200 hours + 217 hours = 1417 hours)

(*i*) 11:00 p.m.

11:00 p.m. = 2300 hours

(∵ 1200 hours + 1100 hours = 2300 hours)

(*j*) 12:00 midnight

12:00 mid-night = 0000 hours or 2400 hours.

(*k*) 3:30 p.m.

3:30 p.m. = 1530 hours

(∵ 1200 hours + 330 hours = 1530 hours)

(*l*) 9:40 p.m.

9:40 p.m. = 2140 hours

(∵ 1200 hours + 940 hours = 2140 hours)

Practice Time 9B

1. (*a*) 9 minutes into seconds

Since, 1 minute = 60 seconds

So, 9 minutes = (9 × 60) seconds = 540 seconds.

(*b*) 12 minutes 54 seconds into seconds

12 minutes 54 seconds

= 12 minutes + 54 seconds

= (12 × 60) seconds + 54 seconds

[∵ 1 minute = 60 seconds]

= 720 seconds + 54 seconds

= 774 seconds.

(*c*) 3 hours 25 minutes 16 seconds into seconds

= 3 hours + 25 minutes + 16 seconds

= (3 × 60) minutes + 25 minutes + 16 seconds

[∵ 1 hour = 60 minutes]

= 180 minutes + 25 minutes + 16 seconds

= 205 minutes + 16 seconds

= (205 × 60) seconds + 16 seconds

[∵ 1 minute = 60 seconds]

= 12300 seconds + 16 seconds

= 12316 seconds.

(*d*) 14 hours into minutes

Since, 1 hour = 60 minutes

So, 14 hours = (14 × 60) minutes = 840 minutes.

(*e*) 9 hours 54 minutes into minutes

= 9 hours + 54 minutes

= (9 × 60) minutes + 54 minutes

= 540 minutes + 54 minutes

= 594 minutes.

(*f*) 7 days into hours

Since, 1 day = 24 hours

So, 7 days = (7 × 24) hours = 168 hours.

(*g*) 8 days 19 hours into hours

= 8 days + 19 hours.

= (8 × 24) hours + 19 hours

(∵ 1 day = 24 hours)

= 192 hours + 19 hours

= 211 hours.

(*h*) 7 weeks 3 days into days

= 7 weeks + 3 days

= (7 × 7) days + 3 days (∵ 1 week = 7 days)

= 49 days + 3 days

= 52 days.

(*i*) 3 years into days

Since, 1 year = 365 days.

So, 3 years = (3 × 365) days = 1095 days.

(*j*) 10 years into months

Since, 1 year = 12 months

So, 10 years = (10 × 12) months = 120 months.

(*k*) 5 years 10 months into months

= 5 years + 10 months

= (5 × 12) months + 10 months

= 60 months + 10 months

= 70 months.

2. (*a*) 1318 seconds

Since, 60 seconds = 1 minute

1318 seconds = (1318 ÷ 60) minutes.

Quotient = 21, Remainder 58.

```
60)1318(21
 −120↓
  118
  − 60
   58
```

Thus, 1318 seconds = 21 minutes 58 seconds.

(*b*) 3165 seconds

Since, 60 seconds = 1 minute

3165 seconds = (3165 ÷ 60) minutes

Quotient = 52, Remainder = 45

```
60)3165(52
 −300↓
  165
 −120
   45
```

Thus, 3165 seconds = 52 minutes 45 seconds.

3. (*a*) 238 minutes

Since, 60 minutes = 1 hour

238 minutes = (238 ÷ 60) hours

Quotient = 3, Remainder = 58

```
60)238(3
 −180
   58
```

Thus, 238 minutes = 3 hours 58 minutes.

(*b*) 498 minutes

Since, 60 minutes = 1 hour

498 minutes = (498 ÷ 60) hours

Quotient = 8, Remainder = 18.

```
60)498(8
 −480
   18
```

Thus, 498 minutes = 8 hours 18 minutes.

(*c*) 1032 minutes

= (1032 ÷ 60) hours

(∵ 60 minutes = 1 hours)

Quotient = 17, Remainder = 12

```
60)1032(17
 −60↓
  432
 −420
   12
```

Thus, 1032 minutes = 17 hours 12 minutes.

(*d*) 3024 minutes

= (3024 ÷ 60) hours

(∵ 60 minutes = 1 hour)

Quotient = 50, Remainder = 24

```
60)3024(50
 −300↓
   24
```

Thus, 3024 minutes = 50 hours 24 minutes.

4. (*a*) 57 hours

Since, 24 hours = 1 day

57 hours = (57 ÷ 24) days

Quotient = 2, Remainder = 9

```
24)57(2
 −48
   9
```

Thus, 57 hours = 2 days 9 hours.

(*b*) 537 hours

Since, 24 hours = 1 day

537 hours = (537 ÷ 24) days

Quotient = 22, Remainder = 9

```
24)537(22
 −48↓
  57
 − 48
   9
```

Thus, 537 hours = 22 days 9 hours.

(*c*) 953 hours

953 hours = (953 ÷ 24) day

(∵ 24 hours = 1 day)

Quotient = 39, Remainder = 17

```
24)953(39
 −72↓
  233
 −216
   17
```

Thus, 953 hours = 39 days 17 hours.

(*d*) 1810 hours

1810 hours = (1810 ÷ 24) day

(∵ 24 hours = 1 day)

Quotient = 75, Remainder = 10

```
24)1810(75
 −168↓
  130
 −120
   10
```

Thus, 1810 hours = 75 days 10 hours.

5. (*a*) 330 days

Since, 7 days = 1 week

330 days = (330 ÷ 7) weeks

Quotient = 47, Remainder = 1

```
7)330(47
 −28↓
  50
 − 49
   1
```

Thus, 330 day = 47 weeks 1 day.

(*b*) 438 days

Since, 7 days = 1 week

438 days = (438 ÷ 7) weeks

Quotient = 62, Remainder = 4

```
7)438(62
 −42↓
  18
 − 14
   4
```

Thus, 438 day = 62 weeks 4 days.

Practice Time 9C

1. (*a*) - (*ii*)

Step 1. Add months:

= 8 months + 6 months

= 14 months

= 12 months + 2 months

(∵ 12 months = 1 year)

= 1 year + 2 months

Years	Months
①	
6	8
+ 8	6
15	**2**

Step 2. Add years:

1 year (carried over) + 6 years + 8 years = 15 years.

Thus, 6 years 8 months + 8 years 6 months

= 15 years 2 months

(*b*) - (*i*) Subtract minutes.

$\because$ 25 minutes < 45 minutes

So, regroup hours and minutes

9 hours 25 minutes

= 8 hours 85 minutes

	h	min
	⑧	⑧⑤
	~~9~~	~~25~~
−	3	45
	5	**40**

Now, 8 hours 85 minutes – 3 hours 45 minutes

= 5 hours 40 minutes

2. (*a*) 9 min 28 s and 6 min 16 s

Step 1. Add seconds:

28 seconds + 16 seconds

= 44 seconds.

Step 2. Add minutes:

9 minutes + 6 minutes

= 15 minutes.

	min	s
	9	28
+	6	16
	15	**44**

Thus, 9 minutes 28 seconds + 6 minutes 16 seconds = 15 minutes 44 seconds.

(*b*) 9 h 32 min and 6 h 26 min

Step 1. Add minutes:

32 minutes + 26 minutes

= 58 seconds.

Step 2. Add hours:

9 hours + 6 hours

= 15 hours.

	h	min
	9	32
+	6	26
	15	**58**

Thus, 9 hours 32 minutes + 6 hours 26 minutes = 15 hours 58 minutes.

(*c*) 2 days 17 h and 3 days 15 h

Step 1. Add hours:

17 hours + 15 hours

= 32 hours

= 24 hours + 8 hours

($\because$ 1 day = 24 hours)

= 1 day + 8 hours.

	days	h
	①	
	2	17
+	3	15
	6	**8**

Step 2. Add days:

1 day (carried over) + 2 days + 3 days

= 6 days.

Thus, 2 days 17 hours + 3 days 15 hours = 6 days 8 hours.

(*d*) 5 weeks 4 days and 4 weeks 6 days

Step 1. Add days:

4 days + 6 days

= 10 days

= 7 days + 3 days

= 1 week + 3 days

($\because$ 1 week = 7 days)

Step 2. Add week:

1 week (carried over)

+ 5 weeks + 4 weeks

= 10 weeks

	Weeks	Days
	①	
	5	4
+	4	6
	10	**3**

Thus, 5 weeks 4 day + 4 weeks 6 days = 10 weeks 3 days.

(*e*) 5 years 4 months and 3 years 7 months

Step 1. Add months:

4 months + 7 months

= 11 months

Step 2. Add years:

5 years + 3 years = 8 years

	Years	Months
	5	4
+	3	7
	8	**11**

Thus, 5 years 4 months + 3 years 7 months = 8 years 11 months.

3. (*a*) 20 min 48 s from 30 min

Step 1. Subtract seconds:

$\because$ 00 s < 48 s

So, regroup minutes and seconds.

$\therefore$ 30 minutes = 29 minutes 60 seconds. Now, 60 seconds – 48 seconds = 12 seconds.

	min	s
	㉙	⑥⓪
	~~30~~	~~00~~
−	20	48
	9	**12**

Step 2. Subtract minutes:

29 minutes – 20 minutes = 9 minutes

Thus, 30 minutes – 20 minutes 48 seconds = 9 minutes 12 seconds.

(*b*) 15 min 33 s from 18 min 40 s

Step 1. Subtract seconds:

40 seconds – 33 seconds

= 7 seconds.

Step 2. Subtract minutes:

18 minutes – 15 minutes

= 3 minutes

	min	s
		③⑩
	18	~~4~~ ~~0~~
−	15	3 3
	03	**0 7**

Thus, 18 minutes 40 seconds – 15 minutes 33 seconds = 3 minutes 7 seconds.

(*c*) 8 h 40 min from 24 h

Step 1. Subtract minutes:

$\because$ 00 min < 40 min

So, regroup hours and minutes.

24 hours = 23 hours 60 minutes.

Now, 60 minutes – 40 minutes

= 20 minutes.

	h	min
	㉓	⑥⓪
	~~24~~	~~00~~
−	8	40
	15	**20**

Step 2. Subtract hours:

23 hours – 8 hours = 15 hours

Thus, 24 hours – 8 hours 40 minutes = 15 hours 20 minutes

(*d*) 2 days 12 h from 4 days 20 h

Step 1. Subtract hours:

20 hours – 12 hours

= 8 hours.

days	h
	① ⑩
4	~~2~~ ~~0~~
– 2	1 2
2	**0 8**

Step 2. Subtract days:

4 days – 2 days = 2 days.

Thus, 4 days 20 hours – 2 days 12 hours

= 2 days 8 hours.

(*e*) 3 weeks 5 days from 5 weeks 3 days

Step 1. Subtract days:

∵ 3 days < 5 days

So, regroup weeks and days. 5 weeks 3 days = 4 weeks 10 days.

Now, 10 days – 5 days = 5 days.

Weeks	Days
④	⑩
~~5~~	~~3~~
– 3	5
1	**5**

Step 2. Subtract weeks:

4 weeks – 3 weeks = 1 week.

Thus, 5 weeks 3 days – 3 weeks 5 days

= 1 week 5 days.

(*f*) 15 years 9 months from 20 years

Step 1. Subtract months:

∵ 00 days < 9 days

So, regroup years and months.

20 years = 19 years 12 months.

Now, 12 months – 9 months

= 3 months.

Years	Months
⑲	⑫
~~20~~	~~00~~
– 15	9
4	**3**

Step 2. Subtract years:

19 years – 15 years = 4 years.

Thus, 20 years – 15 years 9 months

= 4 years 3 months.

4. (*a*) 3 h 45 min after 8:30 p.m.?

Step 1. Convert 8:30 p.m. into 24 - hour clock.

8:30 p.m. = 2030 hours

= 20 hours 30 minutes.

Step 2. Add 3 hours 45 minutes and 20 hours 30 minutes.

30 minutes + 45 minutes = 75 minutes

75 minutes = 60 minutes + 15 minutes

= 1 hour + 15 minutes

Now, 1 hour (carried over) + 20 hours + 3 hours = 24 hours

Step 3. Required time

= 24 hours 15 minutes

= 12:15 a.m.

h	min
①	
20	30
+ 3	45
24	**15**

(*b*) 5 h 30 min after 8:40 p.m.?

Step 1. Convert 8:40 p.m. into 24 - hour clock.

8:40 p.m. = 2040 hours

= 20 hours 40 minutes.

Step 2. Add 5 hours 30 minutes and 20 hours 40 minutes.

40 minutes + 30 minutes = 70 minutes

70 minutes = 60 minutes + 10 minutes

= 1 hour + 10 minutes

Now, 1 hour (carried over) + 20 hours + 5 hours = 26 hours

Step 3. Required time

= 26 hours 10 minutes

= 2610 hours

= (2610 – 2400) hours

= 210 hours.

= 2:10 a.m.

h	min
①	
20	40
+ 5	30
26	**10**

5. (*a*) 4 h before 1:30 p.m.?

Step 1. Converting 1:30 p.m. into 24 - hour clock time.

1:30 p.m. = 1330 hours

= 13 hours 30 minutes

Step 2. Subtract 4 hours from 13 hours 30 minutes.

30 minutes – 00 minutes

= 30 minutes and

13 hours – 4 hours = 9 hours.

h	min
13	30
– 4	00
9	**30**

Step 3. Required time = 9 hours 30 minutes

= 9:30 a.m.

(*b*) 7 h 25 min before 3:20 p.m.?

Step 1. Converting 3:20 p.m. into 24 - hour clock.

3:20 p.m. = 1520 hours

= 15 hours 20 minutes

Step 2. Subtract 7 hours 25 minutes from 15 hours 20 minutes.

Subtract minutes.

$\because$ 20 min < 25 min

So, regroup hours and minutes.

15 hours 20 minutes

= 14 hours 80 minutes.

h	min
(14)	(80)
~~15~~	~~20~~
7	25
7	**55**

80 minutes – 25 minutes = 55 minutes.

Subtract hours.

14 hours – 7 hours = 7 hours.

Step 3. Required time

= 7 hours 55 minutes = 7:55 a.m.

6. 7:25 a.m. = 0725 hours = 7 h 25 min.

3:10 p.m. = 1510 hours = 15 h 10 min.

Subtract 7 h 25 min from 15 h 10 min.

Required time = 7 hours 45 minutes

h	min
(14)	(70)
~~15~~	~~10~~
7	25
7	**45**

7. (*a*) Closing time of the school

= 1:30 p.m. = 1330 hours.

Opening time of the school

= 7:45 a.m. = 0745 hours.

h	min
(12)	(90)
~~13~~	~~30~~
07	45
5	**45**

Shaneya's school hours

= 1330 hours – 0745 hours.

= 0545 hours

[$\because$ 30 min < 45 min regroup hours and minutes]

= 5 hours 45 minutes

Thus, her school hours is 5 hours 45 minutes.

(*b*) Closing time of the shop

= 7:00 p.m. = 1900 hours

Opening time of the shop

= 10:30 a.m. = 1030 hours

h	min
(18)	(60)
~~19~~	~~90~~
10	30
8	**30**

Time duration of the shop remains open

= 1900 hours – 1030 hours

= 0830 hours = 8 hours 30 minutes.

(*c*) Departure time of the bus

= 5:30 a.m. = 0530 hours

and arrival time at destination

= 7:45 p.m. = 1945 hours

h	min
19	45
05	30
14	**15**

Time duration of the journey

1945 hours – 0530 hours

Thus, time duration of the journey is 14 hours 15 minutes.

(*d*) The express train left Vadodara on Monday → 4:40 p.m. = 1640 hours.

Duration of the 1st day

= 2400 hours – 1640 hours = 8:20 hours.

Tuesday → Duration of the 2nd day = 24 hours

Wednesday → Duration of the 3rd day

= 24 hours

Thursday → Duration of the 4th day when the train reached Guwahati.

= 2400 hours – 1230 hours = 11:30 hours.

Total duration of the Journey =

h	min
(1)	
	8 : 2 0
2	4 : 0 0
2	4 : 0 0
+ 1	1 : 3 0
6	**7 : 5 0**

Thus, total duration of the journey is 67 hours 50 minutes.

(*e*) Age of Keshav when he started his job

= 23 years 7 months

His present age

= 52 years 2 months.

Duration of the job

= 52 years 2 months – 23 years 7 months

= 28 years 7 months

Years	Months
(51)	(14)
~~52~~	~~2~~
23	7
28	**7**

Thus, he is in the job since 28 years 7 months.

Practice Time 9D

1. (*a*) 37 minutes 12 seconds by 3

min	s
37	12
×	3
111	**36**

Thus, 37 minutes 12 seconds × 3 = 111 minutes 36 seconds or 1 hour 51 minutes 36 seconds.

(*b*) 6 hours 05 minutes by 3

h	min
6	05
×	3
18	**15**

Thus, 6 hours 05 minutes × 3 = 18 hours 15 minutes.

(*c*) 8 hours 03 minutes 18 seconds by 6

Step 1. Multiply 18 seconds by 6.

18 seconds × 6 = 108 seconds convert 108 seconds into minutes and seconds.

108 seconds = 60 seconds + 48 seconds carry 1 minute to the minutes column and 48 seconds write seconds in the seconds column.

	h	min	s
		①	
	8	03	18
×			6
	48	**19**	**48**

Step 2. Multiply 3 minutes by 6 and add carry over 1 minute to the product.

3 minutes × 6 + 1 = 19 minutes.

Write 19 minutes in the minutes column.

Step 3. Multiply 8 hours by 6.

8 hours × 6 = 48 hours.

Thus, the required product is 48 hours 19 min 48 seconds.

(*d*) 7 hours 11 minutes 3 seconds by 8

	h	min	s
	①		
	7	11	3
×			8
	57	**28**	**24**

Thus, 7 hours 11 minutes 3 seconds × 8 = 57 hours 28 minutes 24 seconds.

(*e*) 2 weeks 5 days by 3

	Weeks	Days
	②	
	2	5
×		3
	8	**1**

∵ 5 days × 3 = 15 days

= 14 days + 1 day = 2 weeks 1 day.

Carry over ② week in weeks column.

And 2 weeks (carry over) + 2 weeks × 3 = 8 weeks

Thus, 2 weeks 5 days × 3 = 8 weeks 1 day.

(*f*) 10 weeks 5 days 10 hours by 2

	Weeks	Days	Hours
	①		
	10	5	10
			2
	21	**3**	**20**

10 hours × 2 = 20 hours

5 days × 2 = 10 days

Since, 1 week = 7 days.

So, 10 day = 7 days + 3 days

= 1 week 3 days.

And 1 week (carry over) + 10 weeks × 2

= 1 + 20 = 21 week

Thus, 10 weeks 5 days 10 hours × 2 = 21 weeks 3 days 20 hours.

2. (*a*) 15 minutes 48 seconds ÷ 3

Step 1. Divide 15 minutes by 3.

Write 5 minutes as quotient and 0 minutes as remainder.

$$\begin{array}{r} 5 \\ 3\overline{)15} \\ -\,15 \\ \hline 0 \end{array}$$ 5 → minutes; 0 → minutes

Step 2. Divide 48 seconds by 3.

Write 16 seconds as quotient and 0 seconds as remainder.

$$\begin{array}{r} 16 \\ 3\overline{)48} \\ -\,3\downarrow \\ \hline 18 \\ -\,18 \\ \hline 0 \end{array}$$ 16 → seconds; 0 → seconds

Thus, 15 minutes 48 seconds ÷ 3 = 5 minutes 16 seconds.

(*b*) 8 hours 16 minutes ÷ 2

$$\begin{array}{r} \text{4 hours 8 minutes} \\ 2\overline{)\text{8 hours}\quad\text{16 minutes}} \\ -\,\text{8 hours}\quad\downarrow \\ \hline \text{0 hours + 16 minutes} \\ -\qquad\text{16 minutes} \\ \hline \text{0 minutes} \end{array}$$

Thus, 8 hours 16 minutes ÷ 2 = 4 hours 8 minutes.

(*d*) 4 days 15 hours 40 minutes ÷ 8.

4 days 15 hours 40 minutes

= 24 × 4 + 15 hours + 40 minutes

[∵ 1 day = 24 hours]

= 96 hours + 15 hours + 40 minutes.

= 111 hours + 40 minutes.

$$\begin{array}{r} \text{13 hours} \\ 8\overline{)\text{111 hours}} \\ -\,\text{104 hours} \\ \hline \text{7 hours} \end{array}$$

= 7 hours + 40 minutes

= 420 minutes + 40 minutes [∵ 1 hours = 60 minutes]

$$\begin{array}{r} \text{57 minutes} \\ 8\overline{)\text{460 minutes}} \\ -\,\text{40}\downarrow\text{ minutes} \\ \hline 60 \\ -\,56 \\ \hline \text{4 minutes} \end{array}$$

$= 4 \times 60 = 240$ seconds [$\because$ 1 mim = 60 seconds]

$$8\overline{)\begin{array}{l}30 \text{ seconds} \\ 240 \text{ seconds} \\ -\ 240 \text{ seconds} \\ \hline 0 \text{ seconds}\end{array}}$$

Thus, 4 days 15 hours 40 minutes ÷ 8 = 13 hours 57 minutes 30 seconds.

3. Time taken by Suyash to rides 13 km
= 1 hour 56 minutes 47 seconds
So, time taken by him to ride 1 km
= 1 hours 56 minutes 47 seconds ÷ 13
1 hours 56 minutes 47 seconds
= 60 minutes + 56 minutes + 47 seconds
= 116 minutes + 47 seconds.
Now, divide 116 minutes 47 seconds ÷ 13

$$13\overline{)\begin{array}{l}8 \text{ minutes} \\ 116 \text{ minutes} \\ -\ 104 \text{ minutes} \\ \hline 12 \text{ minutes}\end{array}}$$

$= 12 \times 60$ seconds + 47 seconds
$= 720$ seconds + 47 seconds $= 767$ seconds

$$13\overline{)\begin{array}{l}59 \text{ seconds} \\ 767 \text{ seconds} \\ -\ 65\downarrow \\ \hline 117 \\ -\ 117 \\ \hline 0\end{array}}$$

Thus, he take 8 minutes 59 seconds to ride 1 km at uniform speed.

Quick Check (Page 195)

(*a*) - (*ii*) Temperature of boiling water = 100°C
(*b*) - (*iii*) Temperature of freezing water = 32°F
(*c*) - (*i*) Normal temperature of human body = 98.6°F

Practice Time 9E

1. (*a*) - (*iii*) To convert temperature from °C to °F, we use the formula $°F = °C \times \frac{9}{5} + 32$.

So, multiply the °C temperature by $\frac{9}{5}$.

$100 \times \frac{9}{5} = 20 \times 9 = 180.$

Now, add 32 to the product obtained to get the temperature in °F.
Therefore, F = 180 + 32 = 212
Thus, 100°C = 212°F

Alternative:

$$F = C \times \frac{9}{5} + 32$$
$$F = 100 \times \frac{9}{5} + 32$$
$$F = 180 + 32$$
$$F = 212°F$$

(*b*) - (*ii*) To convert temperature from °F to °C, we use the formula $°C = (°F - 32) \times \frac{5}{9}$.

Subtract 32 from 122 °F temperature.
122 – 32 = 90

Now, multiply the difference by $\frac{5}{9}$ to get the temperature in °C

Therefore, $C = 90 \times \frac{5}{9} = 10 \times 5 = 50$

Thus, 122°F = 50°C.

2. (*a*) Thermometer is used to measure the temperature of objects.
(*b*) The boiling point of water is 100°C or 212°F.
(*c*) The normal human body temperature is about 37°C or 98.6°F.

3. (*a*) 8°C (*b*) 72°C (*c*) 57°F

4. (*a*) 25°C

Multiply the °C temperature by $\frac{9}{5}$.

$25 \times \frac{9}{5} = 5 \times 9 = 45$

Now, add 32 to the product obtained to get the temperature in °F
Therefore, F = 45 + 32 = 77
Thus, 25°C = 77°F

(*b*) 48°C

Multiply the °C temperature by $\frac{9}{5}$.

$48 \times \frac{9}{5} = \frac{432}{5} = 86.4$

Now, add 32 to the product obtained to get the temperature in °F.
Therefore, F = 86.4 + 32 = 118.4
Thus, 48°C = 118.4°F

(*c*) 75°C

Multiply the °C temperature by $\frac{9}{5}$.

$75 \times \frac{9}{5} = 15 \times 9 = 135$

Now, add 32 to the product obtained to get the temperature in °F.

Therefore, F = 135 + 32 = 167

Thus, 75°C = 167°F

(*d*) 98°C

Multiply the °C temperature by $\frac{9}{5}$.

$98 \times \frac{9}{5} = \frac{882}{5} = 176.4$

Now, add 32 to the product obtained to get the temperature in °F.

Therefore, F = 176.4 + 32 = 208.4°F

Thus, 98°C = 208.4°F

(*e*) 50°C

Multiply the °C temperature by $\frac{9}{5}$.

$50 \times \frac{9}{5} = 10 \times 9 = 90$

Now, add 32 to the product obtained to get the temperature in °F.

Therefore, F = 90 + 32 = 122°F

Thus, 50°C = 122°F

5. (*a*) 68°F

Subtract 32 from °F temperature.

68 – 32 = 36

Now, multiply the difference by $\frac{5}{9}$ to get the temperature in °C.

Therefore, $C = 36 \times \frac{5}{9} = 4 \times 5 = 20$

Thus, 68°F = 20°C.

Alternative:

$C = (F - 32) \times \frac{5}{9}$

$C = (68 - 32) \times \frac{5}{9}$

$C = 36 \times \frac{5}{9}$

C = 4 × 5 = 20°C

(*b*) 113°F

Subtract 32 from °F temperature.

113 – 32 = 81

Now, multiply the difference by $\frac{5}{9}$ to get the temperature in °C.

Therefore, $C = 81 \times \frac{5}{9} = 9 \times 5 = 45$

Thus, 113°F = 45°C.

(*c*) 131°F

Subtract 32 from °F temperature.

131 – 32 = 99

Now, multiply the difference by $\frac{5}{9}$ to get the temperature in °C.

Therefore, $99 \times \frac{5}{9} = 11 \times 5 = 55$

Thus, 131°F = 55°C.

(*d*) 212°F

Subtract 32 from °F temperature.

212 – 32 = 180

Now, multiply the difference by $\frac{5}{9}$ to get the temperature in °C.

Therefore, $C = 180 \times \frac{5}{9}$

$C = 20 \times 5 = 100$

Thus, 212°F = 100°C.

(*e*) 254.4°F

Subtract 32 from °F temperature.

254.4 – 32 = 222.4

Now, multiply the difference by $\frac{5}{9}$ to get the temperature in °C.

Therefore, $C = 222.4 \times \frac{5}{9}$

$C = \frac{1112}{9} = 123.56$

Thus, 254.4°F = 123.56°C.

6. Temperature on Monday = 26°C

Temperature on next day = 26°C + 5°C = 31°C

Let us convert temperature into °F.

We have,

$$F = \left(C \times \frac{9}{5}\right) + 32 = \left(31 \times \frac{9}{5}\right) + 32$$

$$= \frac{279}{5} + 32 = 55.8 + 32 = 87.8°F$$

Hence, temperature on Tuesday was 87.8°F.

Mental Maths (Page 197)

1. (*b*) Friday **2.** (*a*) Monday

3. (*c*) Starting time of the show = 8.45 p.m.

Duration of the show = $1\frac{1}{2}$ hr = 1 hour 30 min.

	h	min
	(1)	
	8	45
+	1	30
	10	**15**

Thus, 8:45 + 1:30 = 9:75
= 10:15 p.m.

4. (*d*) Ending time of the movie = 11:20 p.m.
= 1200 hours + 1120 hours = 2320 hours.
Duration of movie with intermission break
= 0215 hours + 10 minutes = 0225 hours
Starting time of the movie
= 2320 hours – 0225 hours = 2055 hours

	h	min
	(22)	(80)
	~~23~~	~~20~~
–	2	25
	20	**55**

Thus, required time
= 2055 hours

Chapter Assessment

1. (*a*) - (*iv*) Here, 1730 hours > 1200 hours
Therefore, 1730 hours – 1200 hours = 530 hours
= 5:30 p.m.

(*b*) - (*ii*) 4:45 p.m. = 1645 hours (∵ 1200 hours + 445 hours = 1645 hours)

(*c*) - (*iv*) Scheduled departure time from Ahmedabad = 1730 hours.
Here, 1730 hours > 1200 hours.
Therefore, 1730 hours– 1200 hours = 530 hours
= 5:30 p.m.

The train was $\frac{3}{4}$ an hours late = $\frac{3}{4} \times 60$ = 45 minutes. [∵ 1 hour = 60 minutes]

Thus, required departure time
= 5:30 p.m. + 45 minutes
= 6:15 p.m.

(*d*) - (*iii*) The duration of the train took to reach New Delhi = 0855 hours + time interval from 6:15 p.m to 12 mid-night.
= 0855 hours + 2400 – 1815 hours
[∵ 1815 < 2400]
= 0855 hours + 585 hours
= 14 hours 40 minutes.

2. Departure time of the train = 9:30 a.m.
Time duration from 9:30 a.m. to mid-night
= 24:00 hours – 9:30 hours = 14:30 hours
= 14 hours 30 minutes
Train reaches its destination at = 6:45 a.m.
= 06:45 hours
Total duration of the journey
= 14 hours 30 minutes + 6 hours 45 minutes
= 21 hours 15 minutes
Thus, duration of the journey is 21 hours 15 minutes.

3. Duration of work for the company from 5 September 2013 to 4 September 2021, he works for complete 8 years
From 5 September 2021 to 4 December 2021
= 3 months
From 5 December 2021 to 3 January 2022
= 29 days
Thus, Duration of work for the company
= 8 years 3 months 29 days.

4. Duration of 5th December to 31st December
= 27 days.
Duration of 1st January to 12 January = 12 days.
Total duration when her school was closed
= 27 days + 12 days = 39 days.

5. Salman was born on 8th April 2003
Sopia was burn on 3rd March 2011.
So, number of years from 8th April 2003 to 7th April 2010 = 7 years

And, number of months from 8th April 2010 to 7th February 2011 = 10 months

And, number of days from 8th February 2011 to 3rd March 2011 = 24 day

Thus, Sophia is younger and their age difference is 7 years 10 months 24 days.

6. Temperature of tea during making period = 100°C.

Temperature loss per minute = 10°C.

Time taken by tea to reach at a temperature of 30°C *i.e.*, to loose 100° – 30° = 70°C.

So, the tea takes 7 minute to reach at temprerature of 30°C.

7. Temperature of milk = 147°F.

After an hour, the temperature of milk cool down by 21°C.

Let us convert 21°C temperature into °F.

We have,

$$°F = \left(°C \times \frac{9}{5}\right) + 32 = \left(21 \times \frac{9}{5}\right) + 32$$

$$= \frac{189}{5} + 32 = 37.8 + 32 = 69.8°F.$$

Therefore, temperature of milk after an hour

= 147°F – 69.8°F = 77.2°F.

8. Maximum temperature of a week = 42°C

Minimum temperature of the week = 22°C

Difference in temperature = 42°C – 22°C = 20°C.

To convert difference in temperature into °F, we use

$$°F = \left(°C \times \frac{9}{5}\right) + 32 = \left(20 \times \frac{9}{5}\right) + 32$$

= 36 + 32 = 68°F.

Thus, difference between these temperature is 68°F.

9. Normal body temperature in °F = 98.6°F

Temperature of Ram's body

= 98.6°F + 4°F = 102.6°F.

To convert °F to °C, we use

$$°C = (F - 32) \times \frac{5}{9}$$

$$°C = (102.6 - 32) \times \frac{5}{9} = \frac{70.6 \times 5}{9}$$

$$= \frac{353}{9} = 39.22°C.$$

Thus, the temperature of Ram's body in °C is 39.22°C.

10. Duration of advertisement = 18 seconds

Interval between 2 advertisement = $\frac{1}{2}$ hour

Total hours in a day = 24 hours

Total number of times advertisement can telecast $24 \times 2 = 48$

Total duration of the advertisement telecast in a day = 48 × 18 seconds = 864 seconds

$= \frac{864}{60}$ minutes = 14.4 minutes.

$$\begin{array}{r} 60\overline{)864}(14.4 \\ -60\downarrow \\ \hline 264 \\ -240 \\ \hline 240 \\ -240 \\ \hline 0 \end{array}$$ minutes

Thus, advertisements are telecast on the channel 14.4 minutes in a day.

Brain Sizzlers (Page 200)

In 1st clock: The real time of the clock is (5: 52 + 1 hour) = 6:52 hours *i.e.*, not a bed time.

In 2nd clock: The real time of the clock is (1:50 + 20 minutes) = 2:10 *i.e.*, not a bed time.

In 3rd clock: The real time of the clock is (10:10 – 10 minutes) = 10:00 *i.e.*, the bed time.

In 4th clock: The time shown by the clock is (5:00 – 2 hours) = 3:00 *i.e.*, not the bed time.

Therefore clock 3rd is showing the correct bed time among the four clocks.

CHAPTER 10 : MONEY

Let's Recall

1. (*a*)

	₹	1	2	4	.	6	7
+	₹		2	8	.	6	6
	₹	1	5	3	.	3	3

(*b*)

	₹	5	8	7	.	7	9
–	₹	2	4	3	.	4	5
	₹	3	4	4	.	3	4

(*c*)

	₹			2	8	8	.	8	8
×	₹							4	0
				0	0	0	0	0	0
+		1	1	5	5	5	2	0	
	₹	1	1	5	5	5	.	2	0

(*d*)

```
   199.99
9)1799.91(
 −9
   89
  −81
   89
  −81
   89
  −81
   81
  −81
    0
```

2. (*a*) Mr Rohan spent money on hotel stay = ₹ 5800

Money spent on transport = ₹ 3200

Money Spent on food = + ₹ 2850

Total amount spent on the trip = ₹ 11850

Discount on the hotel stay = ₹400

Total money spent by him = ₹11,850 – ₹400

= ₹11,450

Thus, he spent ₹11,450 on the trip.

Practice Time 10A

1. (*a*) Cost of 1 dozen erasers = ₹36

Cost of 1 eraser = ₹36 ÷ 12 = ₹3

(∵ 1 dozen = 12)

So, cost of 3 erasers = ₹3 × 3 = ₹9

(*b*) Cost of 6 erasers = ₹3 × 6 = ₹18

(*c*) Cost of 9 erasers = ₹3 × 9 = ₹27

2. Cost of 5 kg rice = ₹325

Cost of 1 kg rice = ₹325 ÷ 5 = ₹65

So, cost of 8 kg rice

= ₹65 × 8 = ₹520

Thus, the cost of 8 kg rice is ₹520.

```
   65
5)325(
 −30
   25
  −25
    0
```

```
   65
×   8
  520
```

3. Cost of 5 pens = ₹20

Cost of 1 pen = ₹20 ÷ 5 = ₹4

So, cost of 8 pens = ₹4 × 8 = ₹32

and cost of 15 pens = ₹4 × 15 = ₹60

Thus, the cost of 8 pens is ₹32 and cost of 15 pens is ₹60.

4. Cost of 35 apples = ₹245

Cost of 1 apple = ₹245 ÷ 35 = ₹7

So, the cost of 15 apples = ₹7 × 15 = ₹105

Thus, the cost of 15 apples is ₹105.

```
    7
35)245(
  −245
    0
```

```
   15
×   7
  105
```

5. Cost of 18 books = ₹2250

Cost of 1 book = ₹2250 ÷ 18

= ₹125

So, the cost of 4 books

= ₹125 × 4 = ₹500

```
   125
18)2250(
  −18
   45
  −36
   90
  −90
    0
```

```
   125
×    4
  500
```

6. Cost of 12 kg of onions = ₹72

Cost of 1 kg of onions = ₹72 ÷ 12 = ₹6

So, cost of 27 kg of onions = ₹6 × 27

= ₹162

Thus, the cost of 27 kg onions is ₹162.

```
   27
×   6
  162
```

7. Cost of 4 shirts = ₹600

Cost of 1 shirt = ₹600 ÷ 4 = ₹150

So, cost of 1 dozen shirts

= ₹150 × 12 = ₹1800 (∵ 1 dozen = 12)

Thus, the cost of 1 dozen shirts is ₹1800.

```
   150
4)600(
  −4
   20
  −20
    0
   −0
    0
```

8. Mr. Gupta earns in 9 months = ₹6,30,000

Mr Gupta earns in 1 month

= ₹6,30,000 ÷ 9 = ₹70,000

Mr Gupta earn in 3 years

= ₹70,000 × 36 = ₹2,520,000

(∵ 1 year = 12 months)

Thus, ₹25,20,000 he earn in 3 years.

```
   70000
9)630000(
 −63
    0
```

Quick Check (Page 204)

1. (*a*) CP = ₹85, SP = ₹90

(*b*) CP = ₹55, SP = ₹63

(*c*) CP = ₹150, SP = ₹180

Think and Answer (Page 207)

Cost of 1 dozen bananas = ₹60

Cost of 1 banana = ₹60 ÷ 12 = ₹5

(∵ 1 dozen = 12)

SP 3 bananas = ₹15

SP of 1 banana = ₹5

Since, CP = SP

Thus, the fruit seller earns no profit and no loss.

Practice Time 10 B

1. (*a*) (*i*) Profit = SP – CP

(*b*) (*iv*) CP = SP – Profit or CP = SP + Loss

(*c*) (*i*) CP is greater than SP, then there is loss.

(*d*) (*iii*) SP = ₹100, CP = ₹108

We have, SP < CP, there is a loss.

Since, loss = CP – SP = ₹108 – ₹100 = ₹8

2. (*a*) CP = ₹194, SP = ₹203.50 (Given)

Since, SP > CP, there is a profit.

Since, profit = SP – CP = ₹203.50 – ₹194

= ₹9.50

Thus, profit is ₹9.50.

(*b*) CP = ₹164.25, SP = ₹155.50 (Given)

Since, SP < CP, there is a loss

Since, loss = CP – SP = ₹164.25 – ₹155.50

= ₹8.75

Thus, loss is ₹8.75.

(*c*) CP = ₹670, SP = ₹987 (Given)

Since, SP > CP, there is a profit.

Since, profit = SP – CP = ₹987 – ₹670 = ₹317

Thus, profit is ₹317.

(*d*) CP = ₹1426.25, SP = ₹1412.50 (Given)

Since, SP < CP, there is a loss.

Since, loss = CP – SP = ₹1426.25 – ₹1412.50

= ₹13.75

Thus, loss is ₹13.75.

3. CP of a dress = ₹1850

SP of the dress = ₹2025

Profit = SP – CP = ₹2025 – ₹1850 = ₹175

[∵ SP > CP]

Thus, Sonam earns a profit of ₹175.

4. CP of an old car = ₹345000

Cost on repairing = ₹6250

Total CP of car = CP + cost on repairing

= ₹345000 + ₹6250 = ₹351250

New CP of car = ₹351250

SP of the car = ₹415500

We have, SP > CP, then there is a profit.

Since, Profit = SP – CP = ₹415500 – ₹351250

= ₹64250

Thus, Narayan earned a Profit of ₹64250.

5. (*a*) We have, SP = ₹195, loss = ₹18

Since, CP = SP + loss

CP = ₹195 + ₹18

CP = ₹213

(*b*) We have, Profit = ₹83, CP = ₹894

Since, SP = CP + profit

= ₹894 + ₹83 = ₹977

(*c*) We have, SP = ₹2980, Profit = ₹105

Since, CP = SP – Profit

= ₹2980 – ₹105 = ₹2875

(*d*) We have, Loss = ₹1150.75, CP = ₹9449

Since, SP = CP – loss

SP = ₹9449 – ₹1150.75 = ₹8298.25

(*e*) We have, SP = ₹4368, Profit = ₹1486

Since, CP = SP – Profit

= ₹4368 – ₹1486 = ₹2882

(*f*) We have, Loss = ₹1328, CP = ₹19000

Since, SP = CP – loss

= ₹19000 – ₹1328 = ₹17672

6. CP of a harmonium = ₹7490

Cost on transportation = ₹500

Total CP of harmonium = ₹7490 + ₹500 = ₹7990

SP = ₹8350

We have, SP > CP, there is a profit

Since, profit = SP – CP = ₹8350 – ₹7990

Profit = ₹360

Thus, Swami earned a profit of ₹360.

7. CP of a table fan = ₹2950, loss = ₹170

Since, SP = CP – loss

SP = ₹2950 – ₹170 = ₹2780

Thus, the selling price of the table fan is ₹2780.

Mental Maths (Page 208)

1. We have, CP = ₹1354, SP = ₹1005

SP < CP, there is a loss.

Since, loss = CP – SP = ₹1354 – ₹1005

Loss = ₹349

Thus, there is a loss and amount is ₹349.

2. We have, CP = ₹21350, Profit = ₹2000

Since, SP = CP + Profit

SP = ₹21350 + ₹2000

SP = ₹23350

Thus, the selling price is ₹23350.

3. We have, SP = ₹6724, loss = ₹500
Since, CP = SP + loss
= ₹6724 + ₹500 = ₹7224
Thus, the cost price is ₹7224.

4. We have, CP = ₹9702, SP = ₹10542
Since, SP > CP, there is a profit.
Profit = SP – CP = ₹10542 – ₹9702 = ₹840
Thus, there is a profit and amount is ₹840.

Brain Sizzlers (Page 208)

Cost of 2 dozen eggs = ₹108
Cost of 1 egg = ₹108 ÷ 24 = ₹4.5
(∵ 1 dozen = 12)
Number of rotten eggs = 6
Loss = ₹27
Number of remaining egges = 24 – 6 = 18
∴ SP = ₹108 – ₹27
SP = ₹81
Therefore, SP of 1 egg = ₹(81 ÷ 18) = ₹4.50
Thus, selling price of 1 egg was ₹4.50.

Chapter Assessment

1. (*a*) (*iii*) The cost of 6 eggs = ₹24
The cost of 1 egg = ₹24 ÷ 6 = ₹4
Required number of eggs = ₹64 ÷ 4 = ₹16
Thus, 16 eggs can be purchased for ₹64.

(*b*) (*ii*) 6 ball point pens = 1 fountain pen
4 ball point pens = 8 pencils.
So, 1 ballpoint pen = $\frac{8}{4}$ = 2 pencils.
So, 6 ballpoint pen = 6 × 2 = 12 pencils.
As, 1 fountain pen = 6 ball point pens = 12 pencils.
So, 4 fountain pen = 12 × 4 = 48 pencils.
Thus, 48 pencils have the same cost as 4 fountain pens.

(*c*) (*ii*) Ronnie earns in a week = ₹840
Ronnie earns in 1 day = ₹$\frac{840}{7}$ = ₹120
(∵ 1 week = 7 days)
He will earns in 36 days = 36 × 120 = ₹4320
Thus, he will earn ₹4320 in 36 days.

2. Shikha has two 500-rupee notes *i.e.*, ₹1000
Shikha can pick: Perfume + purse + earrings
= ₹300 + ₹500 + ₹200 = ₹1000
Or purse + sunglasses + earrings
= ₹500 + ₹100 + ₹200 = ₹800
Or dress + earrings
= ₹800 + ₹200 = ₹1000
(Answer may vary)

3. Cost price of 1 egg = ₹6
Cost price of 12 eggs = ₹6 × 12 = ₹72
Selling price of 1 egg = ₹4.50
So, cost of 12 eggs = ₹4.50 × 12 = ₹54.00 = ₹54
Since, 54 < 72
∴ SP < CP, there is a loss
Loss = ₹72 – ₹54 = ₹18.
Thus, total loss is of ₹18.

4. SP of 1 kg of tomato = ₹20
Loss = ₹5
Since, CP = SP + Loss
CP = ₹20 + ₹5 = ₹25
Thus, the cost price of tomatoes is ₹25.

5. CP of old car = ₹65,000
Cost on turn it into as good as new = ₹5,500
Total CP of car = ₹65,000 + ₹5,500 = ₹70,500
CP of car = ₹70,500
SP of car = ₹85,000
Since, profit = SP – CP
= ₹85,000 – 70,500 = ₹14,500
Thus, Rohan earned a profit of ₹14,500.

6. Cost of 1 shirt = ₹2,499
Rekha has four notes of ₹500 = ₹500 × 4 = ₹2000
More money she needed to buy a shirt
= ₹2499 – 2000 = ₹499
Thus, she need ₹499 more to buy that shirt.

7. Cost price of 1 horse = ₹25,000
Profit on each horse = ₹7500
Selling price of 1 horse = ₹25000 + ₹7500 = ₹32500
(∵ SP = CP + Profit)
and Profit an 10 horses *i.e.*, on total tansaction ₹7500 × 10 = ₹75000
Thus, selling price of each horse is ₹32500 and total profit in the entire transaction he made is ₹75000.

8. Physiotherapy per sitting charges = ₹750
Number of day in month of August = 31 days
Spent on his physiotherapy in month of August
= ₹750 × 31 = ₹23250
Thus, has he spent ₹23250 on his physiotherapy.

9. Cost of each plate of bhelpuri = ₹45
If she had 10 friends with her.
Cost of 10 plates of bhelpuri = ₹45 × 10 = ₹450
Thus, she spent ₹450 on bhelpuri.

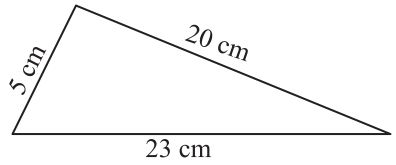
10. Cost price of a teddy-bear bought by Rani = ₹840
Rani bears a loss of ₹60
SP of teddy-bear for Rani = CP of same teddy-bear for Seema
∴ CP = ₹840 – ₹60 = ₹780
Seema sold it to Garima at a Profit of ₹50
∴ SP of teddy-bear for Seema = Cost price of teddy-bear for Garima
= ₹780 + ₹50 = ₹830.
Thus, the cost price of teddy-bear for Garima is ₹830.

11. Total quantity of apples a shopkeeper buys
= 20 kg
Cost of 20 kg apples = ₹1900
∴ Cost of 1 kg apple = $₹\frac{1900}{20}$ = ₹95
8 kg apples were sold at a loss of = ₹15 per kg
∴ Loss on 8 kg of apples = ₹15 × 8 kg = ₹120
Cost of 8 kg apples = ₹95 × 8 kg = ₹760
∴ Cost of 8 kg Apples after loss
= ₹760 – ₹120 = ₹640
Remaining quantity of apples
= 20 kg – 8 kg = 12 kg
∴ Cost of 12 kg apples = ₹95 × 12 kg = ₹1140
12 kg apples were sold at a profit of ₹20 per kg.
∴ Profit on 12 kg apples = 20 × 12 = ₹240
∴ Cost of 12 kg apples after profit
= ₹1140 + ₹240 = ₹1380
∴ Total transaction = ₹640 + ₹1380 = ₹2020.
Since; ₹2020 > ₹1900. Hence, there is a profit .
Thus, profit on total transaction
= ₹2020 – ₹1900 = ₹120.

CHAPTER 11 : PERIMETER, AREA AND VOLUME

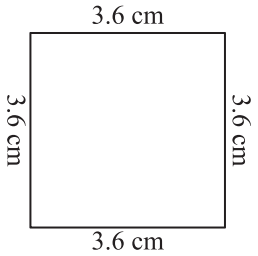
Let's Recall

1. (*a*)



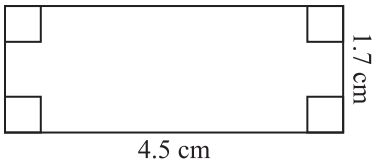
Perimeter = 5 cm + 20 cm + 23 cm = 48 cm

(*b*)



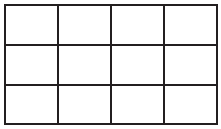
Perimeter = 3.6 cm + 3.6 cm + 3.6 cm + 3.6 cm
= 14.4 cm

(*c*)



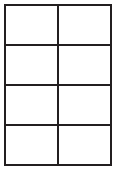
Perimeter of rectangle
= 1.7 cm + 1.7 cm + 4.5 cm + 4.5 cm
= 3.4 cm + 9 cm = 12.4 cm.

2. (*a*)



The given figure is a rectangle. And we know that,
Area of rectangle = length × breadth
Here, length = 4 units, breadth = 3 units
∴ Area = 4 units × 3 units = 12 sq. units

(*b*)



The given figure is a rectangle. And we know that, area of rectangle = length × breadth
Here, length = 4 units, breadth = 2 units
∴ Area = 4 units × 2 units = 8 sq. units

(*c*) 

The given figure is a square. And we know that,

Area of square = side × side

Here, side = 2 units

∴ Area = 2 × 2 units = 4 sq. units

Practice Time 11A

1. (*a*) length = 8 cm, breadth = 5 cm

Length of rectangle = 8 cm

Breadth of rectangle = 5 cm

Perimeter of rectangle = 2 (length + breadth)

= 2 (8 cm + 5 cm)

= 2 × 13 cm = 26 cm.

Hence, the perimeter of the rectangle is 26 cm.

(*b*) length = 56 cm, breadth = 24 cm

Length of rectangle = 56 cm

Breadth of rectangle = 24 cm

Perimeter of rectangle = 2 (length + breadth)

= 2 (56 cm + 24 cm)

= 2 × 80 cm = 160 cm.

Hence, the perimeter of the rectangle is 160 cm.

(*c*) length = 4.5 m, breadth = 1.2 m

Length of rectangle = 4.5 m

Breadth of rectangle = 1.2 m

Perimeter of rectangle = 2 (length + breadth)

= 2 (4.5 m + 1.2 m)

= 2 × 5.7 m = 11.4 m.

Hence, the perimeter of the rectangle is 11.4 m.

(*d*) length = 8.2 m, breadth = 250 cm

Length of rectangle = 8.2 m = 8.2 × 100 cm

= 820 cm

Breadth of rectangle = 250 cm

Perimeter of rectangle = 2 (length + breadth)

= 2 (820 cm + 250 cm)

= 2 × 1070 cm

= 2140 cm or 21.40 m

Hence, the perimeter of the rectangle is 2140 cm or 21.40 m

2. (*a*) 6 cm

Side of square = 6 cm

Perimeter of square = 4 × side = 4 × 6 cm

= 24 cm.

Hence, the perimeter of the square is 24 cm.

(*b*) 7.2 cm

Side of square = 7.2 cm

Perimeter of square = 4 × side = 4 × 7.2 cm

= 28.8 cm.

Hence, the perimeter of the square is 28.8 cm.

(*c*) 9 m

Side of square = 9 cm

Perimeter of square = 4 × side = 4 × 9 m

= 36 m.

Hence, the perimeter of the square is 36 m.

(*d*) 8.5 m

Side of square = 8.5 m

Perimeter of square = 4 × side = 4 × 8.5 m

= 34.0 m.

Hence, the perimeter of the square is 34 m.

3. (*a*) Sides of a triangle are 4 cm, 5 cm and 6 cm

Since, perimeter of the triangle

= Sum of its all sides

= 4 cm + 5 cm + 6 cm

= 15 cm.

Hence, the perimeter of the triangle is 15 cm.

(*b*) Sides of a triangle are 3.8 cm, 4.5 cm and 5.7 cm

Since, perimeter of the triangle

= Sum of its all sides

= 3.8 cm + 4.5 cm + 5.7 cm

= 14 cm.

Hence, the perimeter of the triangle is 14 cm.

(*c*) Sides of a triangle are 4.2 cm, 7 cm and 6.8 cm

Since, perimeter of the triangle

= Sum of its all sides

= 4.2 cm + 7 cm + 6.8 cm

= 18 cm.

Hence, the perimeter of the triangle is 18 cm.

(*d*) Sides of a triangle are 13 cm, 14 cm and 15 cm

Since, perimeter of the triangle

= Sum of its all sides

= 13 cm + 14 cm + 15 cm

= 42 cm.

Hence, the perimeter of the triangle is 42 cm.

4. (*a*) 6 cm

Side of an equilateral triangle = 6 cm.

perimeter of an equilateral triangle

= 3 × side = 3 × 6 cm = 18 cm

Hence, the perimeter of an equilateral triangle is 18 cm.

(*b*) 4.8 cm

Side of an equilateral triangle = 4.8 cm.

Perimeter of an equilateral triangle

$= 3 \times \text{side} = 3 \times 4.8 \text{ cm} = 14.4 \text{ cm}$

Hence, the perimeter of an equilateral triangle is 14.4 cm.

(*c*) 7 cm

Side of an equilateral triangle = 7 cm.

Perimeter of an equilateral triangle

$= 3 \times \text{side} = 3 \times 7 \text{ cm} = 21 \text{ cm}$

Hence, the perimeter of an equilateral triangle is 21 cm.

(*d*) 9.6 cm

Side of an equilateral triangle = 9.6 cm.

Perimeter of an equilateral triangle

$= 3 \times \text{side} = 3 \times 9.6 \text{ cm} = 28.8 \text{ cm}$

Hence, the perimeter of an equilateral triangle is 28.8 cm.

5. (*a*) - (*i*) We have, length = 4 cm, breadth = 7 cm

Since, perimeter of the rectangle

$= 2 (\text{length} + \text{breadth})$

$= 2 (4 \text{ cm} + 7 \text{ cm})$

$= 2 \times 11 \text{ cm} = 22 \text{ cm}.$

(*ii*) We have, length = 4.8 cm, breadth = 3.2 cm

Since, perimeter of the rectangle

$= 2 (\text{length} + \text{breadth})$

$= 2 (4.8 \text{ cm} + 3.2 \text{ cm})$

$= 2 \times 8.0 \text{ cm}$

$= 2 \times 8 \text{ cm}$

$= 16 \text{ cm}.$

(*iii*) We have, length = 7 cm

Perimeter of a rectangle = 24 cm

Since, perimeter of the rectangle

$= 2 (\text{length} + \text{breadth})$

$24 \text{ cm} = 2 (7 \text{ cm} + \text{breadth})$

$\frac{24 \text{ cm}}{2} = 7 \text{ cm} + \text{breadth}$

$12 \text{ cm} = 7 \text{ cm} + \text{breadth}$

$\text{Breadth} = 12 \text{ cm} - 7 \text{ cm}$

$\text{Breadth} = 5 \text{ cm}$

(*iv*) We have, breadth = 12 cm

Perimeter of a rectangle = 60 cm

Since, perimeter of the rectangle

$= 2 (\text{length} + \text{breadth})$

$60 \text{ cm} = 2 (\text{length} + 12 \text{ cm})$

$\frac{60 \text{ cm}}{2} = \text{length} + 12 \text{ cm}$

$30 \text{ cm} = \text{length} + 12 \text{ cm}$

$\text{Length} = 30 \text{ cm} - 12 \text{ cm}$

$\text{Length} = 18 \text{ cm}$

(*v*) We have, length $= 9\frac{1}{2} \text{ cm} = \frac{19}{2}$

$\text{Breadth} = 5\frac{1}{2} \text{ cm} = \frac{11}{2} \text{ cm}$

Since, perimeter of the rectangle

$= 2 (\text{length} + \text{breadth}) = 2\left(\frac{19}{2} \text{ cm} + \frac{11}{2} \text{ cm}\right)$

$= 2\left(\frac{19 \text{ cm} + 11 \text{ cm}}{2}\right) = 2 \times \frac{30}{2} \text{ cm} = 30 \text{ cm}$

(*vi*) We have, length = 5.5 cm

Perimeter of a rectangle = 21 cm

Since, perimeter of the rectangle

$= 2 (\text{length} + \text{breadth})$

$21 \text{ cm} = 2 (5.5 \text{ cm} + 12 \text{ cm})$

$\frac{21 \text{ cm}}{2} = 5.5 \text{ cm} + \text{breadth}$

$10.5 \text{ cm} = 5.5 \text{ cm} + \text{breadth}$

$\text{Breadth} = 10.5 \text{ cm} - 5.5 \text{ cm} = 5 \text{ cm}$

(*b*) - (*i*) We have, side of a square = 5 cm

Since, perimeter of the square $= 4 \times \text{side}$

$= 4 \times 5 \text{ cm}$

$= 20 \text{ cm}.$

(*ii*) We have, side of a square = 12.5 cm

Since, perimeter of the square $= 4 \times \text{side}$

$= 4 \times 12.5 \text{ cm}$

$= 50 \text{ cm}.$

(*iii*) We have, side of a square = 40 cm

Since, perimeter of the square $= 4 \times \text{side}$

$40 \text{ cm} = 4 \times \text{side}$

$\text{Side} = \frac{40}{4} \text{ cm} = 10 \text{ cm}.$

(*iv*) We have, side of a square $= 7\frac{1}{2} \text{ cm}$

Since, perimeter of the square $= 4 \times \text{side}$

$= 4 \times 7\frac{1}{2} \text{ cm} = 4 \times \frac{15}{2} \text{ cm} = 30 \text{ cm}.$

(*v*) We have, perimeter of a square = 90

Since, perimeter of the square = 4 × side

$$90 \text{ m} = 4 \times \text{side}$$

$$\text{Side} = \frac{90}{4} \text{ m} = 22.5 \text{ m}$$

(*vi*) Perimeter of a square = 19.6

Since, perimeter of the square = 4 × side

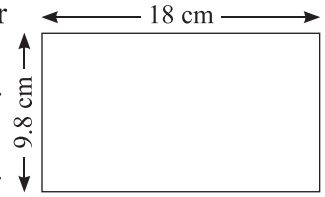
$$\therefore \quad 19.6 \text{ m} = 4 \times \text{side}$$

$$\text{Side} = \frac{19.6}{4} \text{ m}$$

$$\text{Side} = 4.9 \text{ m}$$

6. Length of rectangular cardboard = 18 cm

Breadth of rectangular cardboard = 9.8 cm



Perimeter of rectangular cardboard

= 2 (length + breadth)

= 2 (18 cm + 9.8 cm)

= 2 × 27.8 cm = 55.6 cm

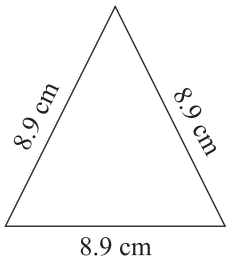
Hence, perimeter of rectangular cardboard is 55.6 cm

7. Side of an equilateral triangle = 8.9 cm

Perimeter of an equilateral triangle = 3 × side

= 3 × 8.9 cm

= 26.7 cm



Hence, perimeter of an equilateral triangle is 26.7 cm

8. Perimeter of a triangle = 24 cm

Let the first side = 4.9 cm, second side = 3.8 cm

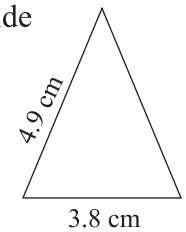
Since, perimeter of a triangle = Sum of its all sides

24 cm = 4.9 cm + 3.8 cm + third side

24 cm = 8.7 cm + third side

Third side = 24 cm – 8.7 cm

Third side = 15.3 cm



Hence, length of the third side of the triangle is 15.3 cm

9. Perimeter of a rectangular garden = 196 m

Breadth = 32 m

Since, perimeter of rectangular garden

= 2 × (length + breadth)

$$196 = 2 \times (\text{length} + \text{breadth})$$

$$\text{Length} + 32 \text{ m} = \frac{196}{2} \text{ m}$$

$$\text{Length} = 98 \text{ m} - 32 \text{ m} = 66 \text{ m}$$

10. Given sides of an isosceles triangle = 7.8 cm.

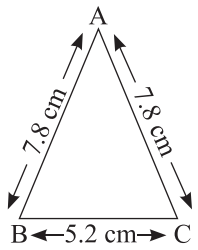
Length of third side = 5.2 cm.

Perimeter of given triangle

= Sum of its all sides

= (7.8 cm + 7.8 cm + 5.2 cm)

= 20.8 cm



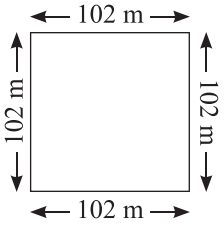
Hence, perimeter of an isosceles triangle is 20.8 cm

11. Side of a square park = 102 m

Since, perimeter of square park

= 4 × side = 4 × 102 m

= 408 m



Distance covered in 4 round around a square park

= 4 × 408 m

(∵ 1 round = 408 m)

= 1632 m or 1.632 km.

12. Since, fence around a square field = Perimeter of the square field = 308 m.

Since, perimeter of a square = 4 × side

$$\therefore \quad 308 = 4 \times \text{side}$$

$$\text{Side} = \frac{308}{4}$$

$$\text{Side} = 77 \text{ m}.$$

Cost of fencing at the rate of ₹28 per metre.

Cost of fencing = 308 × ₹28 = ₹8624.

Hence, length of each side of the square field is 77 m and cost of fencing is ₹8624.

Think and Answer (Page 218)

Given, Area of a square = Perimeter of the square

∵ Area of square = side × side and perimeter of square = 4 × side

Side × Side = 4 × Side

$$\therefore \quad \frac{\text{Side} \times \text{Side}}{\text{Side}} = 4$$

∴ Side = 4 units

Practice Time 11B

1. (*a*) Given: Length of a rectangle = 20 cm
Breadth of the rectangle = 12 cm
Since, area of a rectangle = length × breadth
∴ Area of the rectangle = 20 cm × 12 cm
= 240 sq. cm

(*b*) Given: Length of a rectangle = 11.5 cm
Breadth of the rectangle = 10 cm
Since, area of a rectangle = length × breadth
∴ Area of the rectangle = 11.5 cm × 10 cm
= 115 sq. cm

(*c*) Given: Length of a rectangle = 132 cm
Breadth of the rectangle = 80 cm
Since, area of a rectangle = length × breadth
∴ Area of the rectangle = 132 cm × 80 cm
= 10560 sq. cm

(*d*) Given: Length of a rectangle = 4.5 m

$$\text{Breadth of the rectangle} = 180 \text{ cm} = \frac{180}{100} \text{ m}$$

Since, area of a rectangle = length × breadth
∴ Area of the rectangle = 4.5 m × 1.8 m
= 8.1 sq. m

2. (*a*) Side of a square = 4.2 cm
Since, area of a square = side × side
∴ Area of the square = 4.2 cm × 4.2 cm
= 17.64 sq. cm

(*b*) Side of a square = 64 cm
Since, area of a square = side × side
∴ Area of the square = 64 cm × 64 cm
= 4096 sq. cm

(*c*) Side of a square = 8.5 m
Since, area of a square = side × side
∴ Area of the square = 8.5 m × 8.5 m
= 72.25 sq. m

(*d*) Side of a square = 6.2 cm
Since, area of a square = side × side
∴ Area of the square = 6.2 cm × 6.2 cm
= 38.44 sq. cm

3. (*a*) Given: Length of a rectangle = 9 cm
Breadth of the rectangle = 4.5 cm
Since, area of a rectangle = length × breadth
∴ Area of the rectangle = 9 cm × 4.5 cm
= 40.5 sq. cm

(*b*) Given: Breadth of rectangle = 32 cm
Area of the rectangle = 1600 sq. cm
Since, area of a rectangle = length × breadth
∴ 1600 sq. cm = length × 32 cm

$$\text{Length} = \frac{1600}{32} \text{ cm} = 50 \text{ cm}$$

(*c*) Given: Breadth of a rectangle = 15 cm
Area of the rectangle = 345 sq. cm
Since, area of a rectangle = length × breadth
∴ 345 sq. cm = length × 15 cm

$$\text{Length} = \frac{345}{15} \text{ cm} = 23 \text{ cm}$$

(*d*) Given: Length of a rectangle = 8.5 cm
Area of the rectangle = 51 sq. cm
Since, area of a rectangle = length × breadth
∴ 51 sq. cm = 8.5 cm × breadth

$$\text{Breadth} = \frac{51}{8.5} = \frac{510}{85} \text{ cm}$$

Breadth = 6 cm

4. (*a*) Area of the shaded part $= \frac{1}{2} \times$ Area of rectangle

$= \frac{1}{2} \times$ length × breadth $= \frac{1}{2} \times 3 \times 2$ units.

= 3 sq. units

(*b*) Area of the shaded part $= \frac{1}{2} \times$ Area of rectangle

$= \frac{1}{2} \times$ length × breadth $= \frac{1}{2} \times 4 \times 3$ units.

= 6 sq. units

(*c*) Area of the shaded part $= \frac{1}{2} \times$ Area of square

$= \frac{1}{2} \times$ side × side $= \frac{1}{2} \times 3 \times 3$ units

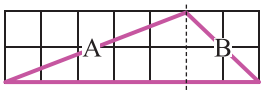
$= \frac{9}{2} = 4.5$ sq. units.

(*d*) Area of the shaded part $= \frac{1}{2} \times$ Area of rectangle

$= \frac{1}{2} \times$ length $\times$ breadth $= \frac{1}{2} \times 5 \times 3$ units.

$= \frac{15}{2} = 7.5$ sq. units.

5. (*a*) First, divide the figure into two parts as shown. Part A is a rectangle and part B is a square.



$\therefore$ Area of part A
= Area of rectangle
= $l \times b$
= 5 units $\times$ 2 units
= 10 sq. units

And, area of triangle in part A $= \frac{10 \text{ sq. units}}{2}$
= 5 sq. units.

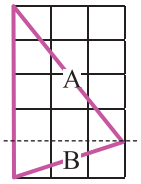
Area of part B = Area of square
= side $\times$ side
= 2 units $\times$ 2 units
= 4 sq. units

And, area of triangle in part B $= \frac{4 \text{ sq. units}}{2}$
= 2 sq. units

$\therefore$ Area of triangle in the given figure = Area of triangle in part A + Area of triangle in part B
Area of triangle in the given figure
= 5 sq. units + 2 sq. units
= 7 sq. units

(*b*) Same as above part.

(*c*) First, divide the figure into two parts as shown.



$\therefore$ Area of part A
= Area of rectangle
= $l \times b$
= 4 units $\times$ 3 units
= 12 sq. units

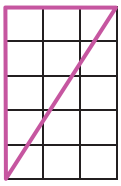
And, area of triangle in part A $= \frac{12 \text{ sq. units}}{2}$
= 6 sq. units

Area of part B = Area of rectangle
= $l \times b$
= 3 units $\times$ 1 units
= 3 sq. units

And, area of triangle $= \frac{3 \text{ sq. units}}{2} = 1.5$ sq. units

Thus, area of given triangle = Area of triangle in part A + Area of triangle in part B
= 6 sq. units + 1.5 sq. units = 7.5 sq. units

(*d*) Area of rectangle
= $l \times b$
= 5 units $\times$ 3 units
= 15 sq. units



And, area of triangle $= \frac{\text{Area of rectangle}}{2}$

$= \frac{15}{2}$ sq. units
= 7.5 sq. units

6. Perimeter of a square = 120 m.
Since, perimeter of a square = 4 $\times$ side
$\therefore$ 120 m = 4 $\times$ side

So, side $= \frac{120}{4}$ m = 30 m

Since, Area of square = side $\times$ side
= 30 m $\times$ 30 m
= 900 sq. m

7. Area of a rectangular plot = 2550 sq. m
Length of a rectangular plot = 75 m
Since, area of a rectangle = length $\times$ breadth
$\therefore$ 2550 sq. m = 75 $\times$ breadth

So, breadth $= \frac{2550}{75}$ m = 34 m

Thus, breadth of the rectangular plot is 34 m.

8. Length of a rectangle = 24 m and
Perimeter of the rectangle = 88 m
Since, perimeter of a rectangle = 2 $\times$ (length + breadth)
$\therefore$ 88 m = 2 $\times$ (24 m + breadth)

24 m + breadth $= \frac{88}{2}$ m

24 m + breadth = 44 m

Breadth = (44 – 24) m
= 20 m.

Since, area of a rectangle = length $\times$ breadth
= 24 m $\times$ 20 m
= 480 sq. m

9. Length of a rectangular hall = 650 cm

$$= \frac{650}{100} \text{ m} = 6.5 \text{ m}$$

Breadth of a rectangular hall = 450 cm

$$= \frac{450}{100} \text{ m} = 4.5 \text{ m}$$

Since, area of a rectangle = length × breadth

Area of the rectangular hall = 6.5 m × 4.5

= 29.25 sq. m

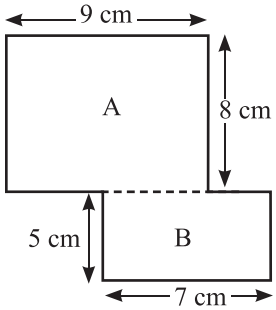
Cost of flooring of 1 sq. m = ₹30

Cost of flooring of 29.25 sq. m

= 29.25 sq. m × ₹30 = ₹877.5

Hence, the cost of flooring is ₹877.5.

10. (*a*)



Area of rectangle A = 9 cm × 8 cm = 72 sq. cm

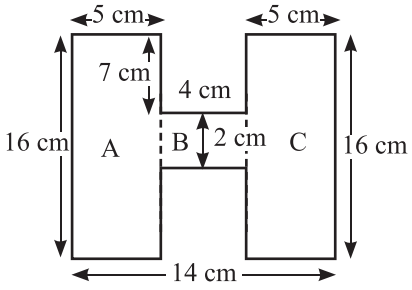
Area of rectangle B = 5 cm × 7 cm = 35 sq. cm

Thus, the area of the given shape

= Area of rectangle A + Area of rectangle B

= 72 sq. cm + 35 sq. cm = 107 sq. cm

(*b*)



Area of part A = length × breadth

= (16 × 5) sq. cm = 80 sq. cm

Area of part B = length × breadth

= (4 × 2) sq. cm = 8 sq. cm

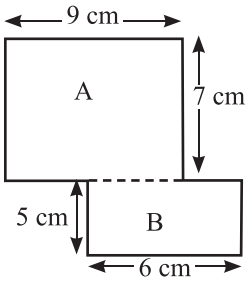
Area of part C = length × breadth

= (16 × 5) sq. cm = 80 sq. cm

Total area = (80 + 8 + 80) sq. cm

= 168 cm

(*c*)



Area of figure A = 9 cm × 7 cm = 63 sq. cm

Area of figure B = 5 cm × 6 cm = 30 sq. cm

Thus, the area of the given shape

= Area of rectangle A + Area of rectangle B.

= 63 sq. cm + 30 sq. cm

= 93 sq. cm

Practice Time 11C

1. In the given figure, number of complete squares (m) = 133

Number of more than half squares (n) = 17

Number of half squares (p) = 2

Total area of the irregular closed figure

$$= m + n + \frac{1}{2}p = \left(133 + 17 + \frac{2}{2}\right) \text{ sq. units}$$

= (133 + 17 + 1) = sq. units

= 151 sq. units

2. In the given figure, number of complete squares m = 23

Number of more than half squares n = 9

Number of half squares p = 6

Total area of the irregular closed figure

$$= m + n + \frac{1}{2}p = \left(23 + 9 + \frac{0}{2}\right) \text{sq. units}$$

= (23 + 9 + 3) = sq. units

= 35 sq. units

3. In the given figure, number of complete squares (m) = 42

Number of more than half squares (n) = 14

Number of half squares (p) = 0

Total area of the irregular closed figure

$$= m + n + \frac{1}{2}p = \left(42 + 14 + \frac{0}{2}\right) \text{sq. units}$$

= 56 sq. units

4. In the given figure, number of complete squares $(m) = 120$

Number of more than half squares $(n) = 16$

Number of half squares $p = 0$

Total area of the irregular closed figure

$$= m + n + \frac{1}{2}p = \left(120 + 16 + \frac{0}{2}\right) \text{sq. units}$$

$= 136$ sq. units

5. and **6.** Same as above.

Practice Time 11D

1. (*a*) The given solid shape is made up of 8 unit cubes of 1 unit.

So, the volume of the solid shape is 8 cu. units.

(*b*) The given solid shape is made up of 7 unit cubes of 1 unit.

So, the volume of the solid shape is 7 cu. units.

(*c*) The given solid shape is made up of 10 cu. unit of 1 unit.

So, the volume of the solid shape is 10 cu. units.

(*d*) The given solid shape is made up of 9 cu. unit of 1 unit.

So, the volume of the solid shape is 9 cu. units.

2. (*a*) Volume of the cuboid
= length × breadth × height
= 15 cm × 6 cm × 8.5 cm = 765 cu. cm

(*b*) Volume of the cuboid
= length × breadth × height
= 5 cm × 2.5 cm × 1 cm = 12.5 cu. cm

(*c*) Volume of the cube
= side × side × side
= 12 cm × 12 cm × 12 cm = 1728 cu. cm

3. (*a*) Given, length = 11 cm, breadth = 12 cm, height = 8 cm

Volume of the cuboid
= length × breadth × height
= 11 cm × 12 cm × 8 cm
= 1056 cu. cm

(*b*) Given, length = 5 m, breadth = 2.5 m, height = 2 m

Volume of the cuboid
= length × breadth × height
= 5 m × 2.5 m × 2 m
= 25 cu. m

(*c*) Given, length = 180 mm, breadth = 78 mm, height = 45 mm

Volume of the cuboid
= length × breadth × height
= 180 mm × 78 m × 45 mm
= 631800 cu. mm

(*d*) Given, length = 4.2 m, breadth = 1.8 m,

$$\text{height} = 60 \text{ cm} = \frac{60}{100} \text{ m} = 0.6 \text{ m}$$

Volume of the cuboid
= length × breadth × height
= 4.2 m × 1.8 m × 0.6 m
= 4.536 cu. m

4. (*a*) Given, side = 18 mm

Since, volume of cube = side × side × side
= 18 mm × 18 mm × 18 mm
= 5832 cu. mm

(*b*) Given, side = 12 cm

Since, volume of cube = side × side × side
= 12 cm × 12 cm × 12 cm
= 1728 cu. cm

(*c*) Given, side = 3 m

Since, volume of cube = side × side × side
= 3 cm × 3 m × 3 m
= 27 cu. m

(*d*) Given, side = 1.05 cm

Since, volume of cube = side × side × side
= 1.05 cm × 1.05 cm × 1.05 cm
= 1.157625 cu. cm

(*e*) Given, side = 28 mm

Since, volume of cube = side × side × side
= 28 mm × 28 mm × 28 mm
= 21952 cu. mm

5. (*a*) Given, length = 3.5 m, breadth = 5 m, height = 2 m

Since, volume of cuboid
= length × breadth × height

$\therefore$ Volume of cuboid = 3.5 m × 5 m × 2 m
= 35 cu. m

(*b*) Given, length = 5 cm, breadth = 4 cm, volume = 140 cu. cm

Since, volume of cuboid
= length × breadth × height

140 cu. cm = 5 cm × 4 cm × height

$$\text{Height} = \frac{140 \text{ cu. cm}}{5 \text{ cm} \times 4 \text{ cm}} = \frac{140}{20} \text{ cm} = 7 \text{ cm}$$

$\therefore$ Height = 7 cm

(*c*) Given, length = 12 cm, height = 7 cm, volume = 420 cu. cm

Since, volume of cuboid = length × breadth × height

420 cu. cm = 12 cm × breadth × 7 cm

$$\text{Breadth} = \frac{420 \text{ cu. cm}}{12 \text{ cm} \times 7 \text{ cm}} = \frac{420}{84} \text{ cm}$$

= 5 cm

(*d*) Given, breadth = 9 m, height = 10 m, volume = 1080 cu. cm

Since, volume of cuboid = length × breadth × height

1080 cu. cm = length × 9 m × 10 m

$$\text{Length} = \frac{1080 \text{ cu. m}}{9 \text{ m} \times 10 \text{ m}} = \frac{1080}{90} = 12 \text{ m}$$

6. Given, length of the brick = 24 cm

Breadth of the brick = 12 cm

Height of the brick = 8 cm

Volume = length × breadth × height

$\therefore$ Since, volume of the brick of shape cuboid

= 24 cm × 12 cm × 8 cm

= 2304 cu. cm

7. Side of cubical a tank = 3.2 m

Since, volume of a cube = side × side × side

= 3.2 m × 3.2 m × 3.2 m

= 32.768 cu. m

8. Given, volume of the cuboidal box = 196 cu. cm, Length of the cuboidal box = 14 cm, Breadth of the cuboidal box = 7 cm

Since, volume of a cuboid = length × breadth × height

$\therefore$ 196 cu. cm = 14 cm × 7 cm × height

$$\text{Height} = \frac{196 \text{ cu. cm}}{14 \text{ cm} \times 7 \text{ cm}} = 2 \text{ cm.}$$

Mental Maths (Page 227)

Area of part A = 3 × 3 = 9 sq. units

Area of part B = 3 × 2 = 6 sq. units

Area of part C = 5 × 3 = 15 sq. units

Area of part D = 6 × 3 = 18 sq. units

$$\text{Area of part E} = \frac{1}{2}(3 \times 5) + \frac{1}{2}(3 \times 5)$$

= 15 sq. units

$$\text{Area of part F} = \frac{1}{2} \times 3 \times 5$$

= 7.5 sq. units

$$\text{Area of part G} = \frac{1}{2} \times 3 \times 4$$

= 6 sq. units

$$\text{Area of part H} = \frac{1}{2} \times 3 \times 4 + \frac{1}{2} \times 2 \times 3$$

= 9 sq. units

$$\text{Area of part I} = \frac{1}{2} \times 2 \times 3 + \frac{1}{2} \times 4 \times 3$$

= 9 sq. units

$$\text{Area of part J} = \frac{1}{2} \times 4 \times 3$$

= 6 sq. units

$$\text{Area of part K} = \frac{1}{2} \times 5 \times 3$$

= 7.5 sq. units

Area (in sq. units)	15	7.5	18	9	6
Shapes	C, E	F, K	D	A, H, I	B, G, J

Maths Connect (Page 228)

1. Perimeter of the building = 2 (length + breadth)

= 2 (209 m + 75 m)

= 2 × 284 m = 568 m

2. Area of the roof of the building = length × breadth

= 209 m × 75 m

= 15675 sq. m

3. Area of the front door = length × breadth

= 6 m × 1.6 m

= 9.6 sq. m

4. Area of the window = side × side

= 1.2 m × 1.2 m

= 1.44 sq. m

5. Area of the compound = length × breadth

= 310 m × 100 m

= 31000 sq. m

Chapter Assessment

1. (*a*) - (*iii*) Given, area of square = 100 sq. units

Since, area of square = side × side

$\therefore$ 100 sq. units = side × side

or Side × Side = 100 sq. units.

Side × Side = 10 × 10 sq. units

on comparing , we get

Side = 10

We have, Perimeter of square = 4 × side

= 4 × 10 units

= 40 units

(*b*) - (*iv*) Perimeter of each square = 4 units (given)

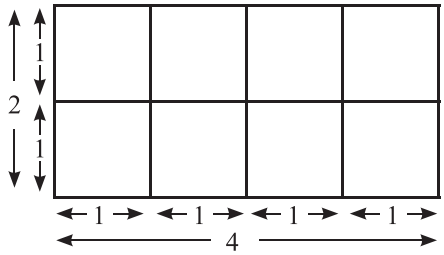
And we know that, perimeter of a square = 4 × side

∴ 4 unit = 4 × side

$\text{Side} = \frac{4}{4}$ units

∴ Side = 1 units.

Now, length of rectangle formed with eight squares = 4 units (given)



∴ Breadth = 2 units.

And we know that, perimeter of a rectangle

= 2 × (*l* + *b*)

∴ Perimeter of the new rectangle = 2 × (4 + 2)

= 2 × 6

= 12 units

(*c*) - (*ii*) Given, length – breadth = 8 cm and perimeter = 64 cm

So, length = breadth + 8 cm — (*i*)

Perimeter of the rectangle = 64 cm

Perimeter of rectangle = 2 (length + breadth)

64 cm = 2 (B + 8 cm + B)

64 cm = 2 (2B + 8 cm)

$2B + 8 = \frac{64}{2}$ cm = 2B + 8

= 32 cm

∴ 2B = 32 cm – 8 cm = 24 cm

$B = \frac{24}{2}$ cm = 12 cm

from (*i*), L = B + 8 cm

L = 12 cm + 8 cm = 20 cm

Hence, dimensions of rectangle = L = 20 cm and B = 12 cm.

(*d*) - (*i*) Square area of each square = 1 sq. m

Now, Counting the number of squares in the given figure, we get, number of squares = 21

∴ Area of shaded portion = 21 sq. m

(*e*) - (*iii*) The total number of cubes of 2 cm which can be packed, in a cubical box of 6 cm

$\frac{\text{Volume of cubical box}}{\text{Volume cube box}} = \frac{6 \times 6 \times 6}{2 \times 2 \times 2} = 27$

Thus, 27 cubes can be packed in a cubical box of 6 cm.

(*f*) - (*iii*) Side of bigger cube = 2 m

= 2 × 100 cm [∵ 1 m = 100 cm]

= 200

Side of smaller cube = 20 cm

Number of cubes that can be packed inside big cube = $\frac{\text{Volume of bigger cube}}{\text{Volume of smaller cube}}$

$= \frac{200 \times 200 \times 200}{20 \times 20 \times 20} = 1000$

[∵ Volume of cube = side × side × side]

Thus, 1000 small cubes packed inside the bigger cube.

2. Side of a square carpet = 40 cm

Area of square carpet = 40 cm × 40 cm

= 1600 sq. cm

[∵ Area of square = side × side]

Area of room = 16 m × 10 m

[∵ Area of rectangle = length × breadth]

= 1600 cm × 1000 cm

[∵ 1 m = 100 cm]

Number of square carpets = $\frac{1600000}{1600} = 1000$

3. Length of a rectangular park = 0.14 km

= 0.14 × 1000 m

[∵ 1 km = 1000 m]

= 140 m

Breadth of the rectangular park = 80 m

Perimeter of the park = $2(l + b) = 2(140 + 80)$ m

$= 2 \times 220$ m $= 440$ m.

Wire required to fencing the park in three rounds

$= 3 \times 440$ m $= 1320$ m

Cost of fencing 1 m wire = ₹220

∴ Cost of fencing the park = 1320 m × ₹2.20

= ₹2904

4. Length of the garden = 340 m

Breadth of the garden = 80 m

∴ Area of the garden = 340 m × 80 m

= 27200 sq. m

Side of square flower bed = 8 m

∴ Area of square flower bed = 8 m × 8 m

= 64 sq. m

∴ Required Number of flower beds

$= \frac{27200}{64} = 425$

Hence, 425 flower beds can be formed.

5. Length of the block = 25 cm.

Breadth of the block = 12 cm

∴ Area of the block = length × breadth

= 25 × 12 sq. cm

Length of the path = 12.5 m = 12.5 × 100 cm

= 1250 cm

Breadth of the path = 4.8 m = 4.8 × 100 cm

= 480 cm

∴ Required number of blocks $= \frac{\text{Area of path}}{\text{Area of block}}$

$= \frac{1250 \times 480}{25 \times 12} = \frac{600000}{300} = 2000$ blocks

6. Length of the room = 4 m 50 cm = 4.5 m

Side of the room = 6 m

Area of the room = 4.5 m × 6 m = 27 sq. m

Area of 4 walls = 27 × 4 sq. m = 108 sq. m

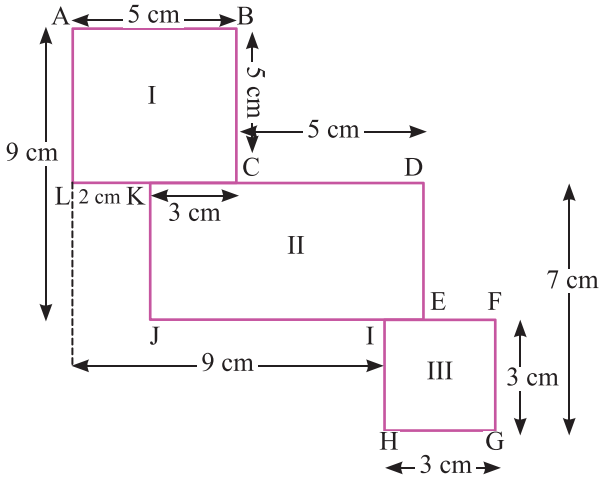
Cost of painting per sq. m is ₹10

∴ Cost of painting the 4 walls

= ₹10 × 108 = ₹1080

Thus, cost of the painting is ₹1080.

7.



Perimeter of given figure = sum of all the sides

∴ Perimeter of given figure = AB + BC + CD + DE + EF + FG + GH + HI + IJ + JK + KL + LA

= 5 + 5 + 5 + (7 – 3) + [(9 + HG) – (AB + CD)] + 3 + 3 + 3 + (9 – KL) + (9 – 5) + (LC – KC) + 5

= 15 + 4 + [(9 + 3) – (5 + 5)] + 9 + (9 – KL) + 4 + (5 – 3) + 5

= 19 + 2 + 9 + 7 + 4 + 2 + 5 = 48 cm.

Now, Area of 1st square = side × side

= 5 cm × 5 cm = 25 sq. cm

Area of rectangle = length × breadth

= 8 cm × 4 cm = 32 sq. cm

Area of 2nd square = side × side

= 3 cm × 3 cm = 9 sq. cm

∴ Area of the given figure = Area of 1st square + Area of rectangle + Area of 2nd square.

= (25 + 32 + 9) sq. cm

= 66 sq. cm

Hence, Perimeter = 48 cm and Area = 66 sq. cm

8. Side of a cubes = 5 unit.

Volume of cube = side × side × side = 5 × 5 × 5

= 125 cu. units

Number of cubes in 1st level = 5 × 5 = 25

Number of cubes in 2nd level

= 5 × 2 + 3 × 1 + 2 × 2

= 10 +3 + 4 = 17

Number of cubes in third level = 2 × 2 = 4

Total number of cubes = 25 + 17 + 4 = 46 cubes

Number of cubes needed to get the cube of dimensions 5 × 5 × 5 = (125 – 46)

= 79 units cubes

9. Given, volume of the cuboid = 3000 cu. m

Area of the base = 300 sq. m

$\because$ Volume of cuboid = $l \times b \times h$

($\because$ Area of base = $l \times b$)

$3000 = 300 \times h$

$h = \frac{3000}{300}$ m = 10 m.

Thus, height of the cuboid is 10 m.

10. Given, Area of base = 1360 sq. cm,

Height = 12 cm

We have, volume of cuboid = $l \times b \times h$

= Area of base × h

= 1360 sq. cm × 12 cm

= 16320 cu. cm

Thus, volume of the box is 16320 cu. cm

11. Side of the cube = 10 m

Volume of the cube = side × side × side

= 10 m × 10 m × 10 m

= 1000 cu. m

According to question,

Volume of cuboid = 5 × 1000 cu. m = 5000 cu. m

Hence, volume of the cuboid is 5000 cu. m.

12. Length of the tank = 60 cm, breadth = 30 cm and height = 45 cm

Volume of the tank = length × breadth × height

= 60 cm × 30 cm × 45 cm

= 81000 cu. cm

Volume of cubical fish tank filled with water

$= \frac{2}{3} \times 81000$ cu. cm = 27000 × 2 cu. cm

= 54000 cu. cm

Volume of the unfilled portion of the tank

= Volume of tank – Volume of tank filled the water

= 81000 cu. cm – 54000 cu. cm

= 27000 cu. cm.

13. Given, length of the bricks = 15 cm, breadth = 6 cm and height = 3 cm

Since, the brick is in the shape of a cuboid.

$\therefore$ Volume of the brick = 15 cm × 6 cm × 3 cm

Given: Length of the wall = 45 m, breadth = 12 m, height = 5 m.

$\because$ Volume of the wall = $l \times b \times h$

= 45 m × 12 m × 5 m

= 4500 cm × 1200 cm × 500 cm

$\therefore$ Required number of bricks

$= \frac{\text{Volume of the wall}}{\text{Volume of the brick}}$

$= \frac{4500 \text{ cm} \times 1200 \text{ cm} \times 500 \text{ cm}}{15 \text{ cm} \times 6 \text{ cm} \times 3 \text{ cm}}$

$= \frac{2700000000 \text{ cu. cm}}{270 \text{ cu. cm}}$

= 1,00,00,000

Hence, the required number of bricks is 1,00,00,000.

14. Length of Siya's lunch box = 10 cm,

breadth = 8 cm and height = 6 cm

$\therefore$ Volume of Siya's lunch box = $l \times b \times h$

= 10 cm × 8 cm × 6 cm = 480 cu. cm

Length of Swati's lunch box = 12 cm,

breadth = 9 cm and height = 4 cm

$\therefore$ Volume of Swati's lunch box = $l \times b \times h$

[$\because$ Lunch box is in the cuboidal shape]

= 12 cm × 9 cm × 4 cm = 432 cu. cm

Since, 480 cu. cm > 432 cu. cm

Hence, Siya's lunch box is bigger in size.

Brain Sizzler's (Page 230)

1. Dimensions of plastic box = 10 cm, 3 cm and 5 cm.

Volume of plastic box = 10 cm × 3 cm × 5 cm

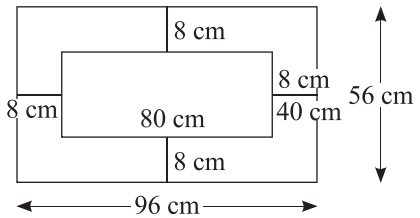
= 150 cu. cm

Since, 1 cubic cm can hold 5 grans of sugar.

So, weight of sugar = 150 × 5 g = 750 grams.

Hence, 750 grams of sugar the box can hold.

2.



Length of the table with cloth = (80 + 8 + 8) cm

= 96 cm

Width of the table with cloth = (40 + 8 + 8) cm

= 56 cm

Area of the table with cloth = length × breadth

= (96 cm × 56 cm) = 5376 sq. cm

Area of the table cloth = $l \times b$

= (80 × 40) sq. cm = 3200 sq. cm

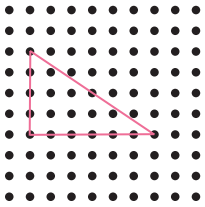
Area of the table not covered by the cloth

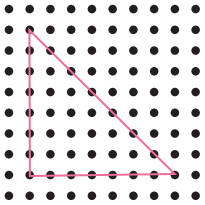
= 5376 sq. cm – 3200 sq. cm = 2176 sq. cm

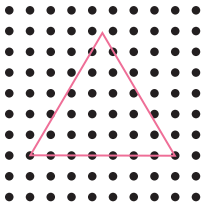
CHAPTER 12 : VISUALISATION OF 3D OBJECTS AND MAPS

Let's Recall

1. (*b*) and (*c*) can be folded to form a cuboid

2. (*a*) 

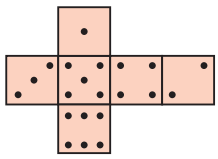
(*b*) 

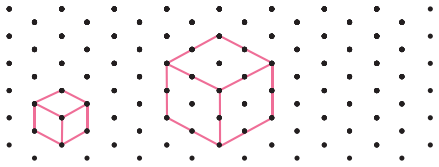
(*c*) 

Practice Time 12A

1. (*b*) and (*d*) are nets of a cube

2. (*a*) - (*iii*) (*b*) - (*iv*) (*c*) - (*i*)
(*d*) - (*ii*) (*e*) - (*v*)

3. 

4. 

(*i*) (*ii*) (*iii*)

Practice Time 12B

2. (*a*) (*i*) Front view
(*ii*) Top view
(*iii*) Side view

(*b*) (*i*) Front view
(*ii*) Side view
(*iii*) Top view

(*c*) (*i*) Side view
(*ii*) Front view
(*iii*) Top view

Practice Time 12C

1. (*b*) Panchkuian Road goes in north-west direction from the Connaught Place.
(*c*) Underground Parking
(*d*) We can see 6 blocks A, B, C, D, E and F with the inner circle.
(*e*) Take Janpath road and turn right from the outer circle then take left turn on Parliament street. Now, take right turn on Hanuman Road to reach Gurudwara.
(*f*) Baba Kharak Singh Marg.

2. (*a*) Distance of Dinesh's house from nursing home = 1 km
and distance of nursing home to Neha's House = 2 km
∴ Total distance = 1 km + 2 km = 3 km.

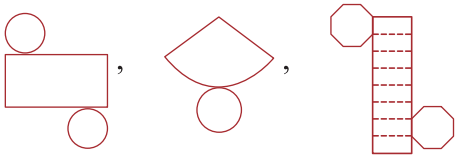
(*b*) Distance of Super Market to Maya's house = 500 m
and distance of Maya's house to Zoya's house = 5 km
Total distance = 500 m + 5 km = 5.5 km.

(*c*) Zoya covered the longest distance *i.e.*, 4 km to reach the school.

(*d*) Maya's house is farthest from the park *i.e.*, 2 km + 5 km = 7 km

Chapter Assessment

1. Option (c) can be folded to make cubes.

2. Shapes 

3. (*a*) When the objects approach the Vanishing Point, they appear smaller.
(*b*) 2D figures have only one perspective.
(*c*) 3D objects have many Perspective.
(*d*) A compass helps us find a direction.

4. (*a*) (*i*) Top view
(*ii*) Front view
(*iii*) Side view

(*b*) (*i*) Front view
(*ii*) Top view
(*iii*) Side view

(*c*) (*i*) Top view
(*ii*) Side view
(*iii*) Side view

5. (*a*) A Circle is above the horizon line.
(*b*) A Rectangle is on the horizon line.
(*c*) A Circle is below the horizon line.

6. (*a*) Valsad is the southern most town of Gujarat.
(*b*) Mehsana is the immediate east of Patan.
(*c*) Kachchh is in the western most of Gujarat.
(*d*) South-east direction.

7. (*a*) The shortest distance between house A-55 and A-53 is of 5 cm or 750 m. ($\because$ 1 cm = 150 m)
(*b*) The least distance that the postman can travel from A-52 to A-54 via A-51 then finally A-56 via A-54 = 2.5 cm + 2.5 cm + 2 cm 7 cm or 1050 m or 1 km 50 m.

CHAPTER 13 : DATA HANDLING

1. 20 students like rope climbing.

2. Bungee jumping is the most preferred adventure activity.

3. Boating is the least preferred adventure activity.

4. Number of students who like bungee jumping
= 7 × 5 = 35 students
Number of students who like giant wheel
= 6 × 5 = 30 students.
Thus total number of students who likes both
= (35 + 30) students = 65 students

5. Number of students who like dancing car
= 5 × 5 = 25 students.
Number of students who like rope climbing
= 4 × 5 = 20 students.
Difference between their number of students
= 25 students – 20 students
= 5 students.

6. Total number of students in class V = 24 × 5 = 120 students .
Thus, 120 students are there in class V.

Think and Answer (Page 251)

1. There are 5 students who likes red colour.

2. There are 2 students who likes yellow colour.

3. White colour is the least favourite colour.

4. Blue is the most favourite colour of the students.

Practice Time 13A

1.

Fruits	Tally marks	Number of students
Mango	𝍸	6
Banana	𝍸 |||	**8**
Apple	||||	4
Papaya	𝍸 ||||	**9**
Orange	𝍸 𝍸	**10**
Grapes	𝍸 𝍸 𝍸 |	16

2. (*a*) Dancing and watching TV are liked the most by the students.
(*b*) Reading is liked the least.
(*c*) 3 students like reading.
(*d*) The student who like singing, dancing and painting are (5 + 9 + 7) = 21.
(*e*) Number of students who likes watching TV = 9.
Number of students who likes swimming = 5.
$\therefore$ Their difference = 9 – 5 = 4.

3.

Car colour	Tally marks	Number
Red	𝍸 ||	7
Green	𝍸 |||	8
White	𝍸 𝍸	10
Blue	𝍸	5
Yellow	𝍸 |	6
Silver	||	2
Black	||	2
		Total = 40

(*a*) Priya counts 10 white cars.
(*b*) Priya counts 8 green cars.
(*c*) The most popular car colur she counted was white.

4.

Weight (in kg)	Tally marks	Number
40	||||	4
43	||	2
47	||||	4
53	||||	4
55	|||	3
57	|||	3
		Total = 20

Practice Time 13B

1. (*a*) Graph represents the sales of TV sets by 2 dealer in a particular week.

(*b*) Scale : 1 square unit = 2 TV sets

(*c*) 16 TV sets were sold on Wednesday.

(*d*) The least sell of TV sets were on Friday and Saturday.

(*e*) The highest sell of TV sets was on Sunday.

(*f*) Total sells of TV sets during the week

$= 10 + 16 + 16 + 8 + 6 + 6 + 20 = 82.$

2. (*a*) ₹6000 is spent on education.

(*b*) Least money is spent on others expenses.

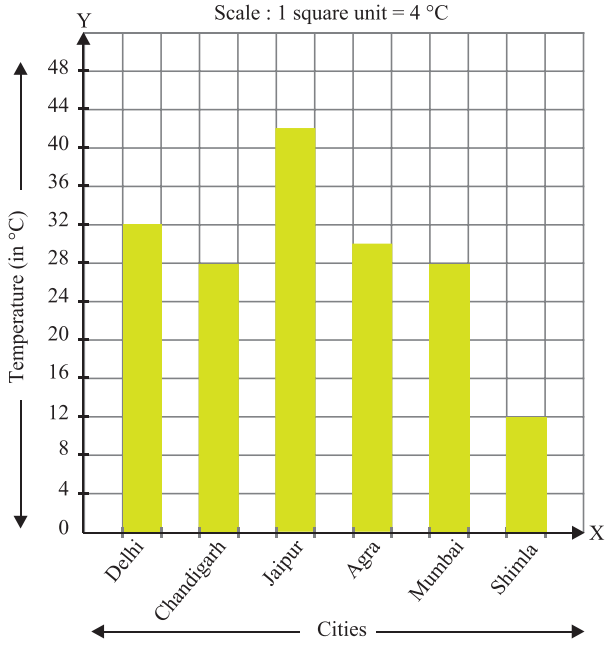
(*c*) Total money spent in a month

= ₹4000 + ₹5000 + ₹6000 + ₹3000 + ₹2000

= ₹20000.

(*d*) Maximum money is spent on education.

3.



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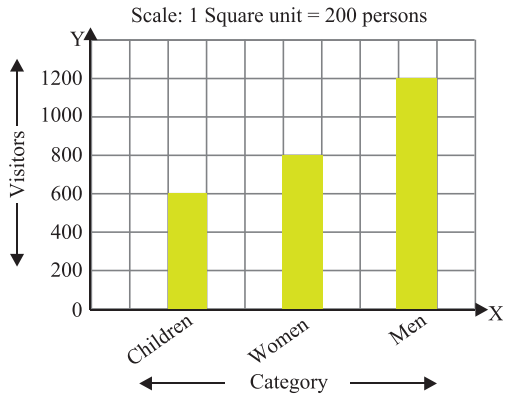

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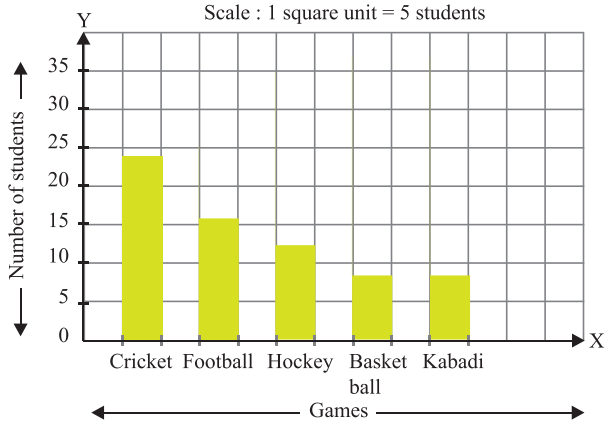


Practice Time 13C

1. (*a*) Spring season is most popular among the students.

(*b*) $\frac{1}{4}$ of the students like Autumn season.

(*c*) Winter and Summer seasons are equally popular.

(*d*) Autumn season is favourite for $\frac{1}{4}$ of students.

2. First find the total number of students

$= 10 + 6 + 6 + 3 + 5 = 30$

Fraction of children whose hobby is to dance

$= \frac{10}{30} = \frac{1}{3}$

Fraction of children whose hobby is to listening music $= \frac{6}{30} = \frac{1}{5}$

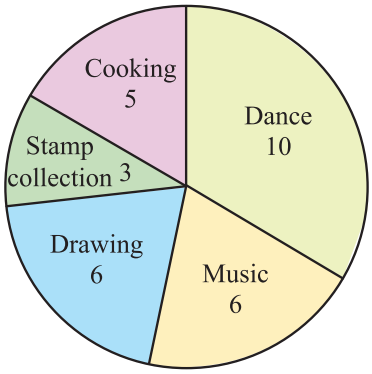
Fraction of children whose hobby is drawing

$= \frac{6}{30} = \frac{1}{5}$

Fraction of children whose hobby is stamp collection $= \frac{3}{30} = \frac{1}{10}$

Fraction of children whose hobby is cooking

$= \frac{5}{30} = \frac{1}{6}$



3. First find the total number of children = 4 + 8 + 3 + 6 + 3 = 24

$\therefore$ Fraction of students who like to watch action movies = $\frac{4}{24}$.

$\therefore$ Fraction of students who like to watch Cartoon movies = $\frac{8}{24}$.

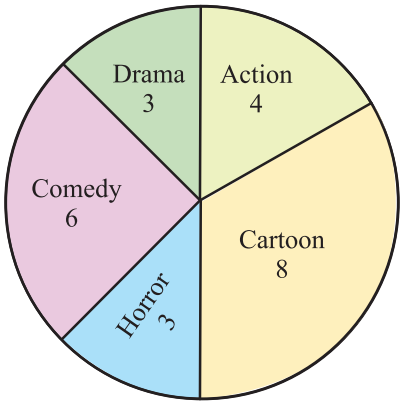
$\therefore$ Fraction of students who like to watch horror movies = $\frac{3}{24}$.

$\therefore$ Fraction of students who like to watch comedy movies = $\frac{6}{24}$.

$\therefore$ Fraction of students who like to watch drama movies = $\frac{3}{24}$.

The denominator of each corresponding fraction is equal.

Now, divide a circle into 24 equal parts and shade its 4 parts for action, 8 parts for cartoon, 3 parts for horror, 6 parts for comedy and 3 parts for drama movies as shown in the circle graph given below.



Brain Sizzlers (Page 259)

Total number of children = 100

Sum of fractions showing liking of fruits except orange

$= \frac{1}{5} + \frac{3}{10} + \frac{1}{4} + \frac{1}{10}$

LCM of 5, 10, 4 and 10

$= 2 \times 2 \times 5 = 20$

$= \frac{4 + 6 + 5 + 2}{20} = \frac{17}{20}$

2	5, 10, 4, 10
2	5, 5, 2, 5
5	5, 5, 1, 5
	1, 1, 1, 1

So, number of children who likes fruits except oranges

$= \frac{17}{20} \times 100 = 85$

So, number of children who like oranges

$= 100 - 85 = 15$

Thus, 15 children like oranges.

Chapter Assessment

1. (*a*) - (*iv*) The quantity of bananas sold (in kg)

$= \frac{1200}{2}$ kg = 600 kg

(*b*) - (*i*) Sale of grapes in a day = $\frac{1200}{8}$ kg

= 150 kg

Sale of oranges in a day = $\frac{1200}{8}$ kg = 150 kg.

$\therefore$ The difference between the sales of grapes and oranges = 150 kg – 150 kg = 0 kg.

(*c*) - (*ii*) Total fruit were sold in a day = 1000 kg.

$\therefore$ The quantity of apples sold in that day = $\frac{1000}{4}$ kg = 250 kg

2. (*a*) Any information in the form of numbers or figures are called data.

(*b*) Representation of data using rectangles is called a bar graph.

(*c*) Other name of pie chart is a circle graph.

(*d*) Tally marks come in groups of five.

3.

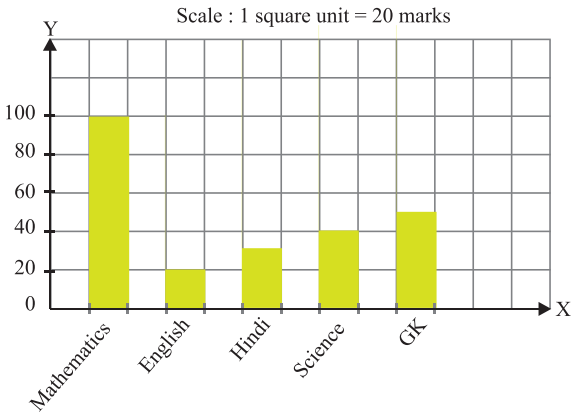
Weight (in kg)	Tally marks	Number
26	||	2
28	||||	4
30	||	2
32	||||	4
36	||	2
40	|||	3
42	|||	3
		Total = 20

4. (*a*) 15 families have three members.

(*b*) 5 people live alone.

(*c*) There are 4 members in most of the families.

5.



6. First find the total time of activities

= 6h + 3h + 2h + 8h + 1h + 4h = 24h

Fraction of school activity = $\frac{6h}{24h} = \frac{1}{4}$

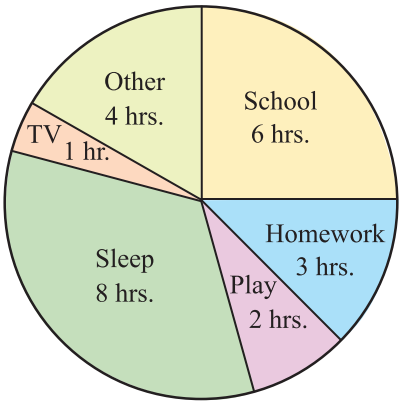
Fraction of homework activity = $\frac{3h}{24h} = \frac{1}{8}$

Fraction of play activity = $\frac{2h}{24h} = \frac{1}{12}$

Fraction of sleep activity = $\frac{8h}{24h} = \frac{1}{3}$

Fraction of watching TV activity = $\frac{1h}{24h} = \frac{1}{24}$

Fraction of others activity = $\frac{4h}{24h} = \frac{1}{6}$



MODEL TEST PAPER - 2

A.

1. (*b*) Volume of cube = side × side × side

Given, volume of cube = 1 cu. cm

= 1 cm × 1 cm × 1 cm

= 10 mm × 10 mm × 10 mm

(∵ 1 cm = 10 mm)

∴ Side = 10 mm

2. (*c*) Convert 2:20 p.m. into 24 hour clock.

= 1420 hours

= 14 hours 20 minutes

Subtract 3:30 hours from 14 hours 20 minutes

Required time = 10:50 hours

= 10:50 a.m.

h	min
(13)	(80)
~~14~~ :	~~20~~
− 3 :	30
10 :	**50**

3. (*c*) We know that, $F = C \times \frac{9}{5} + 32$

$F = 100 \times \frac{9}{5} + 32$

$F = 180 + 32 = 212$

Hence, 100°C = 212°F

4. (*c*) The door is a solid shape that has length breadth and height.

So, solid shape is cuboid.

5. (*b*) Since, 7 cars are represented by 1 flower.

Then, 6 flowers represents by (7 × 6 =) 42 cars.

6. (*b*) The cost of 2 dozen eggs = ₹120

∵ 2 dozen = 24 eggs

∴ The cost of 1 egg = $\frac{₹120}{24}$ = ₹5

The cost of 8 eggs = ₹5 × 8

= ₹40

Hence, the cost of 8 eggs is ₹40.

7. (*b*) Side of equilateral triangle = 14.6 cm (given)

Since, perimeter of an equilateral triangle

= 3 × side

∴ Perimeter of the equilateral triangle

= 3 × 14.6 cm

= 43.8 cm

8. (*c*) Side of a square = 20 cm (given)

Since, area of square = side × side

∴ Area of square = 20 cm × 20 cm

= 400 sq. cm

9. (*a*) 8 = 𝍸 |||

10. (*c*) The next number = 0, 2, 6, 12, 20, 30, 42.

B.

1. 37 cm + 20 mm = (37 × 10) mm + 20 mm
(∵ 1 cm = 10 mm)
∴ 370 mm + 20 mm = 390 mm.

2. The boiling point of water is 100°C or 212°F.

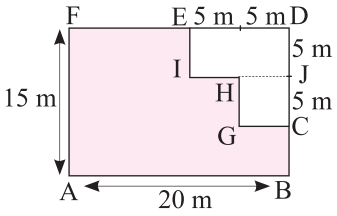
3. If CP is greater than SP, then there is a loss.

4. Side of a cubical tank = 3.2 m = 3.2 × 100 cm
= 320 cm.
Volume of cubical tank = side × side × side
= 320 cm × 320 × 320 cm
= 32768000 cu. cm

5. The collection of information in the form of numbers is called data.

C.

1. Perimeter of a region = Sum of all the sides.
Perimeter of shaded region = AB + BC + CG + GH + HI + IE + EF + FA.

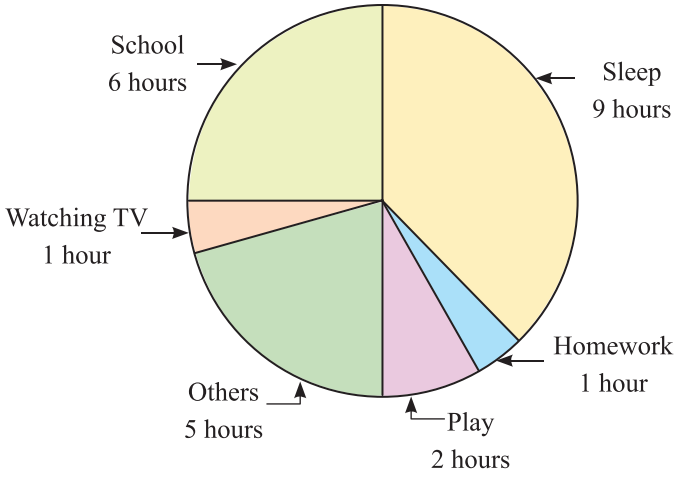


= [20 + 5 + 5 + 5 + 5 + 5 + (20 – 10) + 15] m
= (45 + 10 + 15) m = 70 m
Now, Area of rectangle = $l \times b$
Given: l = 20 m and b = 15 m
∴ Area of shaded region
= Area of rectangle ABDF
– Area of rectangle DEIJ
– Area of square CGHJ
Area of shaded region
= ($l \times b$) – ($l \times b$) – (side × side)
= (20 × 15) m – (10 × 5) m – (5 × 5) m
= 300 m – 50 m – 25 m
= 225 sq. m

2. Cost of air cooler = ₹7,500
Transportation charges = ₹100
Total cost of air cooler = ₹7500 + ₹100 = ₹7600
Loss = ₹180.
∴ Selling of price the air cooler = ₹7600 – ₹180
= ₹7420

3. Number of days of vacations in December
= 15 December to 31 December = 17 days
and number of days of vacations from 1 January to 14 January = 14 days
Number of days her school was closed
= 17 days + 14 days = 31 days

4. First find the total number of hours Geetika spent in a day = 6 h + 1 h + 2 h + 9 h + 1 h + 5 h = 24 h
∴ Fraction of hours she spent in school = $\frac{6}{24}$ h
Fraction of hours she spend in doing her homework = $\frac{1}{24}$ h
Fraction of hours she spend in playing = $\frac{2}{24}$ h
Fraction of hours she spend in sleeping = $\frac{9}{24}$ h
Fraction of hours she spend in watching TV = $\frac{1}{24}$ h
Fraction of hours she spend in others activity = $\frac{5}{24}$ h
Now, divide a circle into 24 equal parts and shade its 6 parts for school, 1 part for home work, 2 parts for playing, 9 parts for sleeping, one hour for TV, 5 parts for others as shown in the circle graph given below.



5. Volume of ice tray = 3 cm × 6 cm × 9 cm
(Since, volume of cuboid = Length × Breadth × height) = 162 cu. cm
Side of an ice cube = 3 cm
The volume of an ice cube = 3 cm × 3 cm × 3 cm
(Since, volume of a cube = side × side × side)
= 27 cu. cm

$$\text{Number of ice cubes} = \frac{\text{Volume of tray}}{\text{Volume of an ice cube}}$$

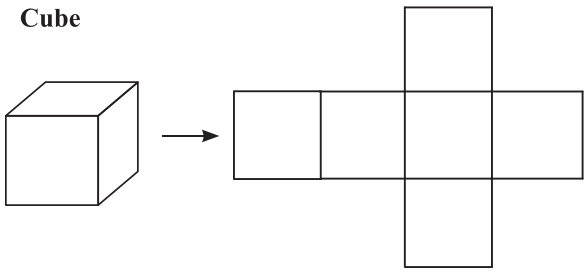
$$= \frac{162}{27} = 6$$

Thus, 6 ice cubes can fit in the ice tray.

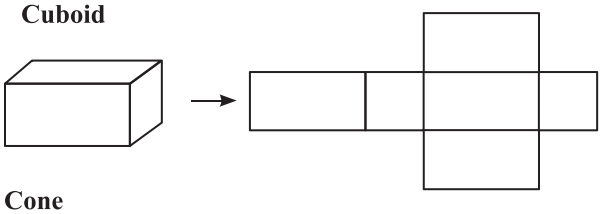
6.

Bill for Shweta			
Item	**Quantity**	**Rate**	**Cost**
(*a*) Sugar	5 kg	₹47	₹235
(*b*) Ketchup	6 bottles	₹155	₹930
(*c*) Mustard oil	$1\frac{1}{2}$ litre	₹118	₹177
(*d*) Rice	10 kg	₹72	₹720
		Total Cost =	₹2062

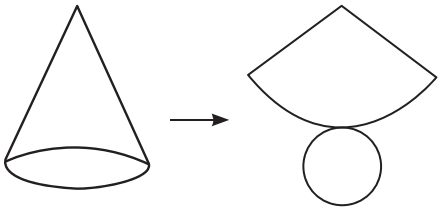
7. (*a*) **Cube**



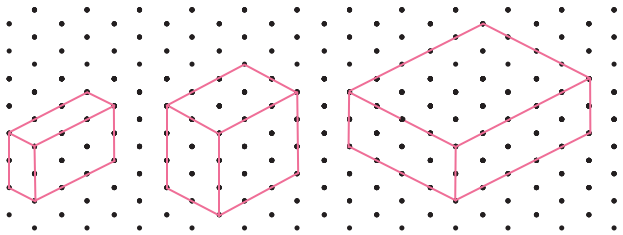
(*b*) **Cuboid**



(*c*) **Cone**



8.



(*a*) (*b*) (*c*)

9. (*a*) $\frac{1}{4}$ turn (*b*) $\frac{1}{2}$ turn

(*c*) $\frac{1}{4}$ turn (*d*) $\frac{1}{2}$ turn