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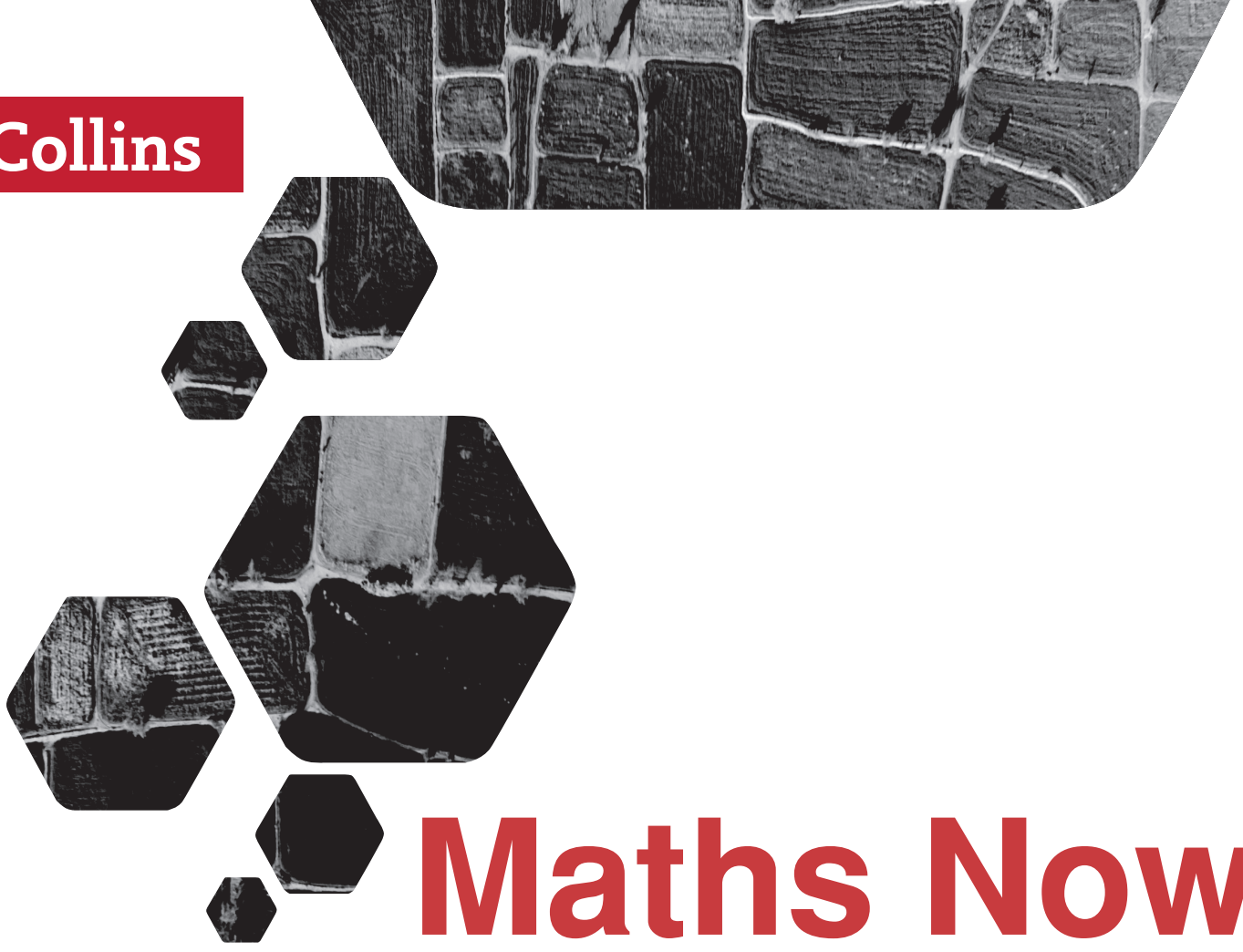

Maths Now

6

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Published by Collins Learning
A division of HarperCollins*Publishers* India Private Limited
HarperCollins*Publishers*
A-75, Sector-57, Noida, Uttar Pradesh 201301, India
1 London Bridge Street, London, SE1 9GF, United Kingdom
2 Bloor Street East, Toronto, Ontario M4W 1A8, Canada
Lvl 13, 201 Elizabeth Street (PO Box A565, NSW, 1235), Sydney NSW 2000, Australia
195 Broadway, New York, NY 10007, USA

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First edition 2020

Reprint: 10 9 8 7 6 5 4 3 2 1
ISBN: 9789353027452

Content co-developed by EXCELSOFT TECHNOLOGIES PVT. LTD.
Typesetting design and layout by Interactive Book Services Pvt. Ltd.
Cover design by Interactive Book Services Pvt. Ltd.
Illustrations by Interactive Book Services Pvt. Ltd.
Printed and bound in India by

Acknowledgements
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Preface

Maths Now is a series of eight books for classes 1 to 8 based on the NCERT syllabus. The series follows an activity-oriented approach to make mathematics engaging for students through emphasizing connections between mathematics and day-to-day experiences. This series also features the balanced use of manipulatives, virtual manipulatives, abstract ideas and other interesting features to improve inherent mathematical skills of students by creating foundational interest in the subject.

This series has been created with a view to enhance the students' understanding of the key concepts of mathematical problem-solving and to increase practical learning by bringing in contexts from outside the classroom. The main aim of the series is to eradicate maths phobia among students, make mathematical concepts crystal clear so that students appreciate the beauty of the subject and the role it plays in one's life.

Key Features

Let's Get Started Chapter starter in the form of a picture-based exercise

Mental Maths Objective-type questions to develop quick-thinking skills

Go Easy! Additional tips helping students to calculate quickly

Do You Know? Nuggets of information to add real-world context to abstract mathematical concepts

Common Errors Pointers highlighting common mistakes and misconceptions

Solved Examples Exercises with step-by-step solutions

Word Problems Textual questions based on real-life situations

Exercises In-text objective-type questions for quick review

Crossword and Puzzles Mathematical problems to stimulate the students' engagement

Maths Lab Activity Hands-on activity to connect concepts with their practical uses in real-life situations

Concept Map Graphic organizer to logically represent relationships between concepts under one topic

Key Concepts List to concisely give an overview of concepts in each topic

Chapter Revision Exercises at the end of each chapter for a comprehensive review

Skill Up!

- **Project** Practical activities to enhance real-world application of concepts
- **Life Skills** Questions to inculcate positive behaviour and add a layer of ethical thinking while solving practical mathematical questions
- **Mind Buzzer** Questions to provide challenging questions relating to real-life examples

Teacher's Notes Important tips related to concepts for the teacher

Worksheets Exercises that covers financial literacy, inferential and experiential learning

Reasoning Worksheet Questions to stimulate rational thinking using mathematical skills

Eminent Mathematicians Brief write-up on eminent mathematicians and their contributions

Poster Important points and formulae in the form of a pull-out page

Review Corner Variety of questions at the end of the book for additional practice

I would like to take this opportunity to thank all the teachers and educationist, especially Dr. C.B. Mishra, Prudence Group of School, who reviewed the books and provided their feedback, which helped in improving the quality of the content.

I would like to dedicate this series to my father, late Mr. S.P. Gupta.

Feedback, invaluable comments and suggestions from users are welcome.

Author
Mona Jhunjhunwala

Key Features

Different features interspersed within the book aim to provide active learning tools and techniques. These tools and techniques have been designed keeping in mind the 5E principle based on the constructivist approach to learning. These features can be used as learning strategies to enhance the understanding of key concepts of mathematics and increase practical learning and problem-solving by bringing in real-life contexts from outside the classroom.

Engage: To capture the attention of students, become mentally engaged and make connections between past and present knowledge

- **Let's Get Started**
- **Common Errors**
- **Go Easy!**
- **Vedic Maths (classes 6 to 8)**
- **Eminent Mathematicians**
- **Poster**

Explore: To enable the students to explore the concepts through hands-on activities, investigations, etc.

- **Maths Lab Activity**
- **Crosswords**
- **Puzzles**
- **Mental Maths**

Explain: To enable the students to understand the main ideas of the topics

- **Learning Objectives**
- **Note**
- **Solved Examples**
- **Concept Map**
- **Key Concepts**

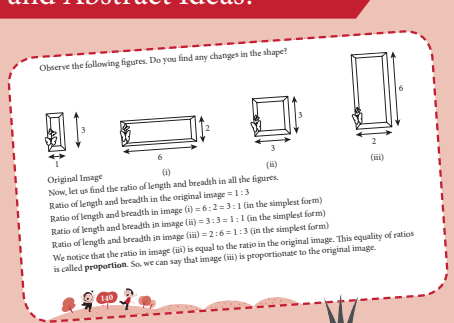
Extend: To enable the students to stimulate thinking and apply prior and current knowledge to real-life situations

- **Do You Know?**
- **Word Problems**
- **Skill Up!**
  - **Project**
  - **Life Skills**
  - **Mind Buzzer**

Evaluate: To review, assess and evaluate what students have learnt

- **Exercises**
- **Chapter Revision**
- **Reasoning Worksheet**
- **Worksheet**
- **Review Corner**

Balanced use of Manipulatives, Virtual Manipulatives and Abstract Ideas!


Observe the following figures. Do you find any changes in the shape?

Original Image (i) (ii) (iii)

Now, let us find the ratio of length and breadth in all the figures.

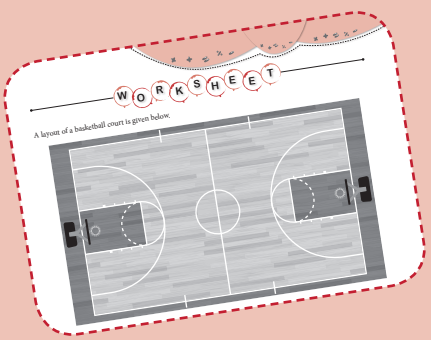
Ratio of length and breadth in the original image = 1 : 3

Ratio of length and breadth in image (i) = 6 : 2 = 3 : 1 (in the simplest form)

Ratio of length and breadth in image (ii) = 3 : 3 = 1 : 1 (in the simplest form)

Ratio of length and breadth in image (iii) = 2 : 6 = 1 : 3 (in the simplest form)

We notice that the ratio in image (iii) is equal to the ratio in the original image. This equality of ratios is called **proportion**. So, we can say that image (iii) is proportionate to the original image.



A layout of a basketball court is given below.

About the Features

Engage

Let's Get Started
Picture-based chapter-opening exercise

Common Errors
Pointers highlighting common mistakes and misconceptions

Eminent Mathematicians
Brief write-up on eminent mathematicians and their contributions

Go Easy!
Shortcuts for easy and fast calculations

VEDIC MATHS
Shortcut techniques to solve mathematical calculations

Poster
Important points and formulae in the form of a pull-out page

Explore

Maths Lab Activity
Hands-on activity to help in improving investigation, reinforcement and extension of concepts just learnt

Mental Maths
Objective-type questions to develop quick-thinking skills

PUZZLE!
Questions in the form of a puzzle to stimulate engagement with the concepts

CROSSWORD
Questions in the form of a crossword to stimulate engagement with the concepts

Explain

Note
Pointers for better understanding of concepts

SOLVED EXAMPLES
Example exercises with step-by-step solutions

Concept Map
Logical representation of relationships between concepts in a chapter

Key Concepts
- Definition of important terms and formulae given as bulleted list

Extend

Do you know?
Nuggets of information to add real-world context to abstract mathematical concepts

WORD PROBLEMS
Textual questions based on real-life situations

SKILL UP!

Project
Practical activities to enhance real-world application of concepts

Life Skills
Thought-provoking questions to help develop sensible life skills such as better awareness, empathy and attitude towards self and others

Mind Buzzer
Questions to arouse intellectual curiosity and encourage the students to think beyond the classroom

Evaluate

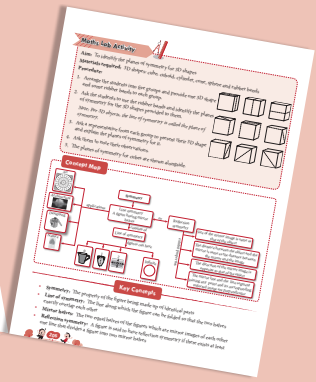
EXERCISE
In-text objective-type questions for quick review, assessment and evaluation

Chapter Revision
Chapter-end questions with varieties of objective and subjective-type questions

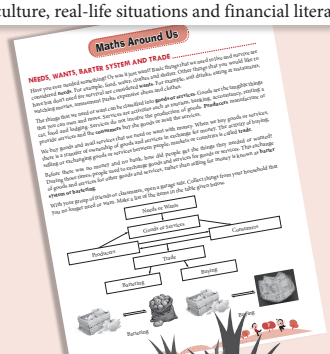
REASONING WORKSHEET
Questions to stimulate rational thinking using mathematical skills

WORKSHEET
Picture-based, fun problem-solving questions to reinforce concepts

REVIEW CORNER
Variety of questions at the end of the book for additional practice



Maths Around Us
A two-page feature providing a variety of interesting information and activities that connect maths and Indian history, art, culture, real-life situations and financial literacy



Maths Around Us

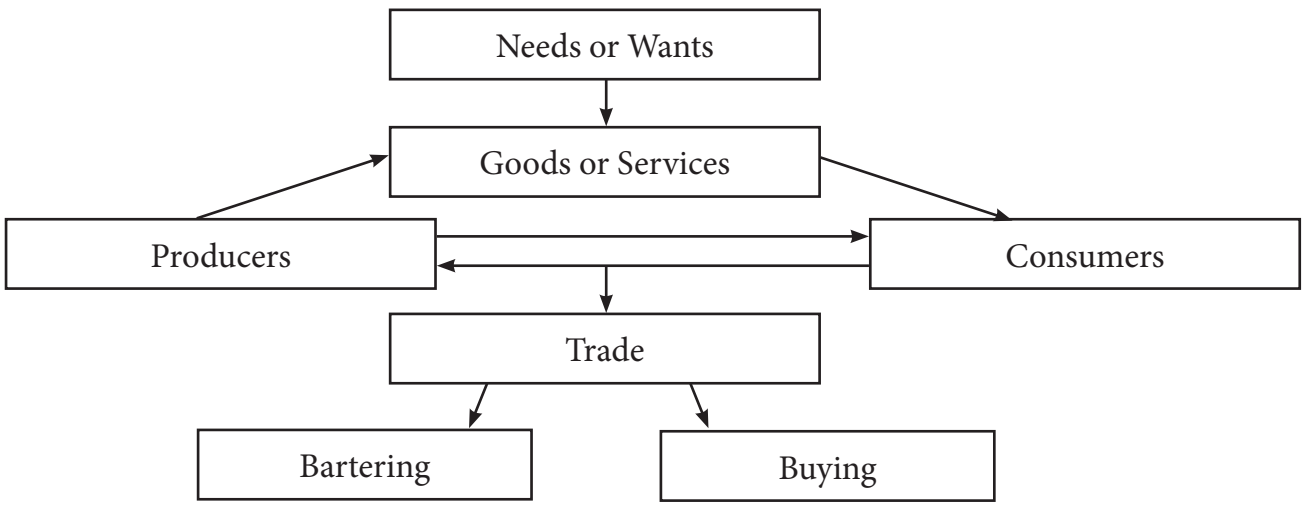
NEEDS, WANTS, BARTER SYSTEM AND TRADE

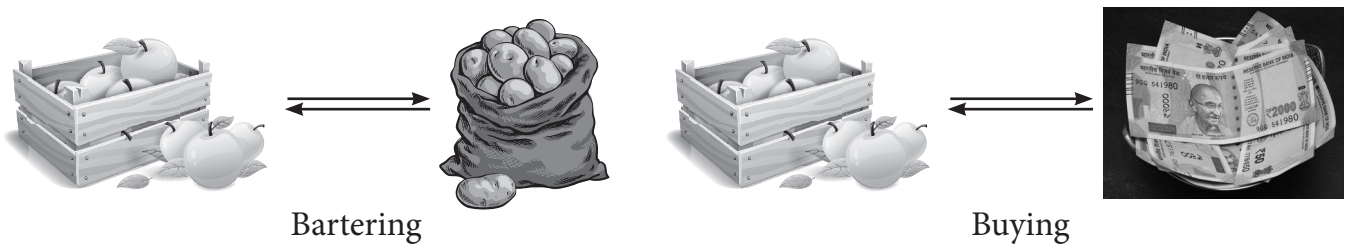
Have you ever needed something? Or was it just want? Basic things that we need to live and survive are considered **needs**. For example, food, water, clothes and shelter. Other things that you would like to have but do not need for survival are considered **wants**. For example, soft drinks, eating at restaurants, watching movies, amusement parks, expensive shoes and clothes.

The things that we need or want can be classified into **goods or services**. Goods are the tangible things that you can own and move. Services are activities such as tourism, banking, accountancy, renting a car, food and lodging. Services do not involve the production of goods. **Producers** manufacture or provide services and the **consumers** buy the goods or avail the services.

We buy goods and avail services that we need or want with money. When we buy goods or services, there is a transfer of ownership of goods and services in exchange for money. The activity of buying, selling or exchanging goods or services between people, markets or countries is called **trade**.

Before there was no money and no bank, how did people get the things they needed or wanted? During those times, people used to exchange goods and services for goods or services. This exchange of goods and services for other goods and services, rather than selling for money is known as **barter system or bartering**.

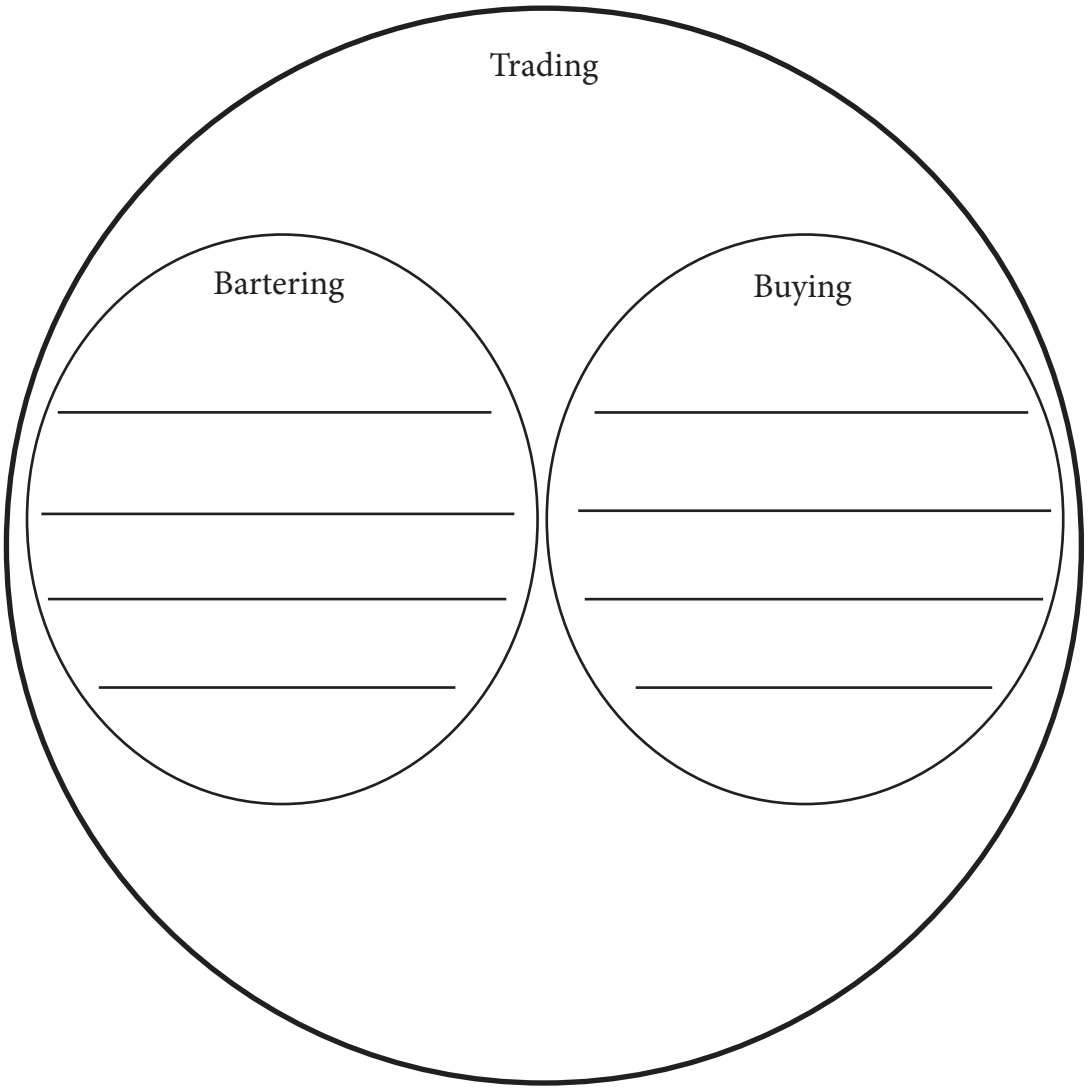




With your group of friends or classmates, open a garage sale. Collect things from your household that you no longer need or want. Make a list of the items in the table given below.

Things that you no longer need	Things that you no longer want

What are the things that your friends have collected? Which of the things would you barter or buy from your friend? Sort and write in the space provided below.



1 Number System

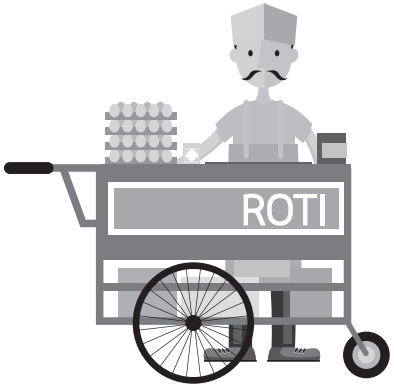
Learning Objectives

- To represent numbers in Indian, International and Roman Number System
- To form various numbers using given digits
- To convert distance and weight from one unit of measurement to another

Let's Get Started

We use numbers every day in most of our activities. When we get up, we check what time it is. We get ready to reach school on time; every period is of a fixed duration.

Name any three more activities, from our daily life, where numbers are used. Take hints from the pictures given below.



When we buy anything, money is used. When we play on the field, in most games, our winning/ losing is dependent on the scores, which are again NUMBERS! When we are evaluated for how much concept we have understood, we are given marks. Since numbers and their usage is a part of our lives, we should learn how to calculate them.

DIGITS AND NUMBERS

In any language, a letter is the smallest part into which a word can be broken. Similarly, in mathematics, a digit is the smallest part into which we can break a number. 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are the ten digits/figures used to form numbers in the Hindu–Arabic System of writing numbers.

A number is used for counting objects or for measuring a certain quantity. A combination of one or more digits used to denote a number is called a **numeral**.

NUMERATION

Numeration means to write a number in words or symbols. For thousands of years, people used fingers and toes for counting. Later they started using tally marks for counting. Some of the ancient number systems are Babylonian Number System, Roman Number System and Indian Number System. The Indian Number System is also called the Hindu–Arabic Number System.

Do you know?

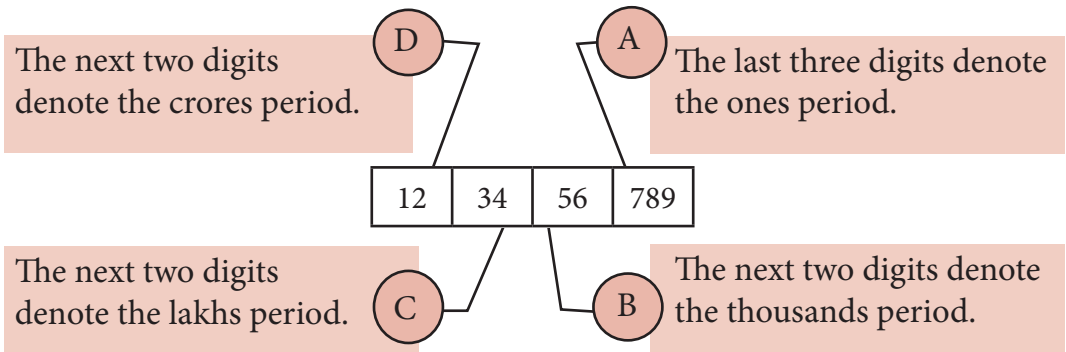
The number system which uses 2 digits (0 and 1) is called the binary number system. Computers understand binary number system.

Indian System of Numeration

Crores, lakhs, thousands and ones are periods of the Indian Number System. A comma is placed after every period as follows:

Two places for crores, two places for lakhs, two places for thousands, three places for ones. For placing commas in a number, start from its end and move towards the left. Place a comma before the last 3 digits, that is after the thousands period. Then move two more places to the left and place a comma after the lakhs period and so on.

Consider the number 123456789.



Thus, 123456789 can be written as 12,34,56,789.

Face value and place value of a digit in a number

Face value of a digit is the same as the digit itself. It does not change with the location of the digit in the number. Place value of a digit depends upon its location in the period.

In the number 57,802, face value of 7 is 7 and place value of 7 is $7 \times 1000 = 7000$.

Face value of 5 is 5 and place value of 5 is $5 \times 10{,}000 = 50{,}000$.

Few more numbers and their place value in the Indian system of numeration, expanded form of the numbers and the number in words are given in Tables 1.1, 1.2 and 1.3.

Table 1.1 Place value in the Indian system of numeration

Number	Crores		Lakhs		Thousands		Ones		
	Ten Crores	Crores	Ten Lakhs	Lakhs	Ten Thousands	Thousands	Hundreds	Tens	Ones
56,792					5	6	7	9	2
4,39,108				4	3	9	1	0	8
67,23,952			6	7	2	3	9	5	2
3,26,87,195		3	2	6	8	7	1	9	5
12,34,56,789	1	2	3	4	5	6	7	8	9

Table 1.2 Expanded form of numbers

Number	Expanded form
56,792	$5 \times 10000 + 6 \times 1000 + 7 \times 100 + 9 \times 10 + 2 \times 1$
4,39,108	$4 \times 100000 + 3 \times 10000 + 9 \times 1000 + 1 \times 100 + 0 \times 10 + 8 \times 1$
67,23,952	$6 \times 1000000 + 7 \times 100000 + 2 \times 10000 + 3 \times 1000 + 9 \times 100 + 5 \times 10 + 2 \times 1$
3,26,87,195	$3 \times 10000000 + 2 \times 1000000 + 6 \times 100000 + 8 \times 10000 + 7 \times 1000 + 1 \times 100 + 9 \times 10 + 5 \times 1$
12,34,56,789	$1 \times 100000000 + 2 \times 10000000 + 3 \times 1000000 + 4 \times 100000 + 5 \times 10000 + 6 \times 1000 + 7 \times 100 + 8 \times 10 + 9 \times 1$

Table 1.3 Numbers in words in the Indian system of numeration

Number	Number name
56,792	Fifty-six thousand seven hundred ninety-two
4,39,108	Four lakh thirty-nine thousand one hundred eight
67,23,952	Sixty-seven lakh twenty-three thousand nine hundred fifty-two
3,26,87,195	Three crore twenty-six lakh eighty-seven thousand one hundred ninety-five
12,34,56,789	Twelve crore thirty-four lakh fifty-six thousand seven hundred eighty-nine

International System of Numeration

International system of numeration is widely used in the world. Billions, millions, thousands and ones are periods of the International Number System.

A comma is placed after every period as follows:

Three places for billions, three places for millions, three places for thousands, three places for ones.

For placing commas in a number, start from its end and move towards the left. Place a comma before the last 3 digits, that is after the thousands period. Then move three more places to the left and place a comma after the millions period and so on.

Table 1.4 Place value in the International system of numeration

Number	Billions			Millions			Thousands			Ones		
				Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
56,792								5	6	7	9	2
439,108							4	3	9	1	0	8
6,723,952						6	7	2	3	9	5	2
32,687,195					3	2	6	8	7	1	9	5
123,456,789				1	2	3	4	5	6	7	8	9

Table 1.5 Number in words in the International system of numeration

Number	Number name
56,792	Fifty-six thousand seven hundred ninety-two
439,108	Four hundred thirty-nine thousand one hundred eight
6,723,952	Six million seven hundred twenty-three thousand nine hundred fifty-two
32,687,195	Thirty-two million six hundred eighty-seven thousand one hundred ninety-five
123,456,789	One hundred twenty-three million four hundred fifty-six thousand seven hundred eighty-nine

COMPARING NUMBERS

To compare numbers, that is to find which number is greater/smaller or whether the numbers are equal, follow the steps given below.

1. Check whether the number of digits is the same in both the numbers.
2. If the first number has more digits than the second, the first number is greater; else the second number is greater.

3. If both numbers have equal number of digits and the digits are the same, the numbers are equal.
4. If both numbers have equal number of digits, the number with the greater digit in the leftmost position (that is the first digit) is greater.
5. If the leftmost digits are equal, compare the second digits of both the numbers (and continue this way) to find the greater digit and the greater number.

SOLVED EXAMPLES

Example 1: Compare 367 and 367.

Solution: 367 = 367

As both numbers have equal number of digits and the digits are exactly same.

Example 2: Compare 4528 and 458.

Solution: 4528 > 458

As 4528 has four digits and 458 has only three digits.

Example 3: Compare 7293 and 6293.

Solution: 7293 > 6293

Both numbers have equal number of digits but 7 > 6.

Example 4: Compare 8126 and 8216.

Solution: 8126 < 8216

Both numbers have equal number of digits. First digit in both is 8 but 1 < 2.

Example 5: Arrange the numbers 45893, 42947, 42356, 36789 in ascending order.

Solution: 36789 < 42356 < 42947 < 45893

Example 6: Arrange the numbers 765844, 783975, 867893, 68993 in descending order.

Solution: 867893 > 783975 > 765844 > 68993

Note

To arrange numbers in ascending/ descending order, write 1, 2, 3,... above the numbers according to their sorting order. Then write the corresponding number as per the sorting order.

Mental Maths

Form the greatest and the smallest 5-digit numbers using all the digits 0, 4, 5, 6 and 7 based on the following conditions.

a. 0 is the second digit.

b. Even digits can occupy only even places.

c. The number ends with a zero or a 5.

d. 6 is the first digit.

e. 5 is at the tens place

EXERCISE 1A

1. **Fill in the blanks.**
   a. The face value of 7 in 45789 is _____.
   b. The place value of 7 in 45789 is _____.
   c. Four hundred fifty-six million two hundred three thousand seven is written as _____.
   d. Six hundred fifty million seven thousand nine is written as _____.
   e. Thirty-two crore four lakh eight thousand three is written as _____.
   f. _____ lakhs = 1 million.
   g. _____ crores = 100 millions.
   h. _____ thousands = 1 lakh.

2. **Write the following numbers in words in Indian and International Number Systems.**
   a. 594868 b. 3907843 c. 59384323 d. 471209474

3. **Write the following numbers in expanded form.**
   a. 293748 b. 2039894 c. 4769400 d. 28495061

4. **Fill in the blanks with the correct symbol < or >.**
   a. 692378 _____ 693425 b. 32445 _____ 327863
   c. 710293 _____ 710200 d. 9008763 _____ 900834
   e. 173927_____ 179372 f. 263730 _____ 263729

5. **Arrange the following numbers in ascending order.**
   26893, 262447, 262156, 263739

6. **Arrange the following numbers in descending order.**
   92693, 92627, 926216, 9263739, 92637, 926371

7. **Form numbers without repeating digits and by using all the given digits.**

Digits	Greatest number	Smallest number
7, 1		
5, 0, 9		
4, 2, 3, 8		
1, 0, 9, 3, 6		
3, 0, 9, 4, 7, 1		

8. Form the greatest and the smallest 4-digit numbers (repetition of digits is allowed) based on the following conditions.

a. The number is an even number.

b. The number is an odd number.

c. The number is divisible by 3.

d. The greatest digit used is 5.

e. The smallest digit used is 3.

f. Each digit is repeated twice.

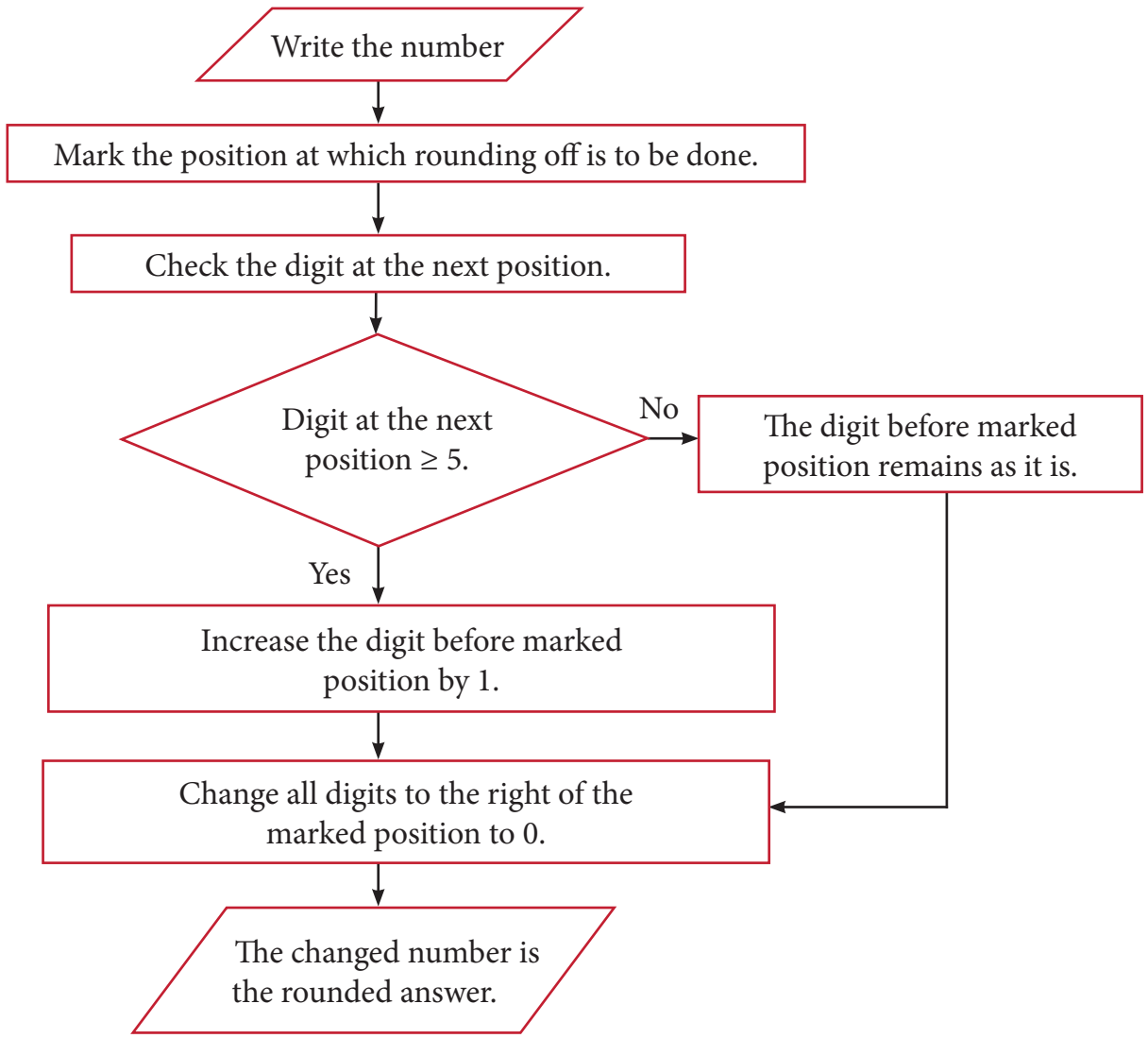
g. The sum of the digits is 8.

h. The product of the digits is 8.

ESTIMATION AND ROUNDING OFF NUMBERS

Estimation means guessing an approximate value for any calculation. Value of certain calculations can be estimated by rounding off.

To round off a number to the nearest 10, 100 and 1000, follow the steps given in the flowchart.



SOLVED EXAMPLES

Example 7: Round off the number 38645 to the nearest 10.

Solution:

TTh	Th	H	T	O
3	8	6	4]	5

The tens digit is 4. Place the "]" mark after it. Next digit is 5. 5 ≥ 5. So, increase 4 by 1 and replace the digit after it by 0.

The number 38645 rounded off to the nearest 10 is 38650.

Example 8: Round off the number 712543 to the nearest 100.

Solution:

L	TTh	Th	H	T	O
7	1	2	5]	4	3

The hundreds digit is 5. Place the "]" mark after it. Next digit is 4. 4 < 5. So, 5 remains in the hundreds place and replace the digits after it by 0.

The number 712543 rounded off to the nearest 100 is 712500.

Example 9: Round off the number 6999543 to the nearest 1000.

Solution:

Tl	L	TTh	Th	H	T	O
6	9	9	9]	5	4	3

The thousands digit is 9. Place the "]" mark after it. Next digit is 5. 5 ≥ 5. So, increase 9 by 1 and replace the digits after it by 0.

The number 6999543 rounded off to the nearest 1000 is 7000000.

Example 10: Estimate the sum of 74 and 38 to the nearest 10.

Solution: Estimated value of 74 to the nearest 10 = 70

Estimated value of 38 to the nearest 10 = 40

Estimated value of (74 + 38) ≈ 70 + 40 = 110

Example 11: Estimate 345 + 67.

Solution: When it is not specified up to which place value we need to estimate our answer, estimate each given number to the place value of its first digit.

345 + 67 ≈ 300 + 70 = 370. Since the first digit 3 of 345 is at the hundreds place, we round off 345 to the nearest 100. The first digit 6 of 67 is at the tens place and we round off 67 to the nearest 10.

Example 12: Estimate 12890 + 82.

Solution: 12890 + 82 ≈ 10000 + 80 = 10080

Common Errors

For estimating or rounding off numbers to the nearest 10, 100 and 1000, find an approximate value of the number. The value of the number does not change drastically. 261936 on rounding off cannot become 900 or 2000 or 60000. ×

The value will be close to 200000 or 300000. ✓

Note

The symbol ≈ means approximately equal.

Mental Maths

What would be the estimated value of 12890 + 82 if 12890 is rounded off to the nearest 1000?

Example 13: Estimate 5689 + 35482 to the nearest 100.

Solution: 5689 + 35482 ≈ 5700 + 35500 = 41200

Example 14: Estimate a. 4182 – 384

b. 675 ÷ 38

c. 3679 × 256

Solution: a. 4182 – 384
≈ 4180 – 380
= 3800

b. 675 ÷ 38
≈ 680 ÷ 40
= 17

c. 3679 × 256
≈ 3700 × 300
= 1110000

Mental Maths

Estimate the answer.

a. 68 ÷ 10 b. 82 × 53

c. 57 × 14 c. 185 ÷ 109

e. 356 × 14

EXERCISE 1B

1. Round off the following numbers as indicated.

	Number	Rounded to the nearest		
		Ten	Hundred	Thousand
a.	74385			
b.	89546			
c.	38479			
d.	753284			
e.	468542			

2. Estimate the following calculations to the nearest 10.

a. 97 + 56 b. 922 + 304 c. 84 × 15 d. 610 × 97

e. 538 ÷ 23 f. 802 ÷ 103 g. 226 – 83 h. 7582 – 474

3. Estimate the following calculations to the nearest 100.

a. 4568 + 719 b. 9689 + 932 c. 126 × 380 d. 3672 × 123

e. 378 – 273 f. 2837 – 1482 g. 702 ÷ 98 h. 664 ÷ 134

4. Estimate the following calculations.

a. 568 + 79 b. 9689 + 932 c. 126 × 38 d. 1772 × 150

e. 38318 – 7973 f. 2917 – 402 g. 710 ÷ 68 h. 374 ÷ 124

CONVERSION BETWEEN UNITS OF LENGTH

To convert a number from a bigger unit to a smaller unit, multiply the number by 10, 100, 1000,..... To convert a number from a smaller unit to a bigger unit, divide the number by 10, 100, 1000,.....

Kilometre, hectometre, decametre, metre, decimetre, centimetre and millimetre are the units in descending order used for measuring length.

Multiples	Kilometre	km
	Hectometre	hm
	Decametre	dam
	Metre	m
Sub-multiples	Decimetre	dm
	Centimetre	cm
	Millimetre	mm

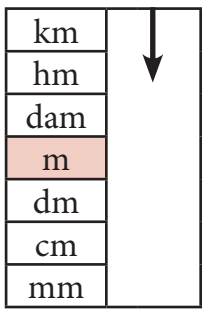
Note

As we move down in the table, the units of length become smaller. From a particular unit when we move down one level for conversion, we multiply by 10. If we move down two levels, we multiply by 100 and so on. If we move up one level, we divide by 10. If we move up two levels, we divide by 100 and so on.

SOLVED EXAMPLES

Example 15: Convert 5 km into a. hectometre, b. decametre, c. metre.

Solution: a.

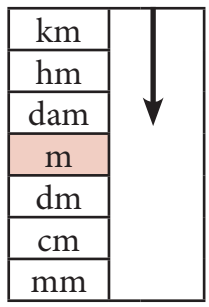


1 km = 10 hm

5 km = 5 × 10

= 50 hm

b.

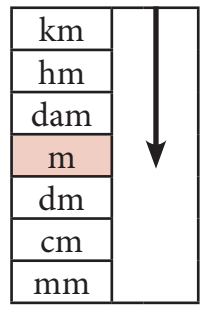


1 km = 100 dam

5 km = 5 × 100

= 500 dam

c.



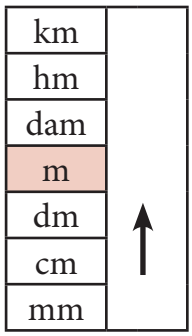
1 km = 1000 m

5 km = 5 × 1000

= 5000 m

Example 16: Convert 7000 cm into a. decimetre, b. metre, c. hectometre.

Solution: a.

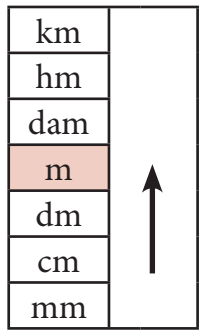


$1 \text{ cm} = \frac{1}{10} \text{ dm}$

$7000 \text{ cm} = \frac{7000}{10}$

= 700 dm

b.

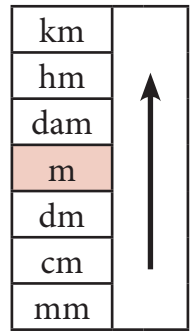


$1 \text{ cm} = \frac{1}{100} \text{ m}$

$7000 \text{ cm} = \frac{7000}{100}$

= 70 m

c.



$1 \text{ cm} = \frac{1}{10000} \text{ hm}$

$7000 \text{ cm} = \frac{7000}{10000} \text{ hm}$

$= \frac{7}{10} \text{ hm}$

Conversion between the units of weight like gram, kilogram and milligram is done in a similar way.

BODMAS

When many arithmetic operations are there in a sum, calculations are done in the order of BODMAS. If brackets are there in a calculation, do all the calculation inside the bracket until only one number is left inside the bracket. After that, remove the bracket. Until the bracket is removed, the rest of the numbers and the operations outside the bracket are just copied to the next step.

Bracket
Of
Divide
Multiply
Add
Subtract

The operation "**Of**" works like multiplication. "**Of**" is performed before division but multiplication is performed after division. So, do not replace "**Of**" by multiplication in calculations which have other arithmetic operators too.

After brackets and "**Of**" calculations are over in a sum, perform division, multiplication, addition and subtraction one after another.

SOLVED EXAMPLES

Example 17: Simplify 50 – 3 of 12 ÷ 4 × 5.

Solution: 50 – 3 of 12 ÷ 4 × 5 = 50 – 36 ÷ 4 × 5

= 50 – 9 × 5 = 50 – 45 = 5

Example 18: Simplify 15 + 2(25 – 18) – (13 + 2 of 6).

Solution: 15 + 2(25 – 18) – (13 + 2 of 6) = 15 + 2 × 7 – (13 + 12)

= 15 + 14 – 25 = 29 – 25 = 4

Example 19: Simplify (72 ÷ 18) of 9 – 800 ÷ 40.

Solution: (72 ÷ 18) of 9 – 800 ÷ 40 = 4 of 9 – 800 ÷ 40

= 36 – 20 = 16

EXERCISE 1C

1. Do the following conversions.

i. Convert into metre.
   a. 500 cm
   b. 700000 mm
   c. 342 km
   d. 67 hm
   e. 81 dam

ii. Convert into kilometre.
   a. 600000 cm
   b. 90000 dm
   c. 520 hm
   d. 4000 dam
   e. 40000 m

iii. Convert into centimetre.
   a. 72 m
   b. 500 mm
   c. 20 dam
   d. 52 hm
   e. 3700 mm

2. Simplify the following.

a. 19 + 2 × 11 + 6 × 2
b. 15 ÷ 5 of 3 × 9
c. (17 – 7) of 12 – 10(17 – 5)
d. 1 + 5 ÷ 1 of 5 – 1
e. 284 – 14(296 – 276)

ROMAN NUMBERS

The Roman Number System originated in ancient Rome. Roman numbers are written using one of the following seven letters from the Latin alphabets.

Roman numeral	I	V	X	L	C	D	M
Hindu–Arabic numeral	1	5	10	50	100	500	1000

Rules for Writing Roman Numbers

The rules for writing Roman numbers are given below:

1. A symbol can be repeated a maximum of three times. If a symbol is repeated in succession, the value of each symbol is added. The symbols I, X, C and M can be repeated but the symbols V, L and D cannot be repeated.

   III = 1 + 1 + 1 = 3 XX = 10 + 10 =20 IIII is not allowed

   CC = 100 + 100 = 200 MM = 1000 + 1000 = 2000 DD is not allowed

2. If a smaller numeral is written to the right of a larger numeral, its value is added but if a smaller numeral is written to the left of a larger numeral, its value is subtracted.

   VII = 5 + 1 + 1 = 7 XV = 10 + 5 = 15 LXX = 50 + 10 + 10 = 70

   XI = 10 + 1 = 11 XVI = 10 + 5 + 1 = 16 IX = 10 – 1 = 9

   XC = 100 – 10 = 90 CD = 500 – 100

3. The symbols V, L and D cannot be written to the left of a symbol of greater value. So, their values cannot be subtracted. Also, these three symbols cannot be repeated.

4. I can be subtracted from V and X only.

1	2	3	4	5	6	7	8	9	10
I	II	III	IV	V	VI	VII	VIII	IX	X

5. X can be subtracted from L, M and C only.

EXERCISE 1D

1. Write in Roman numerals.

a. 15 b. 200 c. 400 d. 49

e. 124 f. 104 g. 1698 h. 1850

2. Write in Hindu–Arabic numerals.

a. XIX b. XXI c. XXXV d. CL

e. XLIV f. LXX g. CLV h. CCC

i. CCCL j. XLIX k. MD l. MC

3. **Solve the following word problems.**
   a. A man bought 1.5 kg guava, 20 hg apples and 1800 g pomegranate. Find the total weight of the fruits in kilogram.
   b. A businessman has a laptop worth ₹1,28,500, a desktop computer worth ₹74,100 and a tablet worth ₹65,000. Find the total cost of these gadgets.
   c. A car is travelling from Imphal to Kohima. The car stops frequently during the journey. The distances travelled by the car in the journey are 22.1 km, 56730 m, 281700 dm and 289 hm. Calculate the distance between the two places in kilometres.
   d. The distance between Jammu and Srinagar is 266.3 km. The distance between Jammu and Pahalgam is 2482 hm. Find the difference in the two distances in kilometres.
   e. For a school adventure trip to Ladakh, each child had to pay ₹32,500. What was the total money paid by 37 children who went for the trip?
   f. During a charity event, storybooks were given away to children as gifts. The total cost of books distributed to 43 children is ₹12,685. Find the cost of each book.

Maths Lab Activity

Aim: To form as many numbers as possible with the given digits (without repeating the digits)

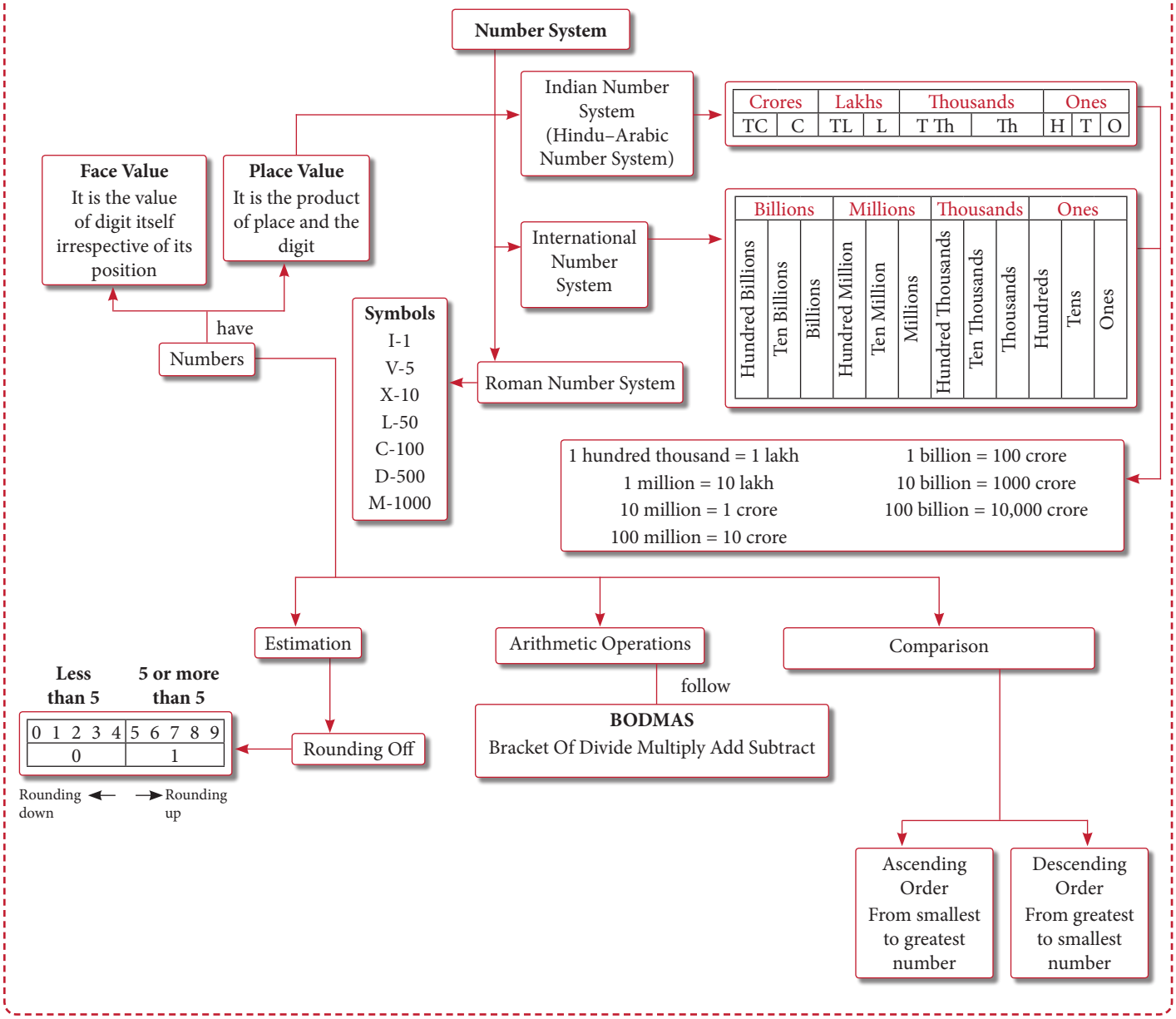
Materials required: One chart paper of any colour, 2 long rulers, pencils, erasers, 2 glue sticks, 4 scissors and 2 sheets of paper for making digit cards

Procedure:

1. Arrange the students into four groups. Give four different digits such as 1, 2, 3, 4 or 0, 1, 2, 3 to each group.
2. For each digit given to a group, make 24 similar digit cards by cutting the sheets. The digit cards should be of measurement 4 cm × 4 cm.
3. Paste the digit cards on the chart paper so that four different digits combine to form different numbers.

Formation of numbers from given digits								
1	2	3	4					

Concept Map



Key Concepts

- **Numeral:** A figure, symbol or group of figures or symbols that denotes numbers
- **Digits:** Any of the numerals from 0 to 9
- **Numbers:** Combination of digits
- **Numeration:** Word form of numbers
- **Place value:** Value of each digit in a number
- **Face value:** Actual value of the digit
- **Conversion:** Converting numbers between different number systems of numeration
- **Rounding off:** Making a simpler value of a number

CHAPTER REVISION

A. Choose the correct option.

1. Pick the odd one out.
   a. XXX b. CCC c. LLL d. III
2. Pick the odd one out.
   a. 12,76,257 b. 1,276,257 c. 5,36,354 d. 36,354
3. Pick the odd one out.
   a. thousand b. lakh c. million d. billion
4. Roman number representation of 89 is
   a. XXCIX b. XIC c. LXXXIX d. none of them
5. 100 million is same as
   a. 1 lakh b. 10 lakh c. 1 crore d. 10 crore

B. Fill in the blanks.

1. The number XXXIV rounded off to the nearest 10 in the Indian number system is _____.
2. $8 \times 100000 + 3 \times 10000 + 1 \times 1000 + 0 \times 100 + 2 \times 10 + 7 \times 1 =$ _____.
3. The greatest four-digit even multiple of 7 is _____.
4. The smallest four-digit even multiple of 7 is _____,

C. State whether the following statements are true or false.

1. Face value of 7 in 34675 is 70.
2. There are 90000 five-digit numbers in all.
3. 9385743 > 9384743 > 9384643 > 9384653 > 9384623 is in descending order.
4. 7484743 < 7484741 < 7494023 < 7494153 < 7494143 is in ascending order.
5. The smallest five-digit number with different even digits is 20468.

D. Match the following.

1. The greatest 3-digit number	a. 990
2. The greatest 3-digit number divisible by 2	b. 992
3. The greatest 3-digit number divisible by 4	c. 994
4. The greatest 3-digit number divisible by 7	d. 996
5. The greatest 3-digit number divisible by 8	e. 998
6. The greatest 3-digit number divisible by 11	f. 999

E. Solve the following.

1. Arrange the numbers 324813, 3163547, 316156, 324739 and 3168273 in ascending order.
2. Write 5284956 in words in the Indian and International number system.
3. Form the greatest and the smallest 4-digit numbers using all the digits 1, 0, 3, 6 such that
   a. 0 is the second digit.
   b. Odd digits can occupy only odd places.
   c. The sum of digits in odd places is 6.
   d. 3 is the second digit.

4. Estimate the following calculations.
   a. 564 + 99 b. 48293 – 39 c. 380 ÷ 24 d. 218 ÷ 24
5. Simplify the following.
   a. $840 \div 7 - 20 \times 4$
   b. $144 - 3(12 + 4 \times 7)$
   c. $(124 - 34)\ (2 \times 7 - 4)$
6. Convert into metre.
   a. 50000 mm b. 43 km c. 40 hm d. 70 dam e. 470 cm
7. Write the Roman numeral for the following.
   a. 50 b. 36 c. 72 d. 97 e. 613
8. Write the Hindu–Arabic numeral for the following.
   a. XXVI b. MC c. CLX d. XXIX e. XLIX
9. Convert the following as indicated.
   a. 18400 m 300000 cm to km
   b. 18 kg 38000 mg to g

F. Answer the following questions.

1. The number of devotees who visited Ajmer Sharif on three consecutive days was 1,56,639 on the first day, 1,52,378 on the second day and 1,48,921 on the third day. Calculate the total number of people who visited the holy place in these three days.
2. Ajay bought 1.25 kg almonds, 4 hg cashew nuts, 60000 cg figs and 200 g raisins. Find the total weight of the dry fruits in grams.
3. Rohan walks 3 km in 1 hours 30 minutes. How many kilometres can he walk in 2 hours 30 minutes.
4. The cost of 1500 cookie biscuits is ₹39000. Find the cost of 1 biscuit.
5. The number of visitors to the Statue of Unity from Thursday to Sunday in a certain week was 28374, 29416, 30048 and 32893. Calculate the total number of people who visited the place in four days.
6. By how much does 9285254 exceed 543978?
7. Add 54 m, 230 cm, 1 km and 15 dam. Give your answer in decimetre.
8. A car is travelling from Chennai to Tirupati. The car has to stop frequently because there are small children in the car. The distances travelled by the car in the journey are 42.5 km, 56730 m, 281700 dm and 289 hm. Calculate the distance between the two places.

SKILL UP!

Project

India is the second most populous country in the world, the first being China. The current population of India is 1,362,575,857. In 2018, it was 1,354,051,854 whereas in 2017, it was 1,339,180,127. The urban population in 2019 is 460,249,876. In 2018, it was 449,945,237 whereas in 2017 it was 439,801,466. (All values are mentioned approximately.)

1. Is the growth in Indian population at this rate good for the country? What will be the effect of this rapid growth in population?
2. Is the land area of the country also changing?

Write a report on the topic "Population of India" using the numbers given in the passage.

Life Skills

Rewrite the passage given under project by rounding off each given number to the nearest 100. Then answer the following questions:

1. What is the increase in the Indian population from 2017 to 2018 and from 2018 to 2019? (Estimated to the nearest 100.)
2. What is the increase in the Indian urban population from 2017 to 2018 and from 2018 to 2019? (Estimated to the nearest 100.)

Find out how many people in India are below poverty line (BPL). How can school students help people below poverty line?

Mind Buzzer

1. Form the greatest and the smallest 4-digit even numbers such that:
   a. repetition of digits is allowed b. repetition of digits is not allowed.
2. The time taken by a car to travel from Guwahati to Shillong is 3 hours 30 minutes. Its average speed is 34 kilometre per hour. Find the distance between the two places.

Teacher's Notes

- Introduce topics with real-life examples of large numbers and Roman numbers.
- Play memory games and matching games with the help of flash cards to make students familiar with 6, 7 and 8-digit numbers.

WORKSHEET

Have you ever been to an amusement park? Which rides do you prefer? Does the choice you make affect the park's business? Answer the questions given below to find out.

The following table shows the sale of amusement park tickets in a city in the month of March.

Entry fee is included in the package price for dry and wet package.

Ticket/ Cost	Week 1	Week 2	Week 3	Week 4
Entry/₹85	131	115	152	134
Dry package/₹425	158	175	210	186
Wet package/₹350	72	91	154	215

Based on the above information, answer the following questions:

1. Which kind of ticket was the least popular in week 1?
2. Which kind of ticket was the most popular in week 2?
3. Which was the best week for the sale of wet package ticket?
4. What could be the probable reason for the answer of question 3?
5. What was the total collection from the sale of tickets in week 1?
6. What was the total collection from the sale of tickets in week 2?
7. What was the difference in the collection from the sale of tickets in week 1 and week 2?
8. What was the total collection from the sale of entry tickets in the four weeks?
9. What was the total collection from the sale of dry package tickets in the four weeks?
10. What was the total collection from the sale of wet package tickets in the four weeks?

2 Whole Numbers

Learning Objectives

- To learn about whole numbers
- To understand the difference between whole numbers and natural numbers
- To learn the properties of whole numbers
- To learn the techniques of doing calculations faster
- To be able to see patterns, identify and formulate rules

Let's Get Started

Count the number of birds and flowers in the picture given below.

Did you start counting from 0 or you started counting at 1? Which numbers did you use for counting? Is there a specific name for such numbers?

Now, add the numbers 12 and 26. Then add 8 to the result.

Add the numbers 12 and 8. Then add 26 to the result.

Is the result the same in both the above cases? Which calculation is easier and faster? If you are asked to calculate mentally, which of the above two arrangements would you prefer and why?

Multiply 16 by 6, 16 by 14. Then add both the results.

Add 14 and 6. Multiply the result by 16.

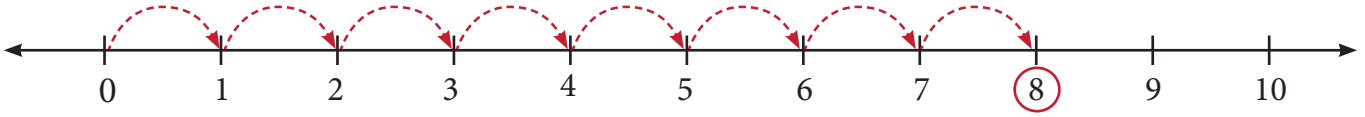
Is the result the same in both the above cases? Which calculation is easier and faster?

WHOLE NUMBERS

The numbers used for counting are called **natural numbers** (or **N**). When we start counting the number of objects, we start counting at 1, not 0. So, 1, 2, 3, 4…… are natural numbers. The collection of natural numbers is infinite. The smallest natural number is 1 but there is no largest natural number.

0 included in the collection of natural numbers gives the set of **whole numbers** (or **W**). Whole numbers are 0, 1, 2, 3, 4,…….. The smallest whole number is 0. The collection of whole numbers is infinite.

Whole numbers can be represented on a number line. A number line is a straight line with numbers placed at equal intervals along its length. To represent the number 8 on the number line, move 8 steps to the right of 0. The point where you reach represents the number 8.



SOLVED EXAMPLES

Example 1: Count the number of whole numbers between 18 and 25.

Solution: The number of whole number between 18 and 25 = 25 – 18 – 1 = 7 – 1 = 6.

Let us verify this.

The numbers that should be included in the above example are 19, 20, 21, 22, 23 and 24. There are 6 numbers here. Hence, verified.

Example 2: Find the number of whole numbers from 18 to 25.

Solution: Number of whole numbers from 18 to 25

= 25 – 18 + 1 = 7 + 1 = 8.

Let us verify this.

The numbers that should be included in the above example are 18,19, 20, 21, 22, 23, 24 and 25. There are 8 numbers here. Hence, verified.

Go Easy!

To count how many whole numbers are there between two numbers, subtract the smaller number from the greater number and then subtract one. For numbers between two given numbers, do not include the given two numbers.

To count how many whole numbers are there from one number to another number, subtract the smaller number from the greater number and then add one.

PROPERTIES OF WHOLE NUMBERS

Mathematical calculations involving numbers are called arithmetic operations. There are four basic arithmetic operations namely addition, subtraction, multiplication and division. Whole numbers follow certain laws while performing these arithmetic operations. These laws are listed below.

Closure Law When an arithmetic operation is performed on two whole numbers and we get a whole number as the result, we say that the closure law is true or the closure law holds good for that operation on the whole numbers.

Commutative Law When an arithmetic operation " ⋆ " is performed on two whole numbers a and b such that a⋆b = b⋆a, we say that the commutative law is true or the commutative law holds good for " ⋆ " on the whole numbers.