Government of Karnataka

MATHEMATICS

Revised

Standard 5

Part I

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Karnataka Text Book Society (R.)
6th Cross, Malleshwaram, Bengaluru-560 003

PREFACE

The Textbook Society, Karnataka has been engaged in producing new textbooks according to the new syllabi prepared which in turn are designed based on NCF – 2005 since June 2010. Textbooks are prepared in 11 languages; seven of them serve as the media of instruction. From standard 1 to 4 there is the EVS and 5th to 10th there are three core subjects, namely, mathematics, science and social science.

NCF – 2005 has a number of special features and they are:

- Connecting knowledge to life activities.
- Learning to shift from rote methods.
- Enriching the curriculum beyond textbooks.
- Learning experiences for the construction of knowledge.
- Making examinations flexible and integrating them with classroom experiences.
- Caring concerns within the democratic policy of the country.
- Make education relevant to the present and future needs.
- Softening the subject boundaries integrated knowledge and the joy of learning.
- The child is the constructor of knowledge.

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The new books are produced based on three fundamental approaches, namely :

Constructive Approach, Spiral Approach and Integrated Approach

The learner is encouraged to think, engage in activities, master skills and competencies. The materials presented in these books are integrated with values. The new books are not examination-oriented in their nature. On the other hand they help the learner in the total development of his/her personality, thus help him/her become a healthy member of a healthy society and a productive citizen of this great country, India.

In Social Science especially in Standard 5, the first chapter deals with the historical, geographical, cultural and local study of the division in which learners live. A lot of additional information is given through box items. Learners are encouraged to work towards

construction of knowledge through assignments and projects. Learning load of memorizing dates has been reduced to the minimum. Life values have been integrated with content of each chapter.

We live in an age of science and technology. During the past five decades man has achieved great things and realized his dreams and reached pinnacle of glory. He has produced everything to make life comfortable. In the same way he has given himself to pleasures and reached the stage in which he seems to have forgotten basic sciences. We hope that at least a good number of young learners take to science in higher studies and become leading scientists and contribute their share to the existing stock of knowledge in order to make life prosperous. Ample opportunity has been given to learners to think, read, discuss and learn on their own with very little help from teachers. Learning is expected to be activity centered with the learners doing experiments, assignments and projects.

Mathematics is essential in the study of various subjects and in real life. NCF 2005 proposes moving away from complete calculations, construction of a framework of concepts, relate mathematics to real life experiences and cooperative learning. Many students have a maths phobia and in order to help them overcome this phobia, jokes, puzzles, riddles, stories and games have been included in textbooks. Each concept is introduced through an activity or an interesting story at the primary level. The contributions of great Indian mathematicians are mentioned at appropriate places.

The Textbook Society expresses grateful thanks to the chairpersons, writers, scrutinisers, artists, staff of DIETs and CTEs and the members of the Editorial Board and printers in helping the Textbook Society in producing these textbooks.

Prof. G S Mudambadithaya
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Chairperson speak....

This 5th standard Mathematics Text book is prepared according to the revised syllabus based on NCF (2005). The basic feature highlighted in NCF(2005) and seriously adopted in this textbook is that " The child is the constructor of her/his own knowledge". A sincere attempt has been made to follow this principle and make mathematics learning a meaningful and joyful experience for children.

The focus in this text book is on **experiential learning** which is based on both **hands-on** and **minds-on** activities. The emphasis is on,

- engaging students in higher order learning tasks,
- guiding students to explore mathematical facts, concepts, generalisations and procedures,
- providing opportunities to express their newly constructed ideas,
- encouraging students to expand/elaborate the ideas by using or applying them in variety of situations/problems relating to real life situations.

Group activity emphasising co-operative learning is the suggested instructional strategy for transacting all the units in this textbook. Every unit begins with an engaging activity which is concrete in nature. Teachers can follow suggested activities or plan and create similar activities for specific purposes.

Additional enriched information is provided in boxes titled " Do you know?" and thought provoking questions in boxes titled "Think!". It should be noted that these two are not for tests and examinations.

Two new units are included in this text book. The purpose of the unit on "Mental Arithmetic" is to provide good practice for mental calculations and enhance speed of mathematical calculations in children. The unit on "Patterns" includes both number patterns and geometrical patterns. This unit enables children to appreciate the beauty of mathematics through its structures and patterns.

We hope that teachers and parents use this text book to facilitate learning environments for children to construct their own knowledge; and students enjoy working through it.

Constructive suggestions are welcome to improve the quality of this textbook.

We sincerely express our grateful thanks to The Karnataka Textbook Society and all its members who co-operated with us.

Dr. G. Vijayakumari
Chairperson
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About the Review of Textbooks

Honourable Chief Minister Sri Siddaramaiah who is also the Finance Minister of Karnataka, in his response to the public opinion about the New Textbooks from standard one to ten, announced, in his 2014-15 budget speech of constituting an expert-committee, to look into the matter. He also spoke of the basic expectations there in, which the Textbook experts should follow: " The Textbooks should aim at inculcating social equality, moral values, development of personality, scientific temper, critical acumen, secularism and the sense of national commitment", he said.

Later, for the production of the Textbooks from class one to tenth, the Department of Education constituted twenty seven committees and passed an order on 24-11-2014. The committees so constituted were subject and class-wise and were in accordance with the standards prescribed. Teachers who are experts in matters of subjects and syllabi were in the committees.

There were already many complaints, and analyses about the Textbooks. So, a freehand was given in the order dated 24-11-2014 to the responsible committees to examine and review text and even to prepare new text and review if necessary. Afterwards, a new order was passed on 19-9-2015 which also gives freedom even to re-write the Textbooks if necessary. In the same order, it was said that the completely reviewed Textbooks could be put to force from 2017-18 instead of 2016-17.

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Many self inspired individuals and institutions, listing out the wrong information and mistakes there in the text, had sent them to the Education Minister and to the 'Textbook Society'. They were rectified. Before rectification we had exchanged ideas by arranging debates. Discussions had taken place with Primary and Secondary Education "Teacher Associations". Questionnaires were administered among teachers to pool up opinions. Separate meeting were held with teachers, subject inspectors and DIET Principals. Analytical opinions had been collected. To the subject experts of science, social science, mathematics and languages, textbooks were sent in advance and later meeting were held for discussions. Women associations and science related organistation were also invited for discussions. Thus, on the basis of all inputs received from various sources, the textbooks have been reviewed where ever necessary.

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Another very important thing has to be shared here. We constituted three expert committees. They were constituted to make suggestions after making a critical study of the text of science, mathematics and social science subjects of central schools (N.C.E.R.T), along with state textbooks. Thus, the state text books have been enriched basing on the critical analysis and suggestions made by the experts. The state textbooks have been guarded not to go lower in standards than the textbooks of central school. Besides, these textbooks have been examined along side with the textbooks of Andhra, Kerala, Tamil Nadu and Maharashtra states.

Another clarification has to be given here. Whatever we have done in the committees is only review, it is not the total production of the textbooks. Therefore, the forms of

already prepared textbooks have in no way been affected or distorted. They have only been reviewed in the background of gender equality, regional representation, national integrity, equality and social harmony. While doing so, the curriculum frames of both central and state have not been transgressed. Besides, the aspirations of the constitution are incorporated carefully. Further, the reviews of the committees were once given to higher expert committees for examination and their opinions have been effected into the textbooks.

Finally, we express our grateful thanks to those who strived in all those 27 committees with complete dedication and also to those who served in higher committees. At the same time, we thank all the supervising officers of the

'Text book Society' who sincerely worked hard in forming the committees and managed to see the task reach it's logical completion. We thank all the members of the staff who co-operated in this venture. Our thanks are also due to the subject experts and to the associations who gave valuable suggestions.

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PART I

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Unit - 1

5 - DIGIT NUMBERS

D1A1L5

After studying this unit you can,

- read and write 5-digit numbers,
- recognise place value of digits in 5 - digit number,
- expand the 5-digit number according to the place value of digits and write the numbers in the standard form,
- arrange the 5-digit numbers in ascending and descending order,
- write the skip numbers for given 5 digit numbers.

You have learnt about 4-digit numbers in the previous class. You know how to write the numbers in - words, place value chart, standard form, expanded form and vice versa.

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Revision Exercise

I. Write the place value chart for the given numbers.

1) 2,684 2) 7,000

3) 9,806 4) 8,649

II. Write the following in words.

1) 1,739 2) 3,007

3) 4,088 4) 11,900

III. Write in figures.

1) Nine thousand three hundred fifteen.

2) Two thousand four hundred.

3) Seven thousand thirty six.

IV. Answer the following.

1) Write the greatest 3-digit number.

2) Write the smallest 3-digit number.

3) Write the greatest 4-digit number.

4) Write the smallest 4-digit number.

V. Compare the numbers and write =, > or < sign in between the numbers.

1) 3,567 ——— 4,567

2) 6,582 ——— 6,385

3) 7,384 ——— 7,384

VI. Write the greatest and the smallest 4-digit numbers using the following digits (without repeating the digits).

1) 1, 2, 3, 4

2) 6, 3, 8, 0

3) 5, 2, 7, 4

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VII. Write the following numbers in ascending order.

1) 2,456	2,465	2,565	2,546
2) 5,768	5,678	5,687	5,867
3) 8,901	8,910	8,109	8,190

VIII. Write the following numbers in descending order.

1) 2,947	3,038	2,930	3,830
2) 4,892	4,982	4,082	4,792
3) 5,678	5,778	5,878	5,978

5-digit numbers

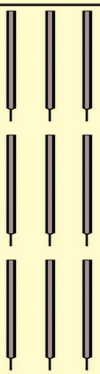
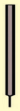
Example 1

Sanjeev has collected 9,999 agarbathis and bundled (grouped) them as shown below.

Ten Thousands	Thousands	Hundreds	Tens	Units
				
Number	9	9	9	9

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If his father gave him one more agarbathi, how many agarbathis does Sanjeev have now ?

Ten Thousands	Thousands	Hundreds	Tens	Units
				
+				
Carry 				
Total 				
Number 1	0	0	0	0

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- In this example, the number of agarbathis obatined is a 5-digit number.
- The obtained 5-digit number 10,000 is read as "TEN THOUSAND"
- The numbers from 10,000 to 99,999 are 5-digit numbers.
- 10,000 is the least 5-digit number.
- 99,999 is the greatest 5-digit number.

Some of the 5-digit numbers are given in words in the table below. Read them.

Number	In words
10,001	Ten thousand one
10,010	Ten thousand ten
11,279	Eleven thousand two hundred seventy nine
20,100	Twenty thousand one hundred
33,333	Thirty three thousand three hundred thirty three
45,698	Forty five thousand six hundred ninety eight
50,000	Fifty thousand
61,030	Sixty one thousand thirty
75,032	Seventy five thousand thirty two
80,574	Eighty thousand five hundred seventy four
99,999	Ninety nine thousand nine hundred ninety nine

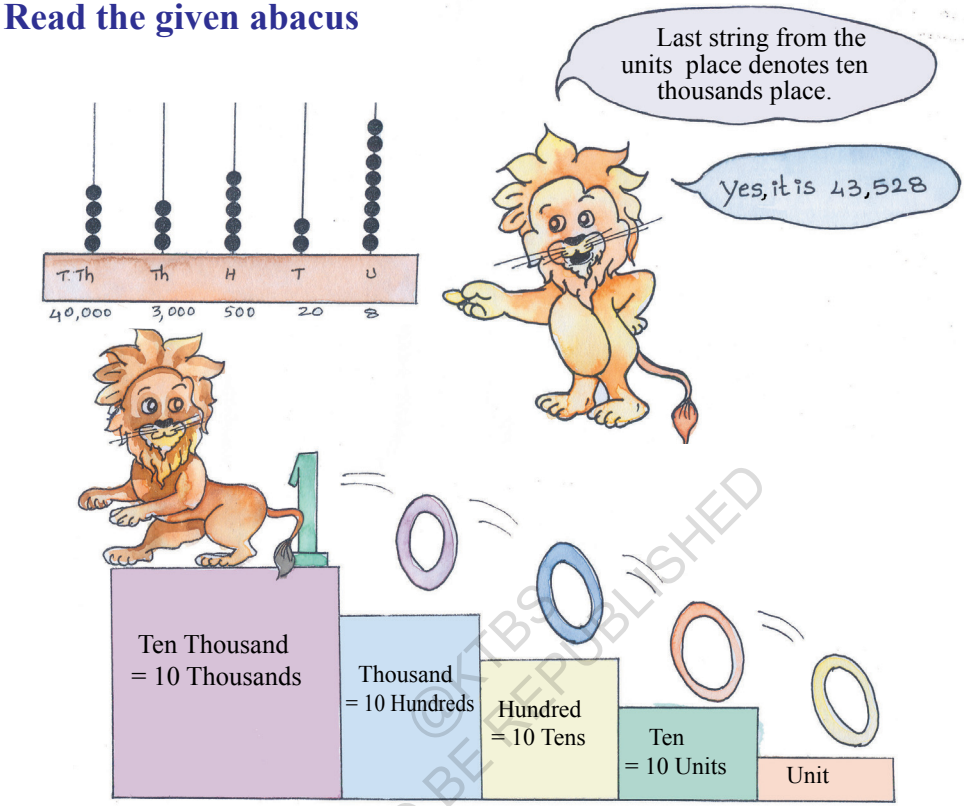
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Observe the following table.

greatest number having			Add 1	Sum	Conclusion: Smallest
Single digit	→	9	9 + 1	10	Two digit number
Two digit	→	99	99 + 1	100	Three digit number
Three digit	→	999	999 + 1	1,000	Four digit number
Four digit	→	9,999	9,999 + 1	10,000	Five digit number

When one is added to the greatest number of each given number of digits, we get the smallest number of next given number of digits.

Read the given abacus



$43,528 = 4 \times 10,000 + 3 \times 1,000 + 5 \times 100 + 2 \times 10 + 8 \times 1$

$= 40,000 + 3,000 + 500 + 20 + 8$

Read the given abacus

Place value chart and expanded form of 5-digit number

Example 1

Write the number fifty three thousand twenty five in place value chart and its expanded form.

Thousands group		Units group		
Ten thousands	Thousands	Hundreds	Tens	Units
10,000	1,000	100	10	1
5	3	0	2	5

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53,025 is expanded as
5×ten thousand + 3×thousand + 0×hundred + 2×ten + 5×unit
= 5 × 10,000 + 3 × 1,000 + 0 × 100 + 2 × 10 + 5 × 1
= 50,000 + 3,000 + 0 + 20 + 5

Example 2

Write 98,431 in place value chart and its expanded form.

Ten thousands	Thousands	Hundreds	Tens	Units
10,000	1,000	100	10	1
9	8	4	3	1

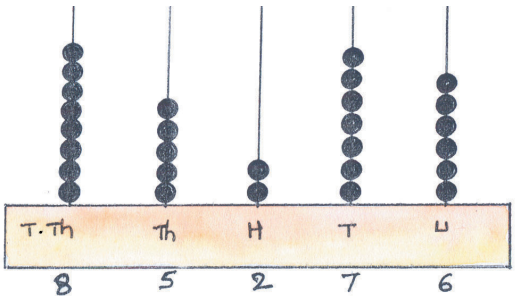
98,431 is expanded as
9×ten thousand + 8×thousand + 4×hundred + 3×ten + 1×unit.
= 9 × 10,000 + 8 × 1,000 + 4 × 100 + 3 × 10 +1 × 1
= 90,000 + 8,000 + 400 + 30 + 1

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Writing expanded form of numbers in standard form

Example 1

Write 8×ten thousand + 5×thousand + 2×hundred + 7×ten + 6×unit in standard form.
8×ten thousand + 5×thousand + 2×hundred + 7×ten + 6×unit
= 8 ×10,000 + 5 × 1,000 + 2 × 100 + 7 × 10 + 6 × 1
= 80,000 + 5,000 + 200 + 70 + 6
= 85,276
The number 85,276 is represented through abacus as follows.



Example 2

Write $3 \times 10,000 + 0 \times 1,000 + 0 \times 100 + 4 \times 10 + 9 \times 1$ in standard form.

$3 \times 10,000 + 0 \times 1,000 + 0 \times 100 + 4 \times 10 + 9 \times 1$

$= 30,000 + 0 + 0 + 40 + 9$

$= 30,049$

Formation of the greatest and the smallest 5-digit number with given digits

Example 1

Form the greatest and the smallest 5-digit numbers using the digits 9, 4, 6, 1, 3 without repeating them.

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To form the greatest 5-digit number

- Compare the given digits.
- Write them in descending order 9, 6, 4, 3, 1.
- Get the greatest 5-digit number 96,431.

The greatest 5-digit number using the digits 9, 4, 6, 1, 3 without repeating is 96,431.

To form the smallest 5-digit number.

- Compare the given digits.
- Write the given digits in ascending order 1,3,4,6,9.
- Get the smallest 5-digit number 13,469.

The smallest 5-digit number using the digits 9, 4, 6, 1, 3 without repeating is 13,469.

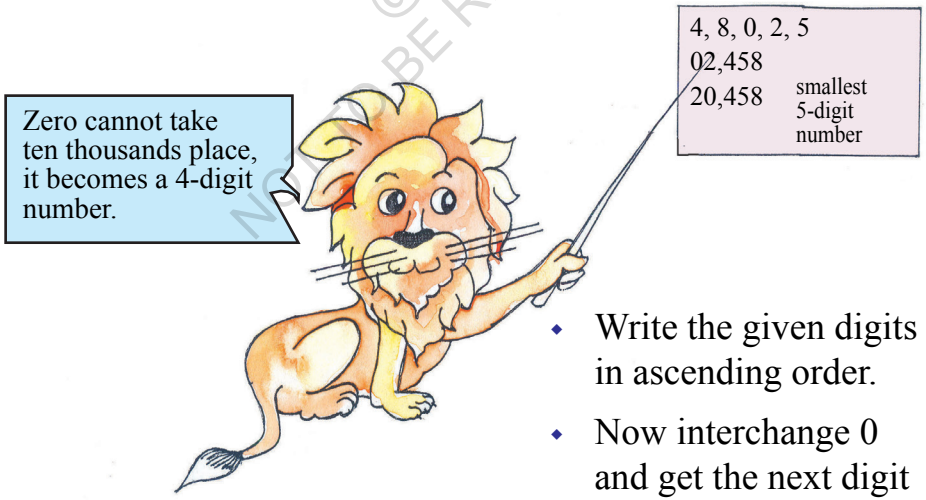
To form the smallest 5-digit number with one of the digits as zero.

Example 2

Form the smallest 5-digit number using digits 4, 8, 0, 2, 5 without repeating them.

- Compare the digits given.
- Write the given digits in ascending order 0, 2, 4, 5, 8.
- Now interchange 0 and the next digit to get the smallest number
  20,458.
- Therefore the smallest 5-digit number using the digits 4, 8, 0, 2, 5 without repeating is 20,458.

How to form smallest 5-digit number using given five digits with one of the digits as zero ?



- Write the given digits in ascending order.
- Now interchange 0 and get the next digit to get the smallest number.

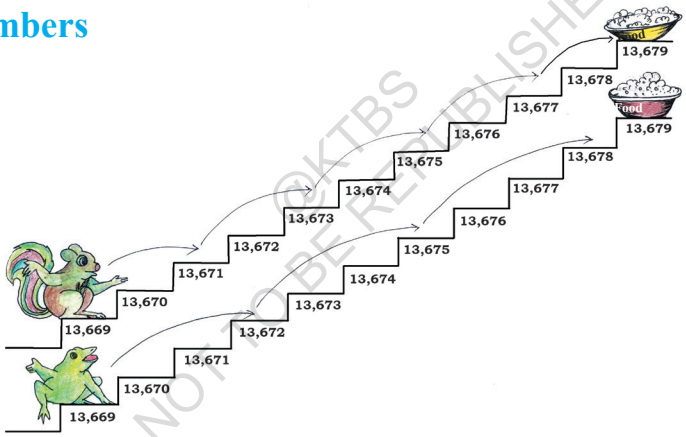
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The preceeding and the succeeding numbers of given 5-digit number

Let us find the preceeding and succeeding numbers of a given 5-digit number.

The Preceeding number (one less than the number)	The number	The succeeding number (one more than the number)
83,652	83,653	83,654
25,047	25,048	25,049
46,789	46,790	46,791
19,999	20,000	20,001

Skip numbers



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Each step is numbered as shown in figure. A squirrel and a frog are on 13,669th step. Squirrel can jump two steps and frog can jump three steps forward at a time. Which of them is going to get the food which is kept at 13,679th step ?

The steps on which frog jumps are _____ , _____ , _____ ,

The steps on which squirrel jumps are _____ , _____ ,_____,

The steps on which frog jumps, make skip numbers of 3.

The steps on which squirrel jumps make skip numbers of 2.

Example 1

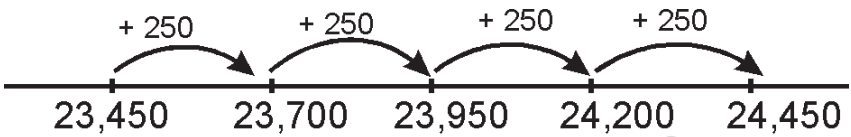
Write the skip numbers for the following.

1. 23,450 , 23,700 , 23,950, _____ , _____ .

The difference between 23,700 and 23,450 is 250.

The difference between 23,950 and 23,700 is 250.

∴ Add 250 to get next skip number.



23,950 + 250 = 24,200. 24,200 is next skip number.

24,200 + 250 = 24,450 is last skip number.

Fill two skip numbers 24,200 and 24,450 in the blanks.

∴ 23,450, 23,700, 23,950, 24,200, 24,450

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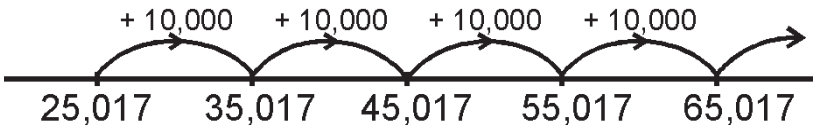
Example 2

Write the skip numbers for the following.

1. 25,017 , 35,017 , _____ , _____ , 65,017.

The difference between 35,017 and 25,017 is 10,000.

Add 10,000 to get next skip number.



35,017 + 10,000 = 45,017 ∴ 45,017 is the next skip number.

45,017 + 10,000 = 55,017 ∴ 55,017 is the fourth skip number.

The third and fourth skip numbers are 45,017 and 55,017.

To identify the smallest and the greatest of given 5-digit numbers

Example 1

Which is the smaller number between 52,428 and 81,214 ?

Compare the digits in ten thousands place.

Digits in ten thousands places are 5 and 8.

5 is smaller than 8.

Therefore 52, 428 is smaller than 81,214.

Example 2

Which is the greater number between 12,234 and 11,484 ?

In the given numbers, if the digits in ten thousands place are the same, then compare thousands place digits.

Here the digits in ten thousands places are same. Compare the digits in thousands place.

Digits in thousands place are 2 and 1.

2 is greater than 1.

Therefore, 12,234 is greater than 11,484.

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Arranging 5-digit numbers in ascending order

Example 1

Write 36,719 , 36,952 , 35,418 , 43,709 , 45,187 in ascending order.

- Compare the digits in ten thousands place. If the digits in ten thousands place are same, then compare the digits in thousands place.
- Write the given numbers in ascending order.
  35,418, 36,719, 36,952, 43,709, 45,187 are in ascending order.

Example 2

Arranging 5-digit numbers in descending order

Write 57,093, 52,169, 54,917, 57,298, 58,791 in descending order.

- First, compare the digits in ten thousands place. If the digits in ten thousands place are same, then compare the digits in thousands place.
- Arrange the given numbers in descending order.

58,791; 57,298; 57,093; 54,917; 52,169 are in descending order.

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Exercise 1.1

I. Insert commas at appropriate places in the following numbers. Write in words.

1) 32894 2) 18415 3) 99999 4) 40003

II. Write the following numbers in figures using commas.

1) Forty five thousand six hundred eighteen.
2) Eighty two thousand three.
3) Thirteen thousand seven hundred nine.
4) Ninety four thousand three hundred fourteen.

III. Write the following numbers in the expanded form.

Example : $47,609 = 4 \times 10,000 + 7 \times 1,000 + 6 \times 100 + 0 \times 10 + 9 \times 1$

1) 19,203
2) 77,777
3) 38,294

IV. Write the following expanded form of numbers in the standard form.

Example : 6×10,000+1×1,000+7×100+9×10+5×1 = 61,795

1) 7 × 10,000 + 2 × 1,000 + 8 × 100 + 3 × 10 + 8×1 =

2) 4 × 10,000 + 0 × 1,000 + 0 × 100 + 0 × 10 +1×1 =

3) 6×ten thousand+3×thousand+5×hundred+1×ten+7×unit=

4) 1×ten thousand+1×thousand+4×hundred+7×ten+4×unit =

V. Form the greatest and the smallest 5-digit numbers using the following digits without repetition.

Example :		**Greatest**	**Smallest**
1)	3, 1, 4, 7, 9	97431	13479
2)	8, 1, 6, 2, 5		
3)	7, 0, 6, 1, 3		
4)	6, 4, 5, 7, 0		
5)	2, 5, 7, 3, 4		

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VI. Complete the table.

	Preceeding number	**Number**	**Succeeding number**
1)		**57,839**	
2)	**18,375**		
3)			**40,781**
4)		**88,890**	
5)			**13,586**

VII. Follow the pattern and complete the series.

1) 23,344, 23,444, 23,544, _____, _____ .

2) 15,790, 35,790, 55,790, _____ , _____ .

3) 88,888, 78,888, 68,888, _____ , _____ .

4) 30,453, _____ , 36,453, 39,453, _____ .

5) 58,600, 62,600, 66,600, _____ , _____ .

VIII. Write the following numbers in increasing order (Ascending order)

1) 30,435, 70,533, 20,411, 40,623.

2) 44,444, 44,044, 40,444, 40,044.

3) 63,841, 63,481, 63,148, 63,184.

4) 50,060, 50,500, 55,000, 50,006.

5) 20,325, 20,825, 20,302, 20,413.

IX. Write the following numbers in decreasing order (Descending order)

1) 23,456 , 34,567, 12,345, 45,678.

2) 40,564 , 45,064, 45,604, 40,456.

3) 12,344, 12,340, 12,304, 13,244.

4) 77,770, 77,077, 77,777, 70,777.

5) 61,234, 62,134, 21,364, 12,364.

X. Compare the following given numbers. Write =, > or < sign in the blanks.

1) 52,085 _____ 52,085.

2) 46,431 _____ 43,613.

3) 15,662 _____ 24,672.

4) 74,312 _____ 76,312.

5) 81,884 _____ 81,365.

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Unit - 2

ADDITION



After studying this unit you can,

- add the given 5-digit numbers without carrying,
- add the given 5-digit numbers with carrying,
- solve verbal problems based on addition of 5-digit numbers.

Let us recall what we have learnt about addition of two or more 4 – digit numbers.

Revision Exercise

I. Add the following numbers.

1) 4,368 + 2,521
2) 2,673 + 5,134
3) 3,653 + 4,213 + 1,156
4) 1,345 + 2,463 + 564

II. Solve the following problems.

1. Sanmati deposited ₹ 3,672 on Monday and ₹ 4,678 on Tuesday in the bank. Find the total amount deposited by her.
2. The population of a village is 3,389. The population of another village is 4,893. Find the total population of both the villages.
3. The number of students of first standard in all the schools of a panchayat is 1,673, second standard is 1,845, third standard is 1,437 and fourth standard is 1,547. Find the total number of students.

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Do You Know ?

You can add the two numbers in any order but the total remains the same. Try the above problems for verification.

Addition of 5-digit numbers without carrying.

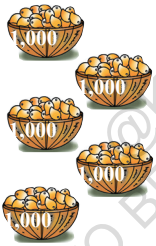
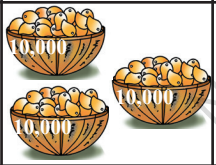
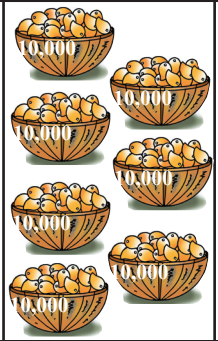
Addition of 5-digit numbers is same as that of addition of 4-digit numbers.

Recall that the digits are added in this order - units, tens, hundreds, thousands and ten thousands.

Example 1

Add the numbers 45,237 and 31,210.

Let us represent the addition of these two numbers through pictures as shown below.

	Ten Thousands (Ten Th)	Thousands (Th)	Hundreds (H)	Tens (T)	Units (U)
					
+					
=					
	7	6	4	4	7

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Observe the two numbers written in the place value chart. The digits in each place are added.

	4 ten thousand	5 thousand	2 hundred	3 ten	7 unit
+	3 ten thousand	1 thousand	2 hundred	1 ten	0 unit
=	7 ten thousand	6 thousand	4 hundred	4 ten	7 unit

Observe the column addition of the above two numbers

		Ten Th	Th	H	T	U
Addends		4	5	2	3	7
Addends	+	3	1	2	1	0
Sum	=	7	6	4	4	7

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Steps involved in addition

1) Write the digit of the numbers in vertical column according to their places.
2) Add digits in the units place. 7 + 0 = 7. Write 7 in units place.
3) Add digits in the tens place. 3 + 1 = 4. Write 4 in tens place.
4) Add digits in the hundreds place. 2 + 2 = 4. Write 4 in hundreds place.
5) Add digits in the thousands place. 5 + 1 = 6. Write 6 in thousands place.
6) Add digits in the ten thousands. 4 + 3 = 7. Write 7 in place. tenthousands place.

Sum of 45,237 and 31,210 is 76,447.

Example 2

Find the sum of 23,567 and 34,131.

		Ten Th	Th	H	T	U
Addends		2	3	5	6	7
Addends	+	3	4	1	3	1
Sum	=	5	7	6	9	8

Example 3

Mr Mallappa purchased a scooter for himself and motor cycle for his son. The cost of the scooter is ₹ 34,221. The cost of the motor cycle is ₹ 35,678. Find the total amount paid by Mr. Mallappa to buy scooter and motor cycle.

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The cost of the scooter = ₹ 34,221.

The cost of the motor cycle = ₹ 35,678.

The amount paid by Mr. Mallappa

= cost of the scooter + cost of the motor cycle.

= ₹ 34,221 + ₹ 35,678

= ₹ 69,899.

	Ten Th	Th	H	T	U
	3	4	2	2	1
+	3	5	6	7	8
=	6	9	8	9	9

∴ Total amount paid by Mr. Mallappa is ₹ 69,899.

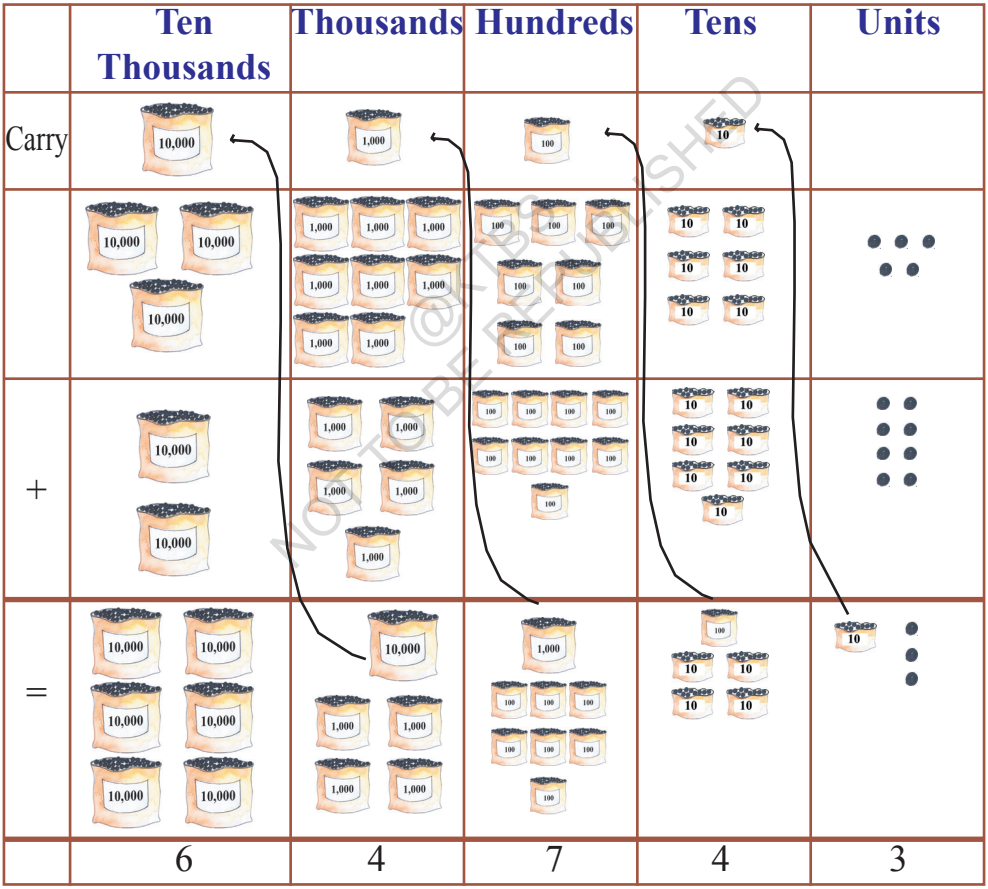
Addition of 5-digit numbers with carrying

Addition of 5-digit numbers with carrying is the same as that of addition of 4-digit numbers with carrying.

Example 1

Find the sum of 38,765 and 25,978.

Let us represent the addition of these two numbers with carrying through pictures as shown below.



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Observe the two numbers written in the place value chart. The digits in each place are added.

Observe the column addition of the above two numbers.

	Ten Th	Th	H	T	U
Carry	1	1	1	1	
	3	8	7	6	5
+	2	5	9	7	8
=	6	(1)4	(1)7	(1)4	(1)3
=	6	4	7	4	3

Steps involved in addition of two numbers with carrying.

1. Write the numbers in the vertical column according to the place of digits.

2. Add digits in the units place. — 5 + 8 = 13. Write 3 in units place and carry 1 to tens place.

3. Add digits in the tens place. — 1 + 6 + 7 = 14. Write 4 in tens place and carry 1 to hundreds place.

4. Add digits in the hundreds place. — 1 + 7 + 9 = 17. Write 7 in hundreds place and carry 1 to thousands place.

5. Add digits in the thousands place. — 1 + 8 + 5 = 14. Write 4 in thousands place and carry 1 to ten thousands place.

6. Add digits in the ten thousands place. — 1 + 3 + 2 =6. Write 6 in ten thousands place.

∴ sum of 38,765 and 25,978 is 64,743.

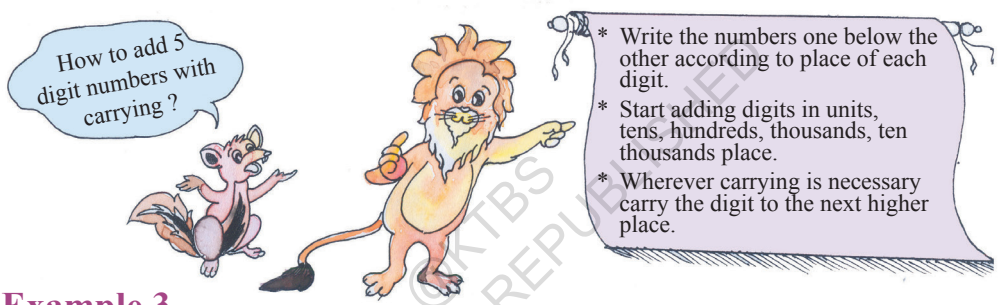
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Example 2

Find the sum of 56,003 and 42,597.

	Ten Th	Th	H	T	U
Carry			1	1	
	5	6	0	0	3
+	4	2	5	9	7
=	9	8	6	0	0

∴ sum of 56,003 and 42,597 is 98,600.



Example 3

A book seller sold 26,817 books in a book exhibition and sold 17,794 books in second book exhibition. Find the total number of books sold by him in both the book exhibitions.

The number of books sold in first book exhibition = 26,817

The number of books sold in second book exhibition = 17,794

The total number of books sold in both the book exhibitions

= 26,817 + 17,794

= 44,611

	Ten Th	Th	H	T	U
Carry	1	1	1	1	
	2	6	8	1	7
+	1	7	7	9	4
=	4	4	6	1	1

∴ the total number of books sold = 44,611.

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Exercise 2.1

I. Find the sum of each of the following.

1) 36,417 + 32,532
2) 28,490 + 61,306
3) 12,973 + 46,016
4) 23,462 + 52,304
5) 42,806 + 34,063

II. Find the sum of each of the following.

1) 36,907 + 53,613
2) 24,596 + 36,578
3) 43,374 + 36,654
4) 25,700 + 2,246 + 16,413
5) 25,236 + 34,051+ 8,368

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III. Solve the following problems.

1) There were 26,759 trees in the protected area of a forest. 13,842 trees were planted during vanamahotsava. Find the total number of trees in the protected area of the forest.
2) A co-operative milk dairy collects 15,209 litres of milk from farmers in a week and 16,826 litres of milk in the next week. How many litres of milk was collected from the farmers in two weeks?

3) An Indian cricketer scored 14,025 runs in the test cricket matches and 15,759 runs in one day cricket matches. How many runs did the cricketer score in all ?

4) A public library in a city has 17,943 books in Kannada, 14,635 books in Hindi and 10,284 books in English. How many books are there in the library altogether ?

5) In an assembly election three candidates were polled 32,135 votes, 29,048 votes and 4,951 votes respectively. Find the total number of votes polled.

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Unit - 3

SUBTRACTION

W8M3B4

After studying this unit you can,

- subtract the given 5-digit number from another 5-digit number without borrowing,
- subtract the given 5-digit number from another 5-digit number with borrowing,
- subtract the given 4-digit number from a 5-digit number,
- solve verbal problems based on subtraction of 5-digit numbers.

Let us recall what we have learnt about subtraction of 4-digit numbers.

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Revision Exercise

I. Subtract the following numbers.

1) 4,528 - 3,214
2) 6,453 - 5,302
3) 3,759 - 2,156

II. Subtract the following numbers.

1) 6,123 - 3,586
2) 8,000 - 4,617
3) 3,564 - 1,345

III. Solve the following problems.

1) A factory manufactured 8,534 boxes. Out of them 5,421 boxes were sold out. Find the remaining number of boxes.

2) The total number of students of standard five in all the schools of a taluk is 5,728. If the number of girls is 3,572, find the number of boys in the schools.

3) Sanjeev has ₹ 8,524. He donated ₹ 2,937 to an orphanage charitable trust. How much amount is left with him ?

Subtraction of 5-digit numbers without borrowing.

Subtraction of 5-digit numbers is the same as that of subtraction of 4-digit numbers.

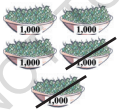
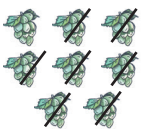
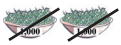
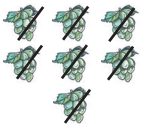
Recall that the digits are subtracted in this order – units, tens, hundreds, thousands and ten thousands.

Example 1

Find the difference between 75,389 and 32,174

Let us represent subtraction of these two numbers through pictures as shown below.

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	Ten Thousands	Thousands	Hundreds	Tens	Units
					
-					
=					
	4	3	2	1	5

Observe the two numbers written in the place value chart. The digits in each place are subtracted.

	7 ten thousand	5 thousand	3 hundred	8 ten	9 unit
-	3 ten thousand	2 thousand	1 hundred	7 ten	4 unit
=	4 ten thousand	3 thousand	2 hundred	1 ten	5 unit

Observe the column subtraction of the above two numbers.

Steps involved in subtraction.

1) Write the numbers in the vertical column according to the place of each digit.
2) Subtract digits in the units place. 9 – 4 = 5. Write 5 in units place.
3) Subtract digits in the tens place. 8 – 7 = 1. Write 1 in tens place.
4) Subtract digits in the hundreds place. 3 – 1 = 2. Write 2 in hundreds place.
5) Subtract digits in the thousands place 5 – 2 = 3. Write 3 in thousands place.
6) Subtract digits in the ten thousands place. 7 – 3 = 4 . Write 4 in ten thousands place.

The difference between 75,389 and 32,174 is 43,215.

		TenTh	Th	H	T	U
Minuend		7	5	3	8	9
Subtrahend	-	3	2	1	7	4
Difference	=	4	3	2	1	5

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Example 2

Subtract 26,235 from 39,637.

Solution :

a. Here 26,235 is subtrahend and 39,637 is minuend.

b. Write 39,637 in first row and 26,235 below it in second row according to the place value of the digits.

c. Now subtract.

		Ten Th	Th	H	T	U
Minuend		3	9	6	3	7
Subtrahend	-	2	6	2	3	5
Difference	=	1	3	4	0	2

Verification

		Ten Th	Th	H	T	U
Difference		1	3	4	0	2
Subtrahend	+	2	6	2	3	5
Minuend	=	3	9	6	3	7

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Do You Know ?

Subtraction can be verified by adding difference and subtrahend. It should be equal to the minuend.

Verify answers of subtraction for example 1 and all other problems on subtraction.

Example 3

A coconut merchant purchased 49,137 coconuts. He sold 26,134 coconuts in a month. How many coconuts are left unsold?
Number of coconuts purchased by the merchant = 49,137
Number of coconuts sold in a month = 26,134

$\therefore$ Number of coconuts unsold = 49,137 - 26,134 = 23,003

	Ten Th	Th	H	T	U
	4	9	1	3	7
-	2	6	1	3	4
	2	3	0	0	3

∴ 23,003 coconuts are unsold

Subtraction of 5-digit numbers with regrouping or borrowing.

Subtraction of 5-digit numbers with regrouping or borrowing is the same as that of subtraction of 4-digit numbers by regrouping or borrowing.

Example 1

Find the difference between 57,394 and 26,765.

Let us represent the subtraction of these two numbers through pictures as shown below.

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	Ten Thousands	Thousands	Hundreds	Tens	Units
57,394					
-26,765					
30,629					
	3	0	6	2	9

Observe the column subtraction of the above numbers.

	Ten Th	Th	H	T	U
	5	7	3	9	4
-	2	6	7	6	5
=					

After regrouping the hundreds and units places

	Ten Th	Th	H	T	U
After Regrouping		6	13	8	14
	5	~~7~~	~~3~~	~~9~~	~~4~~
-	2	6	7	6	5
=	3	0	6	2	9

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Steps involved in subtraction of two numbers with borrowing.

1. Write the numbers in the vertical column according to place of the digits.
2. In units place minuend is 4 and subtrahend is 5. Since 4 is smaller than 5, 5 cannot be subtracted from 4. So borrow 1 ten from tens place. So units place can be rewritten as 1 ten + 4 units

   = 10 units + 4 units

   = 14 units.

Now subtract units place digits. i.e., 14 – 5 = 9. Write 9 in units column.

3. After borrowing 1 ten to units place, tens place is left with 8 tens.

   Subtract : 8 – 6 = 2. Write 2 in tens column.

4. In hundreds place, 3 is less than 7. So 7 cannot be subtracted from 3.

   Hence borrow 1 thousand from thousands place. 1 thousand = 10 hundreds.

   The hundreds place can be rewritten as 10 hundreds + 3 hundreds = 13 hundreds.

Now subtract hundreds place digits i.e., 13 – 7 = 6. Write 6 in hundreds column.

5. After borrowing 1 thousand, thousands place is left with 6 thousands.

   Subtract : 6 - 6 = 0. Write 0 in thousands column.

6. Subtract : 5 - 2 = 3. Write 3 in ten thousands column.

   ∴ The difference between 57,394 and 26,765 is 30,629.

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Verification of subtraction

		Ten Th	Th	H	T	U
Difference		3	0	6	2	9
Subtrahend	+	2	6	7	6	5
Minuend	=	5	7	3	9	4

Example 2

Subtract 73,649 from 90,000.

In these numbers 73,649 is subtrahend and 90,000 is minuend. Now, we have to find the difference between 90,000 and 73,649.

		Ten Th	Th	H	T	U
Minuend		9	0	0	0	0
Subtrahend	-	7	3	6	4	9
Difference	=					

After regrouping

	Ten Th	Th	H	T	U
After Regrouping	8	9	9	9	10
	~~9~~	~~0~~	~~0~~	~~0~~	~~0~~
-	7	3	6	4	9
=	1	6	3	5	1

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Verification

		Ten Th	Th	H	T	U
Difference		1	6	3	5	1
Subtrahend	+	7	3	6	4	9
Minuend	=	9	0	0	0	0

Example 3

Last year 16,986 kg of rice was consumed for midday meals of primary school students. This year it is 21,482 kg of rice. How many more kg of rice is used this year ?

Quantity of rice used to cook for children this year = 21,482 kg

Quantity of rice used to cook for children last year = 16,986 kg

∴ Increase in quantity of rice used this year = 21,482–16,986 kg

= 4,496 kg

∴ 4,496 kg of more rice is used to cook for primary school students this year.

Verification

		Ten Th	Th	H	T	U
Difference			4	4	9	6
Subtrahend	+	1	6	9	8	6
Minuend	=	2	1	4	8	2

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Example 4

The workers of a tea factory have to fill 48,342 packets of tea powder in a day. They had filled 33,675 packets before lunch time, find the remaining packets to be filled.

Number of packets to be filled with tea powder in a day = 48,342.

Number of packets filled with tea powder before lunch time = 33,675.

The number of tea packets to be filled = 48,342-33,675

= 14,667

∴ Remaining packets to be filled =14,667.

Exercise 3.1

I. Find the difference of the following

1) 59,842 - 34,532
2) 86,291 - 64,130
3) 41,297 - 16,025
4) 25,768 - 4,304
5) 17,094 - 3,043

II. Find the difference of the following

1) 42,695 - 20,746
2) 50,625 - 36,178
3) 40,000 - 16,543
4) 25,307 - 6,419
5) 20,000 - 8,625

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III. Subtract.

1) 16,486 from 26,475
2) 36,279 from 52,367
3) 10,000 from 31,579
4) 24,683 from 40,000
5) 4,297 from 11,035

IV. Solve the following problems.

1) What should be added to 37,946 to get 91,643 ?
2) What should be subtracted from 67,215 to get 28,941 ?

3) The sum of two numbers is 87,065. If one of the numbers is 49,726, find the other number.

4) A farmer yielded 38,462 coconuts from his field last year. This year he yielded 47,285 coconuts. Find how many more coconuts he yielded this year ?

5) In an assembly election, Mr.Suresh has got 42,618 votes. Mrs. Rohini got 54,951 votes and won. How many more votes did Mrs. Rohini get than Mr. Suresh ?

Problems involving both addition and subtraction operations.

Example 1

Solve : 22,457 + 32,986 - 35,712

First perform addition of 22,457 and 32,986.

	Ten Th	Th	H	T	U
Carry		1	1	1	
	2	2	4	5	7
+	3	2	9	8	6
=	5	5	4	4	3

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Now subtract 35,712 from the sum of 22,457 and 32,986

	Ten Th	Th	H	T	U
After Regrouping	4	14	14		
	~~5~~	~~5~~	~~4~~	4	3
-	3	5	7	1	2
=	1	9	7	3	1

$\therefore$ 22,457 + 32,986 – 35,712 = 19,731

Example 2

The co-operative milk dairy collects 15,684 litres of milk from village A and 17,324 litres of milk from village B. If the co-operative dairy sells 20,263 litres of milk, find the quantity of remaining milk.

Quantity of milk collected from village A = 15,684 litres.

Quantity of milk collected from village B = 17,324 litres.

∴ Total quantity of milk collected from both the villages = 15,684+17,324 litres

= 33,008 litres.

Quantity of milk sold by the dairy = 20,263 litres

Quantity of milk left with the co-operative dairy = 33,008 - 20,263 litres

= 12,745 litres.

∴ Quantity of milk remaining = 12,745 litres.

Example 3

A petrol bunk had 96,321 litres of petrol. 26,841 litres of petrol was sold on Monday and 35,769 litres of petrol was sold on Tuesday. Find the remaining quantity of petrol in the petrol bunk.

Stock of petrol in the petrol bunk = 96,321 litres

Quantity of petrol sold on Monday = 26,841 litres

Quantity of petrol sold on Tuesday = 35,769 litres

Total quantity of petrol sold in 2 days = 26,841 + 35,769 litres

= 62,610 litres

∴ Quantity of petrol left in the petrol bunk = 96,321 - 62,610 litres

= 33,711 litres

∴ 33,711 litres of petrol is remaining in the petrol bunk.

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Exercise 3.2

I. Solve.

1) 54,398 + 24,897 - 39,486

2) 43,618 + 6,382 - 29,467

3) 21,679 + 27,428 - 2,438

II. Solve the following problems.

1) A mobile phone factory manufactures 23,715 mobiles in November and 34,160 mobiles in December. Out of them 42,534 mobiles were sold. Find how many mobiles are left unsold in the factory.

2) Mr. Anand has ₹ 15,282 in his bank account. He deposits ₹ 25,718 on Wednesday. He withdraws ₹ 30,145 on Thursday. Find his bank balance after withdrawal.

3) Mrs. Anita has ₹ 50,000 with her. She purchases a colour T.V. for ₹13,538 and a refrigerator for ₹ 16,990. Find the amount left with her after the purchase.

4) 60,000 school uniforms are provided for school children of a district. 12,372 and 23,003 uniforms were distributed to schools of two taluks of the district. Find how many uniforms are remaining.

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Unit - 4

FACTORS AND MULTIPLES

U7X2U7

After studying this unit you can,

- explain the meaning of factors of a given number,
- identify factors of a given number,
- find the factors of a given number,
- draw tree diagram to represent the factors of a given number,
- explain the meaning of multiples of a given number,
- find the multiples of a given number,
- identify multiples of a given number.

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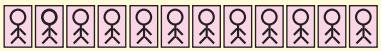
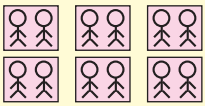
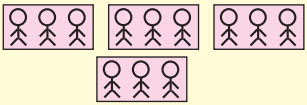
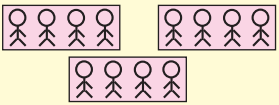
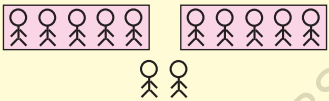
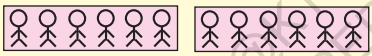
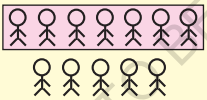
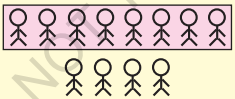
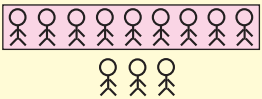
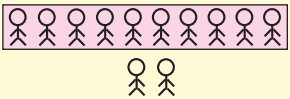
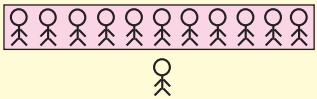
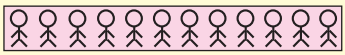
Factors and Multiples of a number

Example 1

Consider the game called "grouping together." There are twelve students in the game.

Students are moving in a circular path. A number is announced. Students make groups having the number of members announced. Students who form groups with more or less than the announced number are treated as out.



Number announced	Groups formed	Number of groups	Members left out
1		12	0
2		6	0
3		4	0
4		3	0
5		2	2
6		2	0
7		1	5
8		1	4
9		1	3
10		1	2
11		1	1
12		1	0

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Observe the above table and complete the following table.

The numbers announced where no group members were left out.	The numbers announced where some group members were left out.
1,2,……..	5,……..

Numbers in the first column are factors of 12.

1, 2, 3, 4. 6 and 12 are factors of 12.

Numbers in the second column are not factors of 12.

5, 7, 8, 9, 10, 11 are not factors of 12.

If 1, 2, 3, 4, 6 and 12 are factors of 12 then,

what is 12 called with respect to 1, 2, 3, 4, 6, and 12 ?

Observe the following table.

1	×	12	=	12
2	×	6	=	12
3	×	4	=	12
4	×	3	=	12
6	×	2	=	12
12	×	1	=	12

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12 is called the **multiple** of 1, 2, 3, 4, 6 and 12

Consider $3 \times 8 = 24$. 3 and 8 are factors of 24 and 24 is multiple of 3 and 8.

Therefore, factors and multiples are related to each other.

Example 2

Multiply and complete the table.

×	1	2	3	4	5	6	7	8	9	10	11	12
1												12
2						12						
3				12								
4			12									48
5												
6		12						48				
7												
8						48						
9												
10												
11												
12	12			48								

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The numbers of the first row are 1,2,3, 4, 5,6, 7, 8, 9, 10 ,11 and 12.

These numbers are multiples of 1.

The numbers in second row are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 and 24. These numbers are multiples of 2.

List the multiples of 7, 9 and 11.

Observe the following examples

1 is a multiple of 1. $1 \times 1 = 1$

2 is a multiple of 2. $2 \times 1 = 2$

6 is a multiple of 6. $6 \times 1 = 6$

9 is a multiple of 9. $9 \times 1 = 9$

11 is a multiple of 11. $11 \times 1 = 11$

From the above examples we can conclude that,

every number is a multiple of itself.

Observe the following examples.

1 is a multiple of 1. $1 \times 1 = 1$

2 is a multiple of 2. $1 \times 2 = 2$

5 is a multiple of 5. $1 \times 5 = 5$

10 is a multiple of 10. $1 \times 10 = 10$

15 is a multiple of 15. $1 \times 15 = 15$

From the above examples we can conclude that,

every number is a multiple of 1.

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Example 3

Which are the two numbers to be multiplied to get the product 8 ?

$1 \times 8 = 8$, $2 \times \square = 8$, $4 \times \square = 8$, $8 \times \square = 8$

The factors of 8 are 1, 2, 4 and 8.

Example 4

Find the factors of 48

$1 \times 48 = 48$, $2 \times \square = 48$, $3 \times \square = 48$, $4 \times \square = 48$

$6 \times 8 = 48$, $8 \times \square = 48$, $12 \times \square = 48$, $16 \times \square = 48$

$24 \times \square = 48$, $48 \times \square = 48$ $4 \times \square = 48$,

$\therefore$ The factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48.

We can conclude that, when two or more numbers are multiplied to get the product, the numbers multiplied are called factors of the product.

Observe the following table :

Multiple	Factor	Division	Remainder
48	2	48 ÷ 2 =24	Zero
48	3	48 ÷ 3 = 16	Zero
48	8	48 ÷ 8 = 6	Zero
48	48	48 ÷ 12 =4	Zero

We can conclude that, a number is a factor of the given number if it divides the given number completely leaving zero as remainder.

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DO YOU KNOW ?

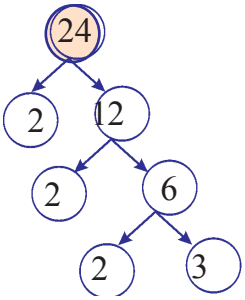
If the sum of all the factors of a given number is equal to twice the number, then the number is called a perfect number. Factors of 6 are 1, 2, 3 and 6. Sum of all factors of 6 is 1+2+3+6 = 12 Twice the number = 2 × 6 =12. So, the first perfect number is 6. Find the other perfect numbers.

FACTOR TREE

Any number can be expressed as product of two numbers (factors). This can be represented diagrammatically by factor tree as follows.

Example 1

Write the factor tree of 24.



$24 = 2 \times 12$

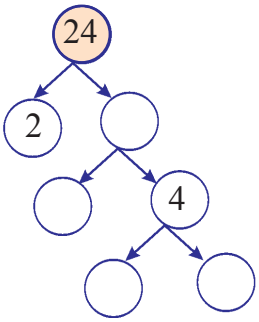
$24 = 2 \times 2 \times 6$

$24 = 2 \times 2 \times 2 \times 3$

$\therefore 24 = 2 \times 2 \times 2 \times 3$

Example 2

Complete the following factor tree.



$24 = 3 \times 8$

$24 = 3 \times \square \times \square$

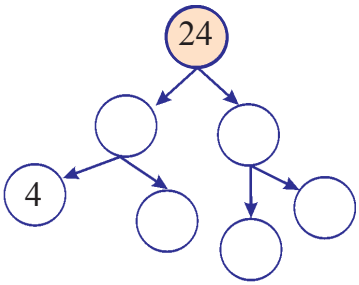
$24 = 3 \times \square \times \square \times \square$

$\therefore 24 = 3 \times \square \times \square \times \square$

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Example 3

Complete the following factor tree.



$24 = 4 \times 6$

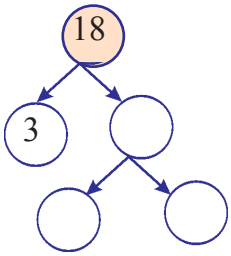
$24 = \square \times \square \times \square \times \square$

$\therefore 24 = \square \times \square \times \square \times \square$

$\therefore$ Factor tree for a given number can be started with any two factors.

Example 4

Write the factor tree of 18.



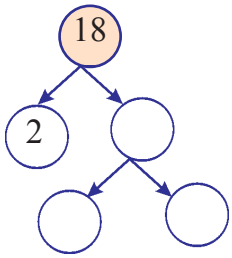
$18 = 3 \times 6$

$18 = 3 \times \square \times \square$

$\therefore\ 18 = 3 \times \square \times \square$

Example 5

Complete the factor tree of 18.



$18 = 2 \times 9$

$18 = 2 \times \square \times \square$

$\therefore\ 18 = 2 \times \square \times \square$

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Factor tree can be written in different ways by taking different factors.

Points to remember

1. Every number is a multiple of 1.
2. Multiple of a number is either equal to or greater than the number.
3. 1 is a factor of every number.
4. Every number is a factor of itself.

Exercise 4.1

1) Circle the multiples of 4 with blue colour, cross the multiples of 6 with red colour and underline the multiples of 9 with a pencil.

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	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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2) Circle the multiples of 7 in the following numbers.
7, 13, 14, 21, 22, 35, 36, 42 and 45

3) Circle the multiples of 12 in the following numbers.
6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72

4) Write the multiples of 2 between the numbers 50 and 60.

5) Write the multiples of 15 between the numbers 50 and 100.

6) Write five multiples of the following numbers.
15, 17, 19 and 23

7) Find which of the following numbers are factors of 24 ?
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 22 and 24

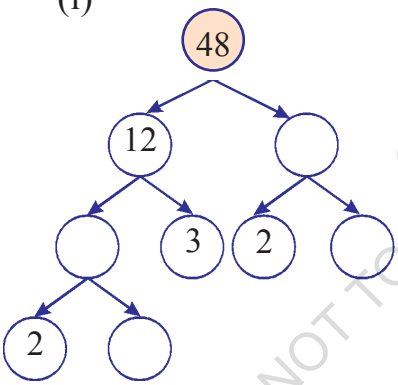
8) Write any two factors of the following numbers.
6, 18, 28, 36, 42, 48

9) Write all the factors of the following numbers.
9, 13, 20, 26, 40

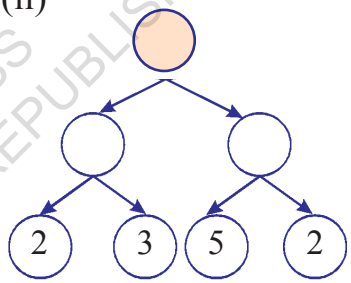
10) Write the factor tree for the following numbers.
12, 20, 28, 32 and 36

11) Complete the following factor tree by writing missing numbers.

(i)



(ii)



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Chapter - 5

FRACTIONS

N5Y9T7

After studying this Chapter you can,

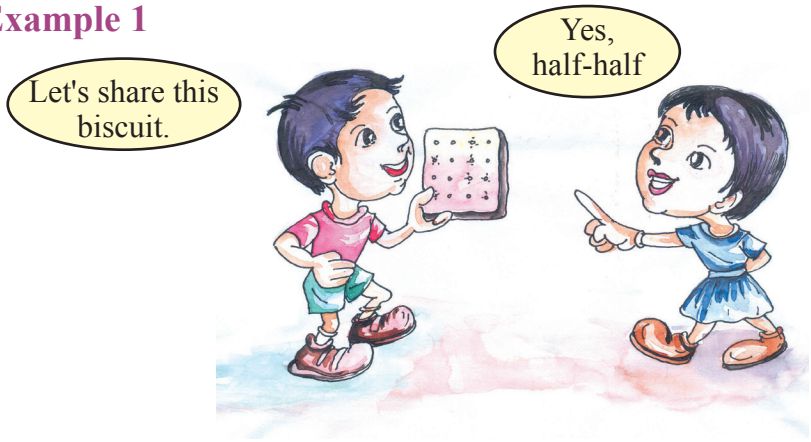
- explain the meaning of fraction,
- write fraction for the given situation,
- give examples for fractions,
- compare the fractions having,

  a) equal denominators b) equal numerators.
- identify the greater or smaller fractions,
- explain the meaning of equivalent fraction,
- write equivalent fractions for a given fraction,
- identify equivalent fractions,
- locate $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$ on the number line,
- estimate the degree of closeness of a given fraction,
- simplify the larger unit fractions into smaller unit fraction (dividing by common number).

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Fraction as a part of the whole.

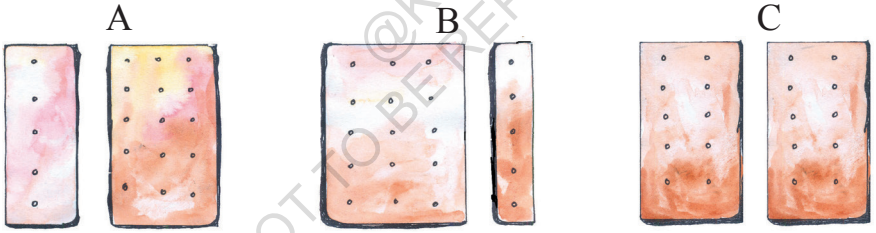
Example 1



When you say **'half- half',** into how many parts are you going to break the whole ? Two parts.

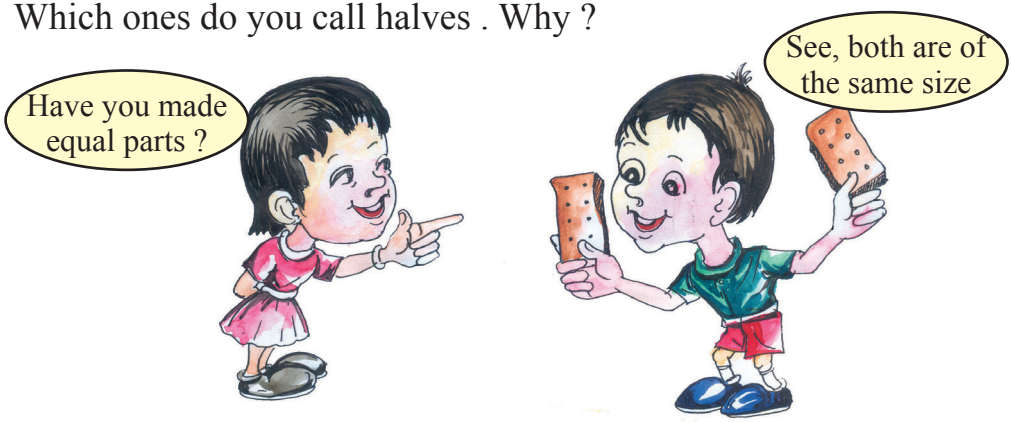
Two halves make one whole.

Study the pairs given below.



Two unequal parts Two unequal parts Two equal parts

Which ones do you call halves . Why ?



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In fig C, the whole is divided into two equal parts.

Each part is a half.

Half is expressed as $\frac{1}{2}$.

Example 2g

Look at these circular cutouts. Each has been divided into four parts. Is there any difference in the way they have been divided?

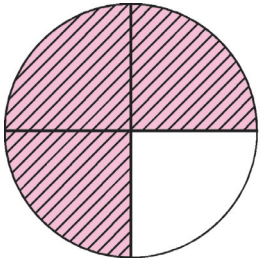


fig 2(a)

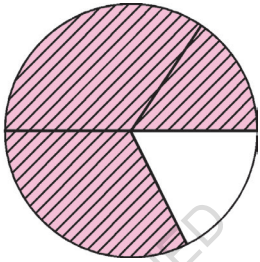


fig 2(b)

In fig 2(a) we can choose any part and say that it is one-fourth of the circular cutout, as equal parts are made.

Can we do the same in fig 2 (b) ? …… No. Why ?

The important point is that, to express a fraction as part of a whole, we must divide the whole into equal parts.

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Example 3

Look at the rectangle. What portion of the rectangle is coloured green ?



It is one out of the three. Here, the whole rectangle is divided into 3 equal parts.

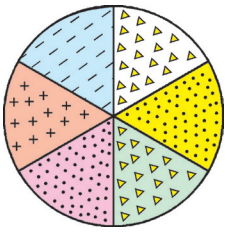
One such equal part is coloured green. It is written as $\frac{1}{3}$

Example 4

Look at this circle.

Into how many equal parts is the circle divided ?

It is divided into 6 equal parts.



How many parts of the circle is marked with plus sign (+) ?

It is one out of six parts. It is written as $\frac{1}{6}$.

How many parts of the circle is marked with dots ?

It is two out of six. It is written as $\frac{2}{6}$.

Numerator and Denominator

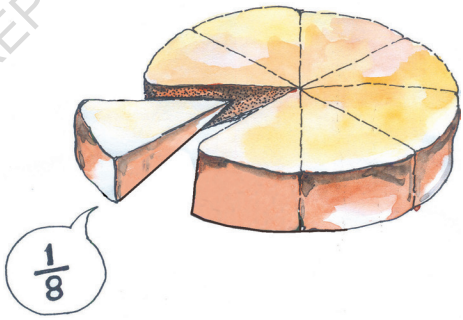
Look at the fractions : $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$

A fraction consists of two numbers written one above the other, separated by a line. The number above the line is called the **numerator** and the number below the line is called the **denominator**.

Numerator	$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$
Denominator	

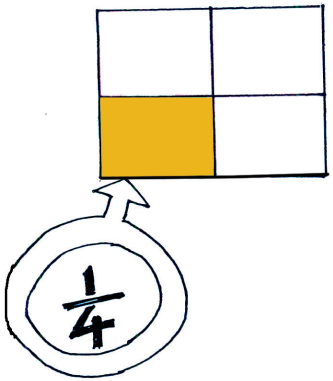
A cake is divided into 8 equal parts. One equal part is represented as $\frac{1}{8}$.

$\frac{1}{8}$ is a fraction. The total number of parts is the denominator. The part taken out is 1. This is represented as the numerator.



$$\frac{1}{8} \rightarrow \frac{\text{Numerator}}{\text{Denominator}}$$

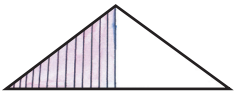
In this figure 1 out of 4 equal parts is coloured.



$$\frac{1}{4} \rightarrow \frac{\text{Numerator}}{\text{Denominator}}$$

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Observe the triangle given below.

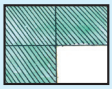


$$\frac{\text{No. of coloured parts}}{\text{Total no. of equal parts made}} = \boxed{\frac{1}{2}} \begin{matrix} \rightarrow \text{Numerator} \\ \rightarrow \text{Denominator} \end{matrix}$$

$$\frac{\text{No. of uncoloured parts}}{\text{Total no. of equal parts made}} = \boxed{\frac{1}{2}} \begin{matrix} \rightarrow \text{Numerator} \\ \rightarrow \text{Denominator} \end{matrix}$$

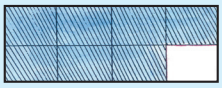
From these examples we conclude that,

- Fraction is a part of a whole.
- To write a fraction we need two numbers.
- The number of equal parts into which the whole is divided, forms the denominator.
- The number of equal parts selected or shaded, forms the numerator.



$\frac{3}{4}$ → Numerator / Denominator ← $\frac{7}{8}$

Three by four



Seven by eight

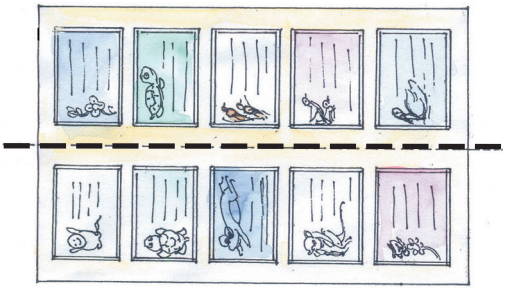
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Fraction as a part of collection

Example 1

This is a collection of 10 labels. Divide this collection into two equal parts. Each of these parts will have 5 labels.

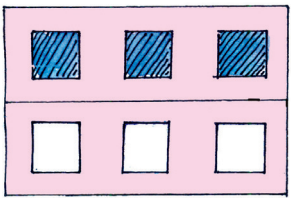
So $\frac{1}{2}$ of 10 is 5.



Example 2

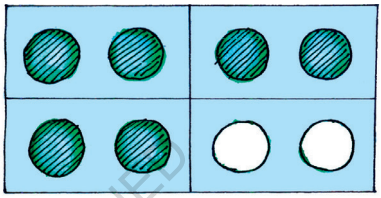
Study the fractional part of the following collections.

a) $\frac{1}{2}$ of this collection is coloured.



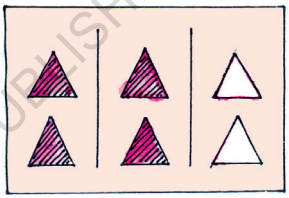
$\therefore \frac{1}{2}$ of 6 is 3

b) $\frac{3}{4}$ of this collection is coloured



$\therefore \frac{3}{4}$ of 8 is 6

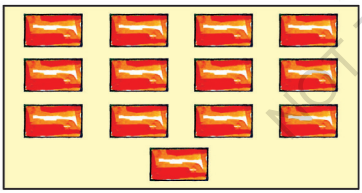
c) $\frac{2}{3}$ of this collection is coloured.



$\therefore \frac{2}{3}$ of 6 is 4

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Example 3



Abdul has 13 pieces of Mysore paks in his plate. He gives 2 pieces of Mysore paks to his friend D' souza.

Can you tell what part of Mysore paks does D'Souza get ? It is 2 out of 13.

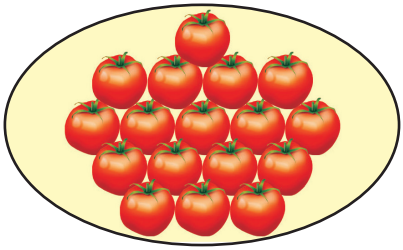
Here 13 is total number in the collection. 2 is the number taken.

Therefore it can be represented by $\frac{2}{13}$.

It is read as two by thirteen or two thirteenth.

Example 4

Manohar sells tomatoes in his shop.



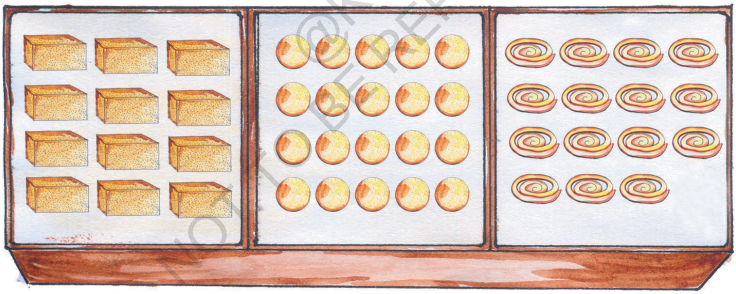
There are 17 tomatoes of equal size in the tray. He weighs half a kg tomatoes and gets 5 tomatoes. Can you tell what part of tomatoes does he get ? It is 5 out of 17.

Here 17 is the total number in the collection. 5 is the number of tomatoes taken.

Fraction as a part of the Group

Example 1 :

This is Hari's sweet shop.



Mysore paks Laddus Jilebees.

What are the sweets available in Hari's sweet shop ?

On what part of the shelf does he keep Laddus ?

It is $\frac{1}{3}$ and read as one third or one by three.

Hari wants to sell $\frac{7}{20}$ of Laddus to Viju.

How many Laddus does Viju get ? It is 7.

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Example 2

This is Mani's vegetable shop.

Brinjals Potatoes Tomatoes



Chillies Carrots Tomatoes

Which vegetable is kept in the largest area ? .....

What part is it ? ..... It is $\frac{2}{6}$ or $\frac{1}{3}$

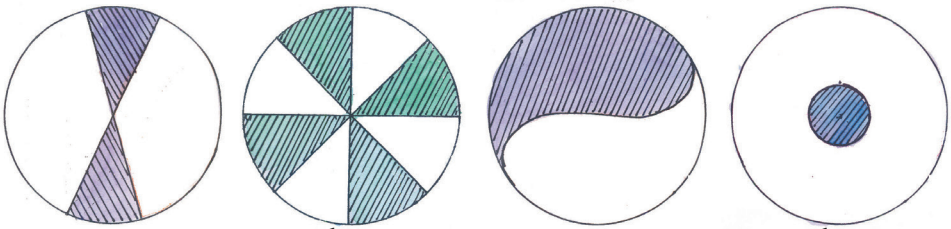
What part of the area is used to keep carrots ? It is $\frac{1}{6}$

From the above examples we conclude that, fraction is a part of a collection in a group.

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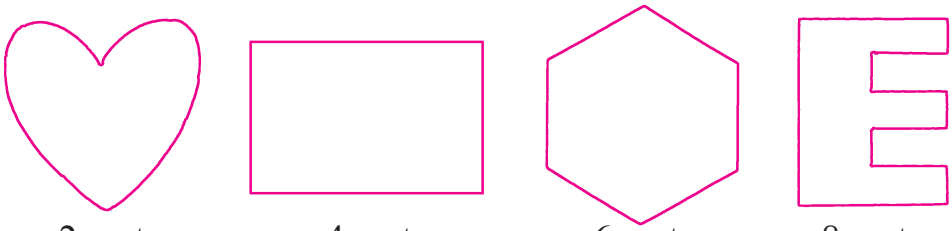
Exercise 5.1

1) Which of the following figures have been divided into parts of the same size ?



a b c d

2) Draw a line or lines to divide each of these figures into the required number of equal parts.



2 parts 4 parts 6 parts 8 parts

3) Write each of the following as a fraction.

a) Half
b) Two-third
c) Two-tenth
d) Five-seventh
e) Five-sixteenth
f) Five-twelveth
g) Eight-nineth.
h) Four-nineth
i) Three-fourth
j) Two-fifth

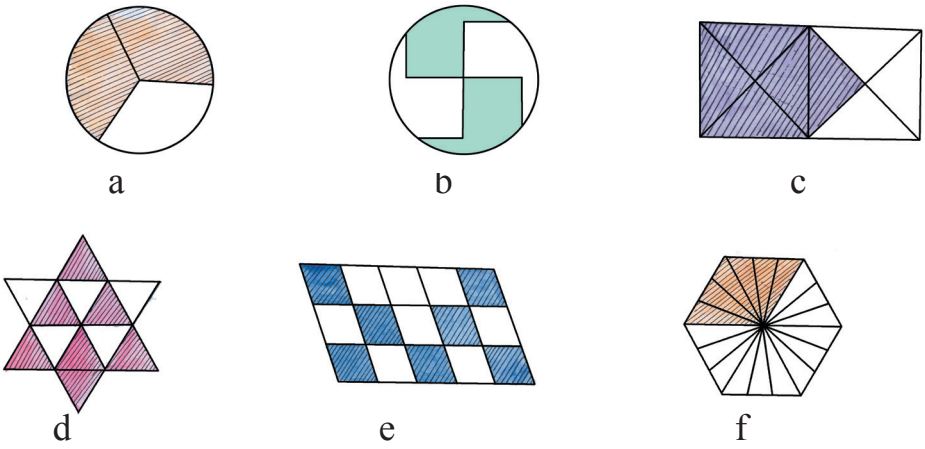
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4) Write each of the fraction in words.

a) $\frac{2}{5}$ b) $\frac{3}{4}$ c) $\frac{7}{10}$ d) $\frac{11}{12}$ e) $\frac{2}{3}$

f) $\frac{4}{5}$ g) $\frac{5}{8}$ h) $\frac{3}{7}$ i) $\frac{5}{6}$ j) $\frac{7}{9}$

5) What fraction of the figure is shaded ?



a b c

d e f

6) Fill in the blanks.

a) The denominator of the fraction $\frac{1}{8}$ is …….

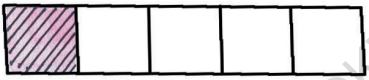
b) The numerator of the fraction $\frac{2}{5}$ is …….

c) 3 is the……..of the fraction $\frac{1}{3}$.

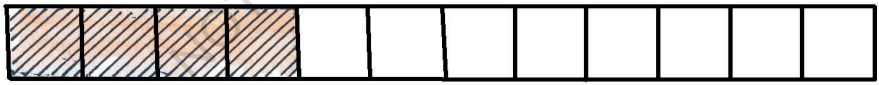
d) 1 is the ……of the fraction $\frac{1}{5}$.

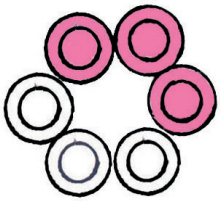
e) In a fraction, the denominator is written below the …….. separated by a line.

7) Write down the fraction of the coloured portions in these figures.

a) 

b) 

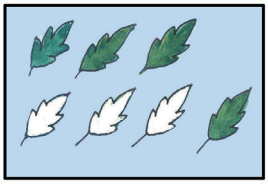
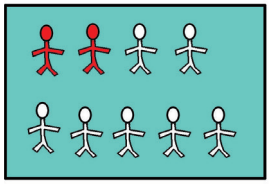
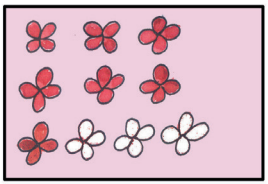
c) 

d) 

e) 

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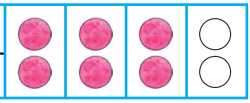
8) Write the fraction for the shaded part in each of the following figures.

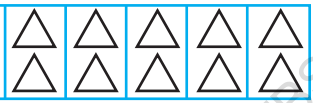
....

9) Colour the figures as instructed.

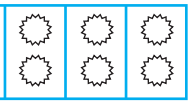
Example : Colour $\frac{3}{4}$



a. Colour $\frac{1}{5}$



b. Colour $\frac{2}{3}$



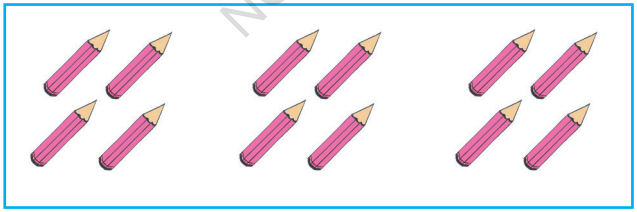
c. Colour $\frac{2}{9}$



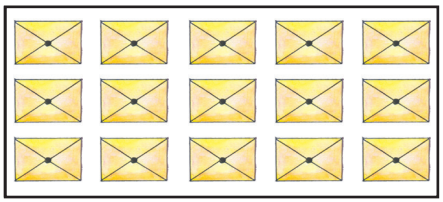
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10) Represent the given fraction by drawing a line.

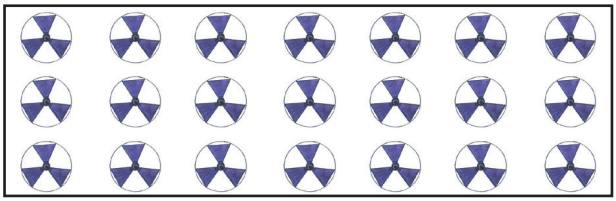
a) What is $\frac{1}{3}$ of 12 ?



b) What is $\frac{2}{5}$ of 15 ?

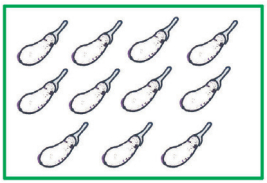


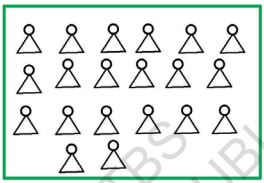
c) What is $\frac{2}{7}$ of 21 ?

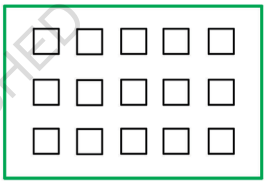


11) Shade the figures to show the fractions.

a) $\frac{6}{11}$ b) $\frac{7}{20}$ c) $\frac{8}{15}$







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12) Which of the following shaded figures represent $\frac{4}{9}$?

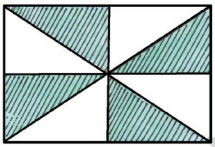


fig 1

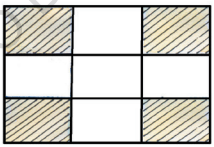


fig 2

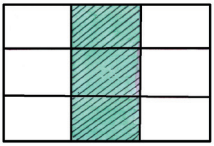


fig 3

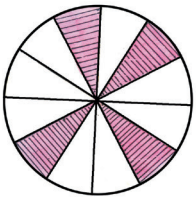


fig 4

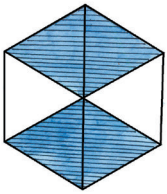


fig 5

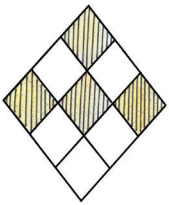


fig 6

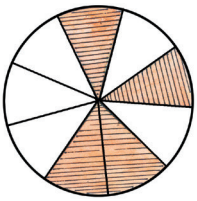
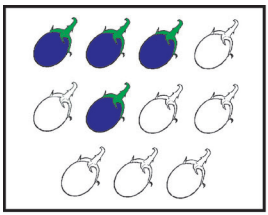
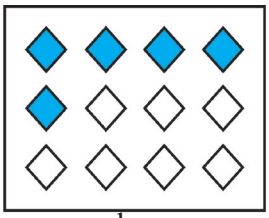


fig 7

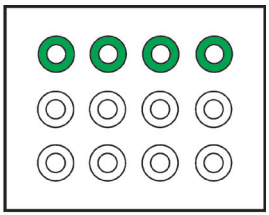
13) Which of the following shaded figures represent $\frac{5}{12}$? Discuss the reason.



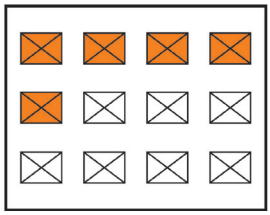
a



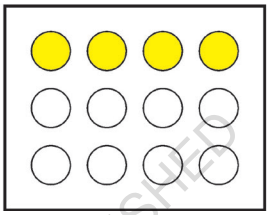
b



c

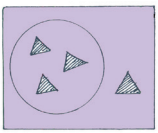


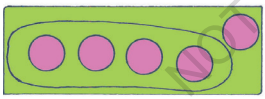
d

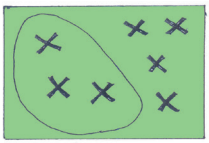


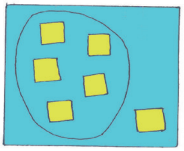
e

14) Represent the grouped parts as fractions.

Example  → $\frac{3}{4}$

a) 

b) 

c) 

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Comparison of fractions

Comparison of fractions having same denominators.

Example 1

Look at the shaded parts of the following figures.



$\frac{1}{7}$



$\frac{3}{7}$

Are the shaded parts of each figure equal in size ?

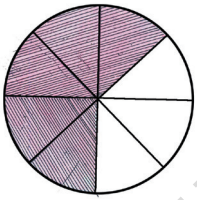
Here $\frac{1}{7}$ is smaller than $\frac{3}{7}$.

Symbolically, we write $\frac{1}{7} < \frac{3}{7}$

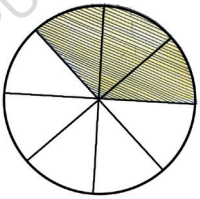
Observe that denominator 7 is the same, in both fractions.

Numerator 1 is smaller than numerator 3.

Example 2



$\frac{5}{8}$



$\frac{3}{8}$

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Here $\frac{5}{8}$ is greater than $\frac{3}{8}$.

Denominator 8 is same. Numerator 5 is greater than numerator 3.

Symbolically, we write $\frac{5}{8} > \frac{3}{8}$

From these examples, we conclude that if fractions have the same denominator, then

i) smaller the numerator, smaller is the value of the fractional number,

ii)greater the numerator, greater is the value of the fractional number.

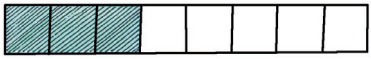
Comparison of fractions having same numerators.

Example 1 :

Look at the shaded parts of the following figures.



$\frac{3}{5}$



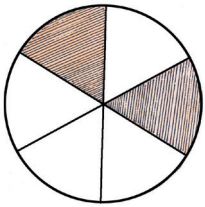
$\frac{3}{8}$

Which shaded part is greater ?

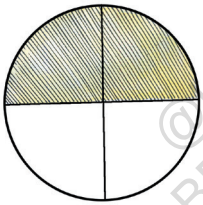
$\frac{3}{5}$ is greater than $\frac{3}{8}$

Example 2

Which shaded part is greater ?



$\frac{2}{6}$



$\frac{2}{4}$

$\frac{2}{4}$ is greater than $\frac{2}{6}$

Symbolically we write $\frac{2}{4} > \frac{2}{6}$

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In both these cases, the numerator is same. We observe that, a fraction having lesser denominator is greater.

We can conclude that, if fractions have the same numerator, then

i) greater the denominator, smaller the value of the fractional number,

ii) smaller the denominator, greater the value of the fractional number.

Example :

1) $\frac{4}{13}$ is lesser than $\frac{4}{9}$

$\frac{4}{13} < \frac{4}{9}$

2) $\frac{5}{7}$ is greater than $\frac{5}{9}$

$\frac{5}{7} > \frac{5}{9}$

Exercise 5.2

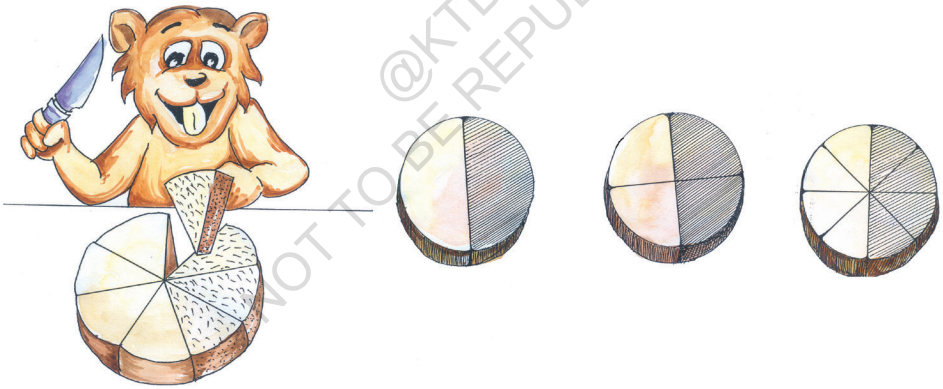
Fill in the gaps using > or < signs.

1. $\frac{3}{5} \square \frac{3}{7}$
2. $\frac{9}{15} \square \frac{9}{11}$
3. $\frac{4}{7} \square \frac{4}{5}$
4. $\frac{5}{12} \square \frac{7}{12}$
5. $\frac{6}{17} \square \frac{3}{17}$
6. $\frac{5}{19} \square \frac{11}{19}$
7. $\frac{12}{21} \square \frac{12}{15}$
8. $\frac{11}{17} \square \frac{11}{15}$
9. $\frac{6}{11} \square \frac{6}{15}$
10. $\frac{14}{23} \square \frac{5}{23}$
11. $\frac{17}{20} \square \frac{12}{20}$
12. $\frac{11}{15} \square \frac{8}{15}$

EQUIVALENT FRACTIONS

Example 1 :

Look at these cakes.



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The shaded part of all the figures are equal in size.

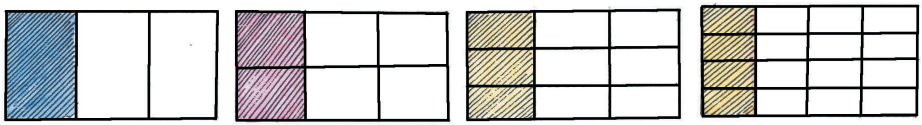
We notice that in each case half of the figure is shaded.

$\therefore \frac{1}{2} = \frac{2}{4} = \frac{4}{8}$

These fractions are called **"Equivalent fractions."**

> **Fractions which indicate the same value are said to be equivalent fractions.**

Example 2 : Observe the following figures.



$\therefore \quad \frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$

$\frac{1}{3} = \frac{1}{3} \times \frac{2}{2} = \frac{1 \times 2}{3 \times 2} = \frac{2}{6}$; $\frac{1}{3} = \frac{1}{3} \times \frac{3}{3} = \frac{1 \times 3}{3 \times 3} = \frac{3}{9}$;

$\frac{1}{3} = \frac{1}{3} \times \frac{4}{4} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$ and so on.....

Thus, **to find equivalent fractions, multiply the numerator and the denominator of the fraction by the same number (other than zero).**

Example 3 : Write two equivalent fractions of $\frac{3}{7}$.

$\frac{3}{7} = \frac{3}{7} \times \frac{2}{2} = \frac{3 \times 2}{7 \times 2} = \frac{6}{14}$; $\frac{3}{7} = \frac{3}{7} \times \frac{3}{3} = \frac{3 \times 3}{7 \times 3} = \frac{9}{21}$

$\therefore \frac{3}{7} = \frac{6}{14} = \frac{9}{21}$

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Checking the equivalence of fractions.

Example 4 : a) $\frac{3}{4}$ and $\frac{9}{12}$

$\frac{3}{4} \times \frac{9}{12}$ (cross multiply)

$3 \times 12 = 36$

$4 \times 9 = 36$

$36 = 36$

$\therefore \frac{3}{4} = \frac{9}{12}$

$\frac{3}{4}$ is equivalent to $\frac{9}{12}$

b) $\frac{2}{7}$ and $\frac{6}{18}$

$\frac{2}{7} \times \frac{6}{18}$ (cross multiply)

$2 \times 18 = 36$

$7 \times 6 = 42$

$36 \neq 42$

$\frac{2}{7} \neq \frac{6}{18}$

$\frac{2}{7}$ is not equivalent to $\frac{6}{18}$

We conclude that in given two fractions,

i) if the two fractions are cross multiplied and the products are equal, then the fractions are equivalent.

ii) if the two fractions are cross multiplied and the products are not equal, then the fractions are not equivalent.

Finding equivalent fraction with given numerator and denominator.

Example 5 : a) $\frac{2}{5} = \frac{\square}{15}$

$\frac{2}{5} = \frac{2 \times \boxed{3}}{5 \times 3} = \frac{\boxed{6}}{15}$

b) $\frac{3}{7} = \frac{12}{\square}$

$\frac{3}{7} = \frac{3 \times 4}{7 \times \boxed{4}} = \frac{12}{\boxed{28}}$

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Exercise 5.3

I Complete the series.

1) $\frac{2}{3} = \frac{4}{6} = \frac{\square}{9} = \frac{8}{\square}$

2) $\frac{5}{7} = \frac{\square}{14} = \frac{15}{\square} = \frac{\square}{42}$

II. Write the next three equivalent fractions.

1) $\frac{2}{5}, \frac{4}{10},$ ....., ..., ...

2) $\frac{3}{8}, \frac{6}{16},$ ....., ..., ...

3) $\frac{9}{11}, \frac{18}{22},$ ....., ..., ...

III. Are the two fractions equivalent ? Mark with ✓ or ✗

1) $\frac{3}{5}$ and $\frac{18}{30}$

2) $\frac{12}{17}$ and $\frac{8}{20}$

3) $\frac{2}{7}$ and $\frac{7}{21}$

4) $\frac{5}{11}$ and $\frac{25}{55}$

IV. Find an equivalent fraction of $\frac{4}{7}$ having

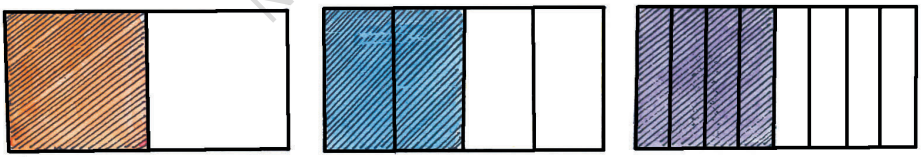
1) 16 as numerator
2) 24 as numerator
3) 21 as denominator
4) 84 as denominator

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Simplification of fractions

Example 1

Look at the equivalent fractions.



$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$; $\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$; $\frac{1}{2} = \frac{1 \times 4}{2 \times 4} = \frac{4}{8}$

$\therefore$ We can write these as $\frac{4}{8} = \frac{2}{4} = \frac{1}{2}$

How can we get $\frac{2}{4}$ and $\frac{1}{2}$ as the equivalent fractions of $\frac{4}{8}$?

$$\frac{4}{8} = \frac{4}{8} \div \frac{2}{2} = \frac{4 \div 2}{8 \div 2} = \frac{2}{4}$$

$$\frac{4}{8} = \frac{4}{8} \div \frac{4}{4} = \frac{4 \div 4}{8 \div 4} = \frac{1}{2}$$

From the above examples, we can conclude that, equivalent fractions are obtained by dividing the numerator and the denominator of the given fraction by the same number (except 0).

Example 2 :

$\frac{3}{9} = \frac{3}{9} \div \frac{3}{3} = \frac{3 \div 3}{9 \div 3} = \frac{1}{3}$ Thus, $\frac{3}{9} = \frac{1}{3}$

$\frac{8}{16} = \frac{8}{16} \div \frac{8}{8} = \frac{8 \div 8}{16 \div 8} = \frac{1}{2}$ Thus, $\frac{8}{16} = \frac{1}{2}$

$\frac{8}{16} = \frac{8}{16} \div \frac{4}{4} = \frac{8 \div 4}{16 \div 4} = \frac{2}{4}$ Thus, $\frac{8}{16} = \frac{2}{4}$

$\frac{8}{16} = \frac{8}{16} \div \frac{2}{2} = \frac{8 \div 2}{16 \div 2} = \frac{4}{8}$ Thus, $\frac{8}{16} = \frac{4}{8}$

$\frac{15}{25} = \frac{15}{25} \div \frac{5}{5} = \frac{15 \div 5}{25 \div 5} = \frac{3}{5}$ Thus, $\frac{15}{25} = \frac{3}{5}$

To get a simplified form of a fraction with lower terms, divide the numerator and the denominator of the given fraction by the same number.

In this case the value of the equivalent fractions remain the same as the given fraction.

Example 3

Reduce the fraction $\frac{36}{42}$ to its lowest form.

$\frac{36}{42} = \frac{36}{42} \div \frac{2}{2} = \frac{36 \div 2}{42 \div 2} = \frac{18}{21}$ (both the numerator and denominator are divided by same number 2.)

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Can you reduce $\frac{18}{21}$ further ?

$\frac{18}{21} = \frac{18}{21} \div \frac{3}{3} = \frac{18 \div 3}{21 \div 3} = \frac{6}{7}$ (divide both by the same number 3.)

Can you reduce $\frac{6}{7}$ further ?

The only number by which both 6 and 7 can be divided is 1. When you reach this stage, you get the lowest form.

Or

$\frac{36}{42} = \frac{36}{42} \div \frac{6}{6} = \frac{36 \div 6}{42 \div 6} = \frac{6}{7}$

1. Reducing a fraction to its lowest form is called simplification of fraction.

2. To get the simplest form of a given fraction, go on dividing the numerator and the denominator by the same number until you get lowest form.

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Exercise 5.4

I. Reduce each of the following fractions into its lowest form.

1) $\frac{8}{16}$ 2) $\frac{5}{10}$ 3) $\frac{54}{108}$ 4) $\frac{4}{20}$ 5) $\frac{3}{15}$

6) $\frac{12}{16}$ 7) $\frac{9}{27}$ 8) $\frac{36}{48}$ 9) $\frac{24}{56}$ 10) $\frac{24}{72}$

Chapter - 6

ANGLES

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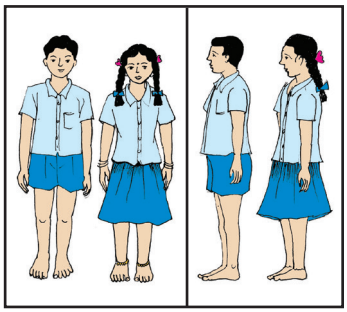
After studying this Chapter you can,

- explain the meaning of an angle with the help of folded paper, sticks, hands of a clock etc.,
- identify the situations and objects where angles are formed in the surrounding environment,
- measure and name the different angles,
- identify right angle, acute angle and obtuse angle in the environment,
- identify and use skillfully the instruments from a geometrical instrument box,
- trace and draw right angle, acute angle and obtuse angle.

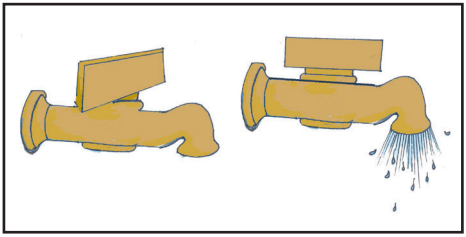
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Let us observe some of the daily activities.

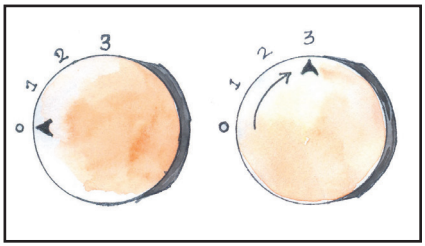
- When you stand in a line for marchfast, you will turn to your right or to your left, according to the instructions. While turning can you say how much you have turned ?



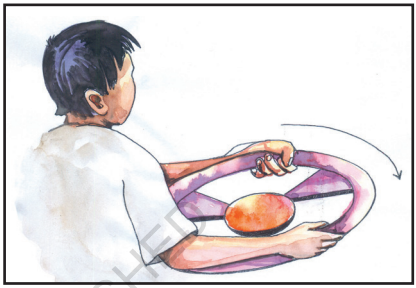
- How much you have to turn the tap to get water ?



- Have you observed the regulator of a fan? To increase or decrease the speed of a fan, we have to turn the knob of the regulator. In the figure, the knob of the regulator has been turned from **0** to **3**. What is the measure of this rotation?

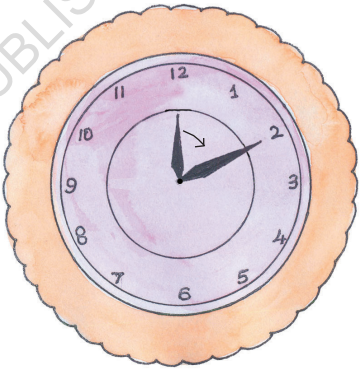


- The bus driver will turn the steering wheel of the bus. How can you measure the rotation of steering wheel ?



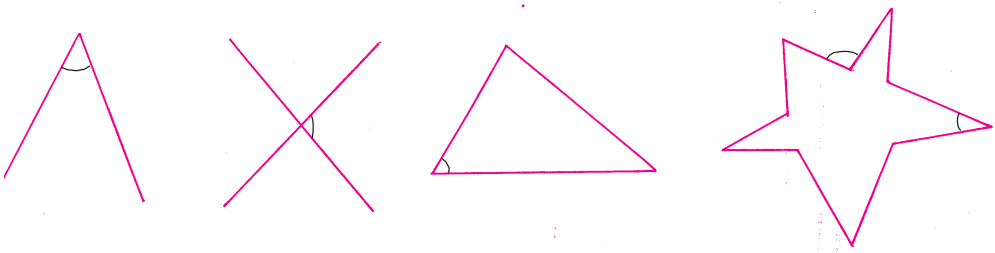
Angles

- The minute hand of a clock will turn in 10 minutes as shown in the figure. Here the rotation of the needle can be represented as an **angle**. This angle has two arms (sides) and one common point.



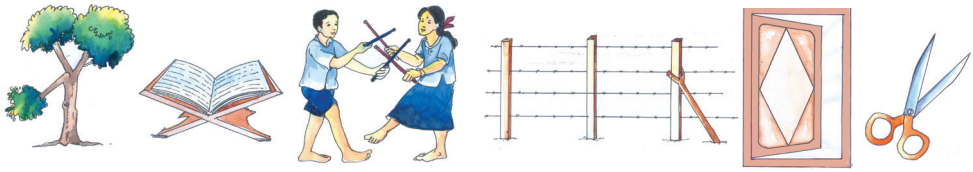
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Observe the following geometrical figures having angles.

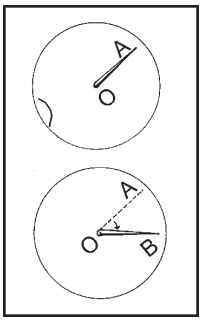


In the above figures, some angles are marked by drawing lines. Identify the remaining angles by drawing lines as shown.

We can observe the same type of angles in the environment and in our daily activities. Identify the angles in the following figures by drawing lines.



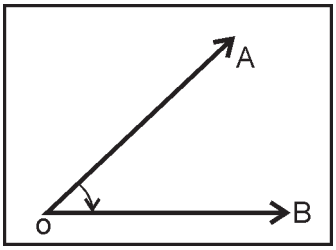
Activity : Cut a piece of cardboard in circular shape. Mark its centre as O. Take a plastic stick and fix it to the centre of the circle. The distance of the stick is marked as OA. Now rotate the plastic stick. Mark the distance of the stick as OB. The stick has moved from the point A to the point B without changing its place at **O**. This measure of the movement of the stick is called **Angle**.



An angle has two rays and one common end point.

Representation of an angle

Here $\overrightarrow{OA}$ and $\overrightarrow{OB}$ are the two rays. These are the arms or the sides of the angle. The point **O** is called the vertex of the angle. An angle is represented by the symbol '∟' or and denoted by capital letters of the English alphabet.



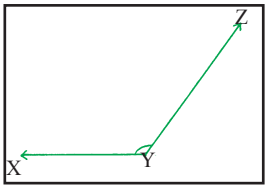
In the above figure AOB is the angle. We can represent the angle AOB as ∟**AOB** or ∟BOA The middle letter represents the vertex of the angle.

Do you know : The word **angle** has been originated from the Greek word **angiloose**. Angiloose means curved, slanted or not straight. The space between the leg and the foot is called **ankle**.

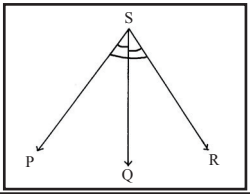


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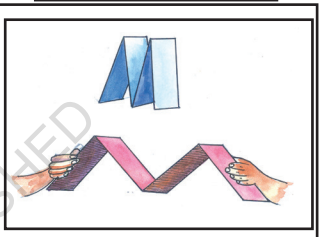
In the adjoining figure, XYZ is the angle. It is represented as $\angle XYZ$ or $\angle ZYX$. It is also represented as $\hat{XYZ}$ or $\hat{ZYX}$



Angles in the adjoining figure are $\angle PSQ$, $\angle QSR$ and $\angle PSR$.



Do yourself : Take a thick sheet of paper and fold it as shown in the figure. Make the shape of **M**. Observe the angles formed here. When you spread the outer fold, you can observe that the measure of angles between these folds will increase.



In the same way fold the paper to represent the letters V, L, E, N, T, Z etc. Observe the angles formed in the folds.

Fold the paper and make different shapes and observe the angles formed in them.

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Exercise 6.1

1) Observe your surrounding environment and list the situations where the angles are formed.
2) Observe the angles formed while doing the following yogasana postures.



Trikonasana



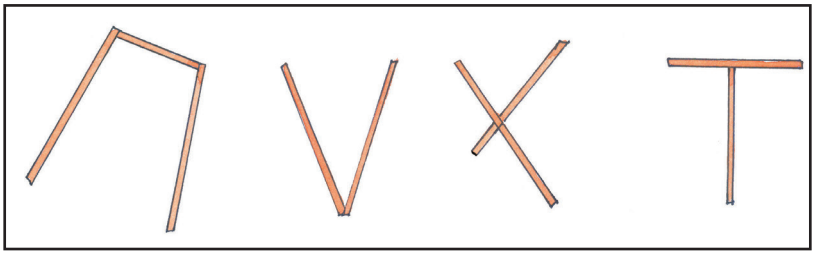


Upavishtakonasana



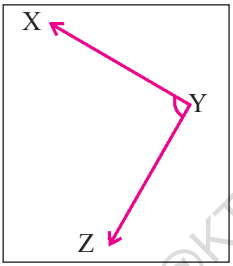
Halasana

3) Pavan has arranged sticks as shown in the figure. Observe the angles formed here and mark the angles by drawing lines.



4) Name the angle, vertex and the sides in the following figures.

Example :

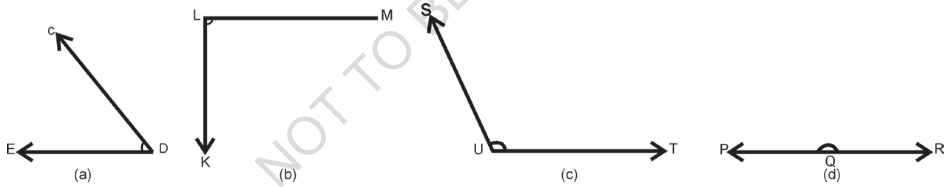


Angle - $\angle XYZ$

Vertex - Y

Sides - $\overrightarrow{YX}$ and $\overrightarrow{YZ}$

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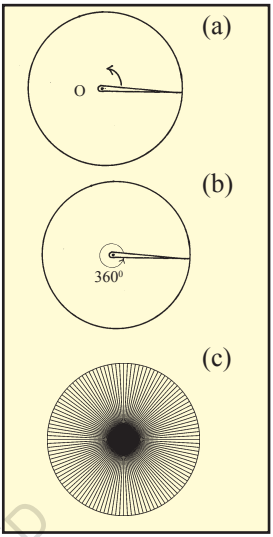


Measurement of an angle

Mamata has got two clocks. In one clock the time shown is 3 hours 30 minutes. In another clock, the time shown is 9 hours 30 minutes. In which clock the angle formed between hour hand and minute hand is greater ?



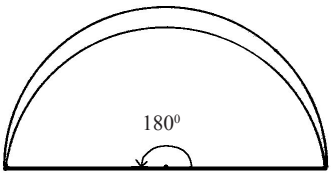
In order to answer the above question, let us understand how to measure an angle. Take a circular cardboard, and fix a plastic needle at the centre. Rotate the needle from a fixed position. When this needle comes back to its original position, one rotation will be completed. We call this rotation as one **complete angle.** This one rotation will trace one circle. If the circle is equally divided into 360 parts, we get 360 equal angles. This one angle is called **one degree.** One degree is denoted as $\mathbf{1^0}$ **(**We read as **one degree).** So the measure of one complete angle is 360^0 (360 degrees).

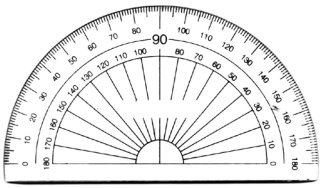


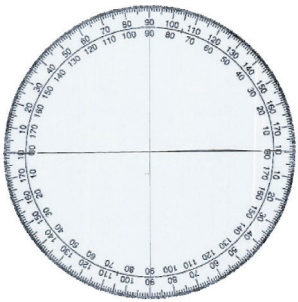
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Protractor

Mark the centre of a circular paper. Fold the paper along its centre as shown in the figure. The measure of the angle at the centre is 360^0. Therefore, half of this must be 180^0. This measure of 180^0 is called **straight angle**. There is an instrument in your geometry instrument box called **protractor**. Observe its shape. We can measure the angle using protractor. In this protractor 0^0 to 180^0 is marked from left to right and also 0^0 to 180^0 from right to left. So the maximum angle measured by this protractor is 180^0.



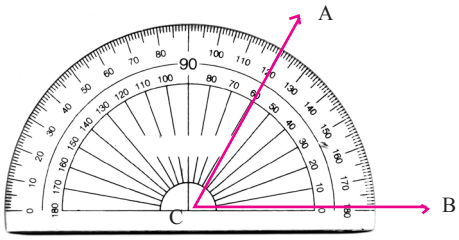




Do you know : There are complete protractors which measure an angle of upto 360^0.

Method of measuring a given angle using protractor :

Let us measure $\angle ACB$ with the help of a protractor.

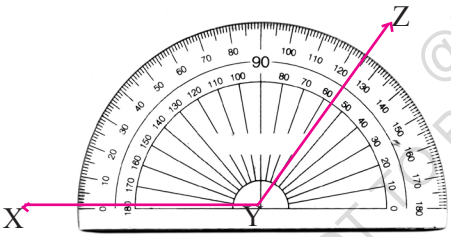


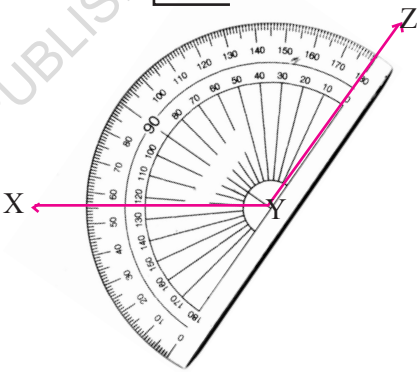
Steps :

1) Place the protractor on $\angle ACB$ as shown in the figure. The point **O** of the protractor should exactly coincide with the vertex **C** of $\angle ACB$. One side of the angle, CB should coincide with the base line (0^0) of the protractor.

2) Now count from 0^0 and move towards A. This means from CB count $10^0, 20^0, 30^0$ ..... till other side CA of the angle coincide with 60^0 in the protractor. So the measure of $\angle ACB$ is 60^0.

Activity 1





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Ranjit measures and reads the $\angle XYZ$ as 55^0.

Is he correct ? Why ?

Discuss with your teacher and friends the points to be considered while measuring an angle.

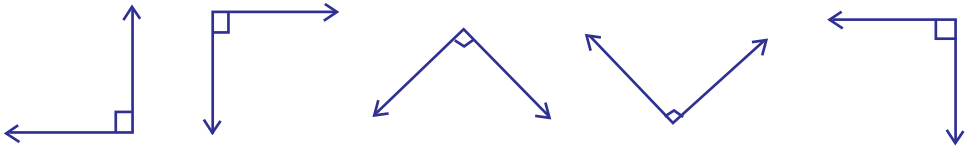
Note : An angle has two arms. While measuring the angle, either of the arms can be coincided with the 0^0 line of the protractor, then the measure of the angle remains the same.

Activity 2 : Prepare a protractor and complete that protractor with the help of a circular cardboard piece and try to measure the angles using them. Discuss the problems that you face here.

Types of Angles

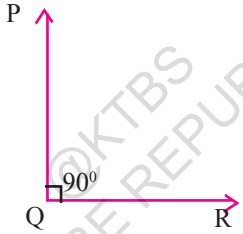
Right angle

Measure the following angles.



The measure of all the angles are equal to 90^0. The angle having its measure as 90^0 is called **right angle.** In a right angle two sides of an angle are perpendicular to each other.

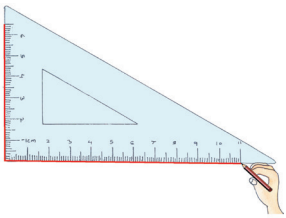
In the figure $\angle PQR = 90^0$. We say the side PQ is at right angle to side QR. Observe the way of denoting right angle (90^0).



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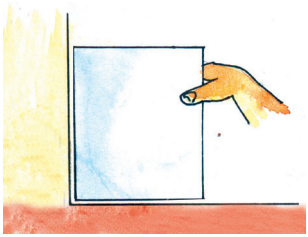
Activity 1 : Fold a circular paper through its centre. The measure of the angle is 180^0. When you fold it through its centre once again, examine whether you get a right angle.

Activity 2 : Take a set square from your geometry instrument box and trace its edges as shown in the figure. Examine whether it is a right angle.

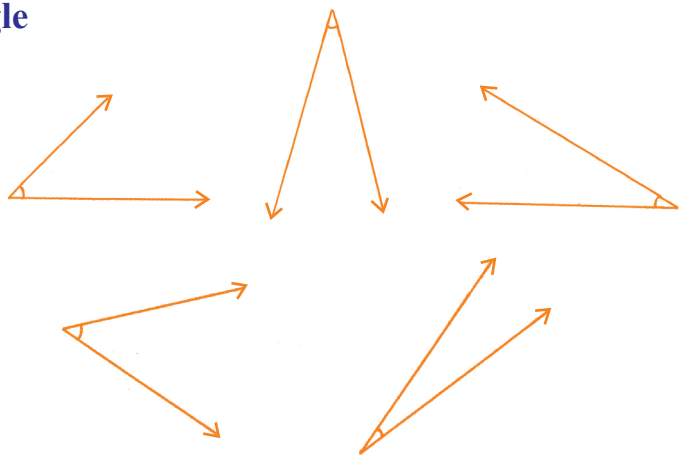


We can observe the formation of many right angles around us.

For example, the angle formed between the adjacent edges of paper of a book, the angle formed between wall and floor, the angle formed between a wicket which is straight and the ground etc.



Acute angle

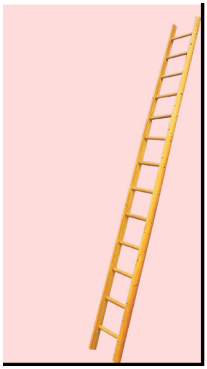


Measure the above angles and record them. All these angles are less than 90^0 or a right angle. Such angles whose measures are less than 90^0, are called **Acute angles.**

Observe the following examples and mark the acute angles.

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- The ladder kept inclined to a wall.



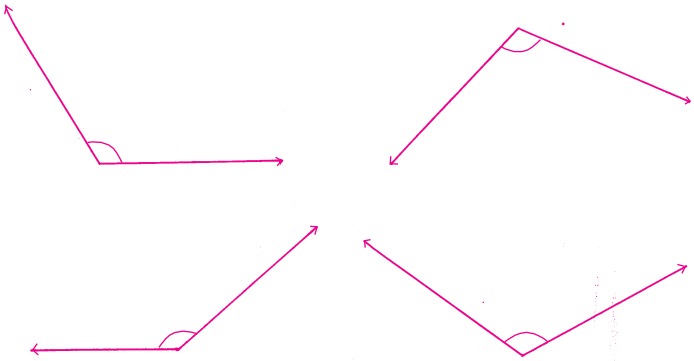
- The angle formed between two hands of a scissors



- The photo kept inclined to a wall.



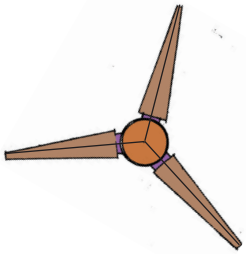
Obtuse angle



Measure the angles given above and record them. All these angles have measures more than 90^0 or a right angle and less than 180^0 or a straight angle. Such angles whose measures are more than 90^0 and less than 180^0 are called **Obtuse angles.**

Observe the following examples and mark the obtuse angles.

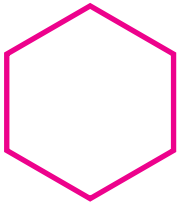
- The fan which has 3 blades.





- The boy standing with lifted hands.

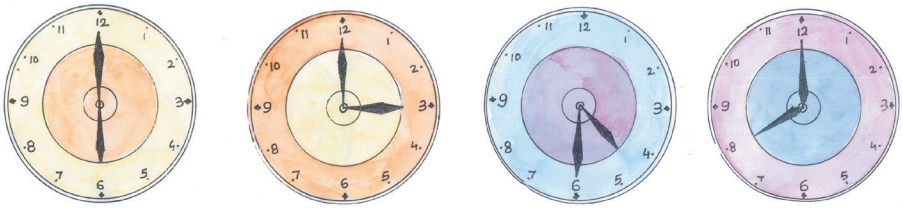
- Angles formed in this figure



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Angles in a clock

You have observed many types of angles formed between the hour hand and the minute hand in a clock. Observe the angles formed between the hands when the clock shows the following timings.

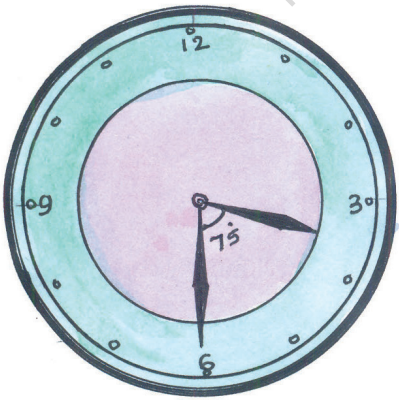


When the minute hand needle rotates once, it turns 360^0. Then the hour hand needle will turn 30^0. Based on this idea, discuss the following questions.

- Among the 12 numbers marked in a clock, what is the angle formed between one number of a clock and its nearest number ?
- What is the angle formed between the two hands when the clock is showing 10 hours 30 minutes ?
- In a day, how many times right angle will be formed between the hour hand and minute hand ?

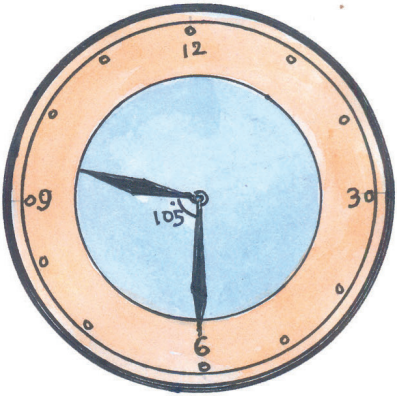
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3 hours 30 minutes



Acute angle

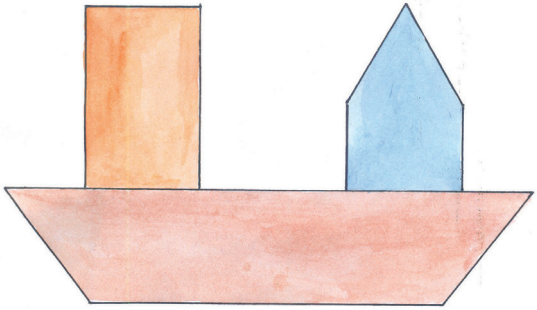
9 hours 30 minutes



Obtuse angle

Activity

1) Mark the right angles in the figure with red colour, acute angles with green colour and obtuse angles with blue colour. List their numbers.

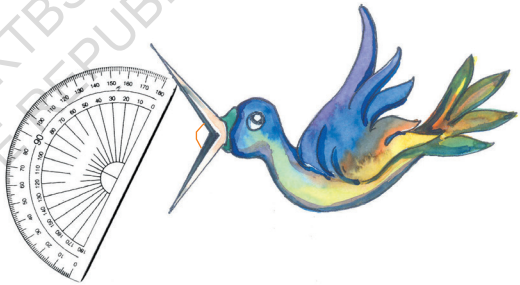


Right angle = ...

Acute angle = ...

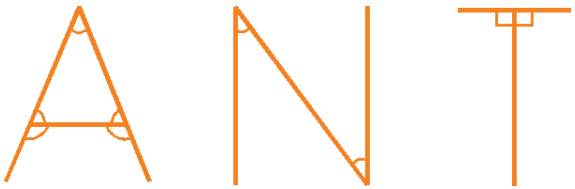
Obtuse angle = ...

2) Observe the angle between the beaks of the bird. Identify whether it is right angle, acute angle or obtuse angle.



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3) Mark the different angles formed in each letter of the word "ANT". Mention the number of each type of angles found.

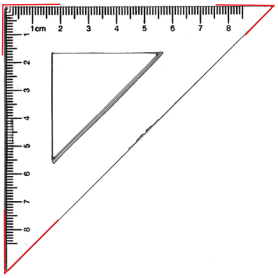


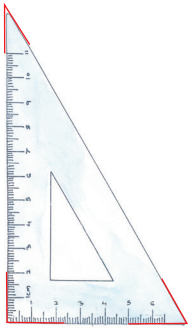
Right angle .....

Acute angle .....

Obtuse angle .....

4) Use the set squares from your geometry instrument box and construct angles of measure 90^0, 60^0 and 45^0 as shown in the figure. Verify by measuring them using protractor.



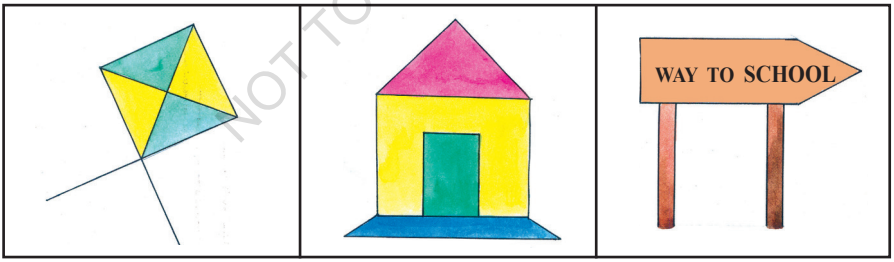


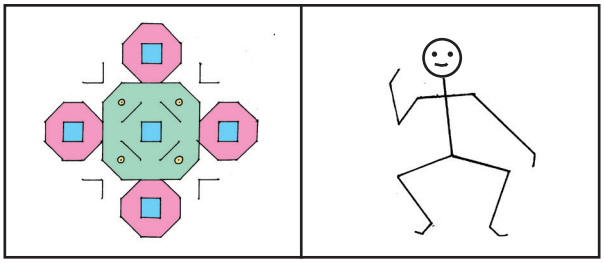
Think : Using set squares, can you construct the angles 15^0, 75^0, 105^0 and 120^0 ? How ?

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Exercise 6.2

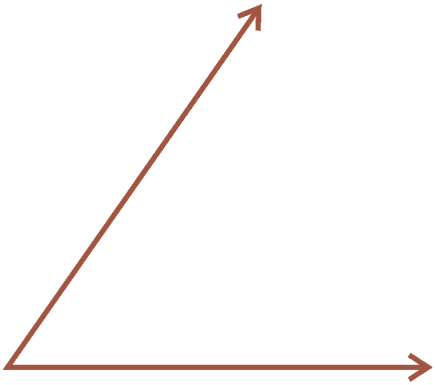
1) Mark the right angle, acute angle and obtuse angle with different colours in the following figures.



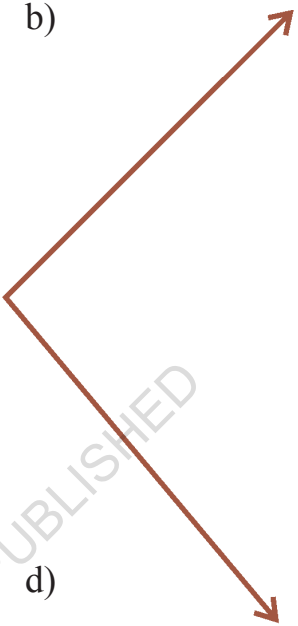


2) Measure the following angles and write the measurement and type of each angle.

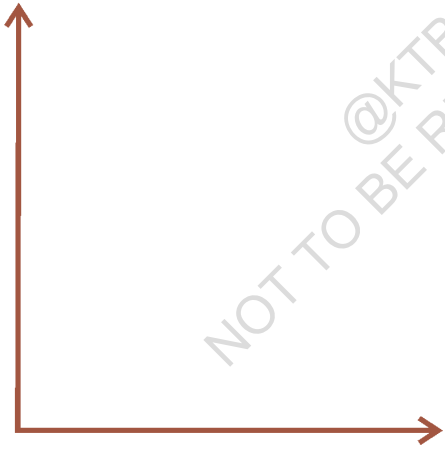
a)



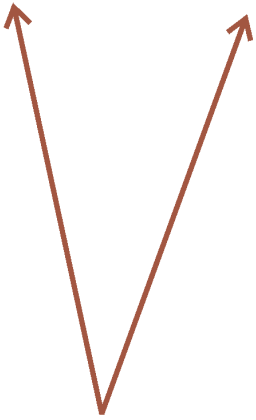
b)



c)



d)

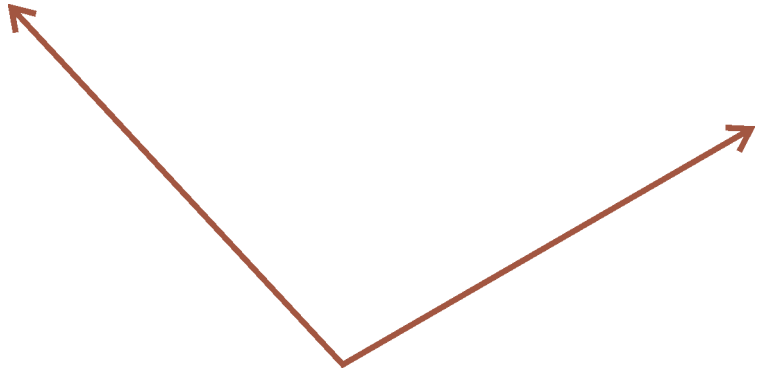


e)



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f)



3) Observe the acute angle, obtuse angle and right angles in your class room and list them.

   Example : The two edges of a black board - right angle.

4) Write your name using English capital letters. List the number of acute angles, obtuse angles and right angles in them.

5) Draw any six angles using scale and measure them using protractor.

6) Write the measure of the angle between the two hands of the following clocks and name them.



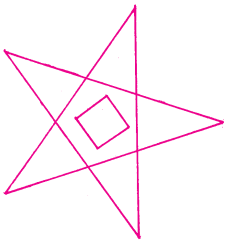
a) b) c) d) e)

7) Choose the right answer from the following.

   a) Example for obtuse angle.

      1) 90^0 2) 53^0 3) 178^0 4) 180^0

   b) In the given figure, the number of right angles, acute angles and obtuse angles are



      1) 15, 4, 10 2) 4, 15, 10

      3) 10, 10, 4 4) 4, 5, 5

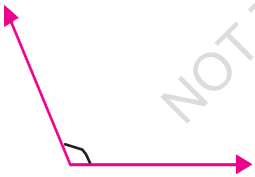
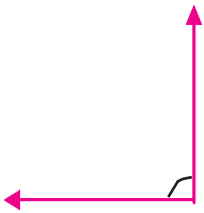
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8. Classify the measures of angles given below :

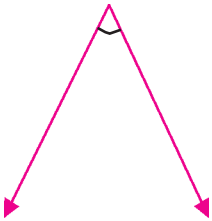
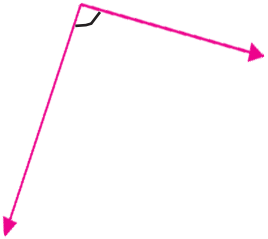
16^0, 180^0, 88^0, 179^0, 45^0, 90^0, 100^0, 35^0, 142^0.

Acute angle	Right angle	Obtuse angle	Straight angle

9. Estimate the measure of the following angles. Verify by measuring them. Name the type of angles.

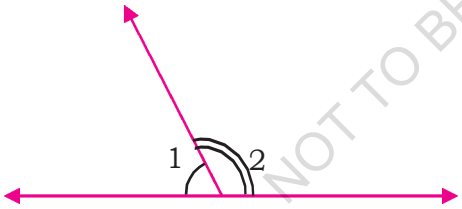
Sl. No	Angles	Estimated measure	Actual measure	Type of Angle
eg. 1		110^0	120^0	obtuse
2				

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3				
4				

10. Measure the angles in the figures given below. Find the sum of the angles.

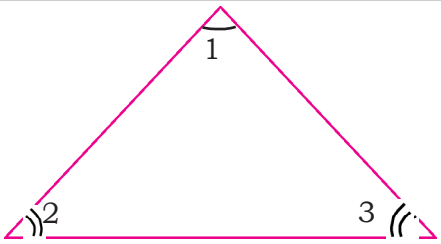
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Angle 1 + Angle 2

= _____ + _____

= _____



Angle 1 + Angle 2 + Angle 3

= _____ + _____ + _____

= _____

Chapter - 7

CIRCLES

F6F2W2

After studying this Chapter you can,

- identify the instruments from a geometrical instrument box,
- acquire the skill to use the geometrical instruments as per the requirement,
- explain the meaning of a circle,
- construct circles with the help of compasses for the given measurements.

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Activity 1 : Use circular objects like bangle, plate, coin etc and draw circles. Identify the centres of these circles. Can you exactly locate the centres of these circles ?

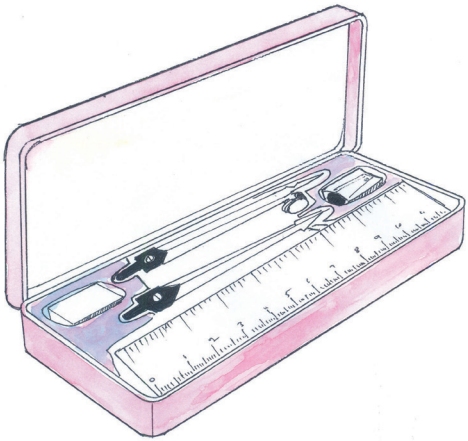
Activity 2 : Circles with radius 1cm, 2.5cm, 4.2cm and 6cm are to be drawn. Can you draw them accurately using bangle, plate and coin? why? Discuss.

Now, let us learn about construction of circles for given measurements.

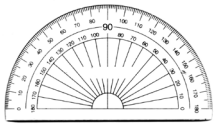
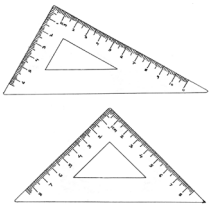
Before this, let us know about the instruments required for it.

Geometrical instrument box.

The geometrical instrument box consists of different instruments which help us to construct different geometrical figures.



The name of the instrument and its use is given in the table below.

Name of the instrument	Instrument	Uses of the instrument
Scale (ruler)		a) To draw straight line and line segment. b) To measure the length of the line segment.
Dividers		To measure the length of the line segment accurately.
Compasses		To construct the circle of given radius.
Protractor		To measure the angle.
Set squares		a) To draw and measure the right angle. b) To draw parallel lines and perpendicular lines.

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Activity

1) Discuss with your teacher how to use the geometrical instruments accurately. Use them and construct different pictures.

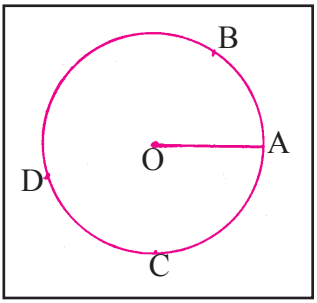
Example :



2) Observe the instruments used by your teacher to draw the geometrical figures on the black board. What difference do you find between those instruments and the instruments used by you?

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Circle



A circle is a closed plane figure. All the points on the circle are equidistant from a fixed point. This fixed point is called the centre of the circle. In the figure, **O** is called the centre of the circle. **A** is a point on the circle. In the same way B, C and D are also points on the circle. We can mark any number of points on the circle. OA is a line segment which joins the centre **O** and the point **A** on the circle. OA is the radius of the circle.

Activity : Join B, C and D to the centre of the circle. OB, OC and OD are radii of the circle. Measure their length using a scale and write them. OA = ...cm, OB = ... cm, OC = ... cm, OD = ... cm.

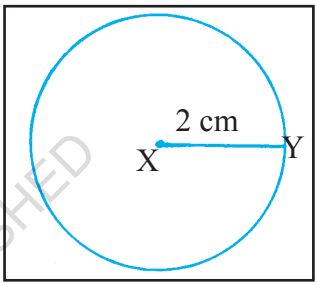
What do you observe from the above measurements ? All the radii of a circle are equal. Radius is denoted by the letter 'r'. In the figure the radius r = ... cm.

Observe :

- Every circle will have a centre and a definite measurement of the radius.
- Centre and radius are not the part of a circle. They specify the existence of the circle.

In this figure, **X** is the centre of the circle. **Y** is a point on the circle. **XY** is the radius of the circle and it is denoted by **r**.

Radius **r** = 2 cm



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Exercise 7.1

I. Complete the following using suitable answers.

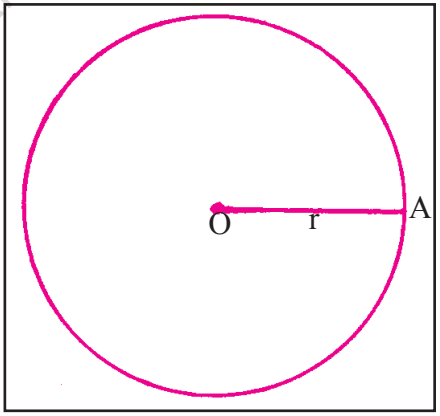
a) The distance between the centre of a circle and a point on the circle is called.....

b) In the given figure,

1) Centre of the circle is .....

2) Radius of the circle is represented by the line segment .....

3) Radius of the circle is .....



II. Mark the correct statement by '✓' and false statement by '×'

a) Only one radius can be drawn to a circle ( )

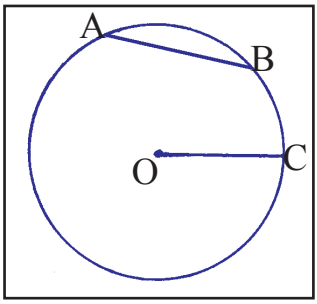
b) All radii of a circle are equal ( )

c) There is only one centre for a circle ( )

d) In the figure

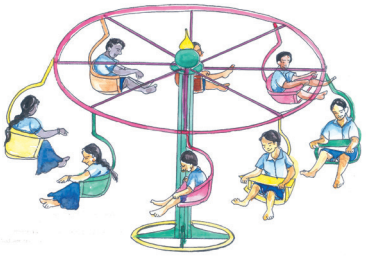
(i) OC is the measure of the radius ( )

(ii) AB is the radius ( )

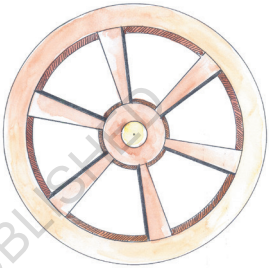


III. i) In each of the following figures, identify the circle, its radius and centre.

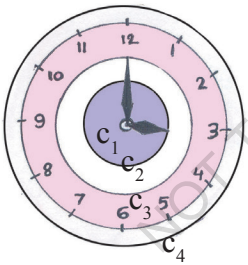
a)



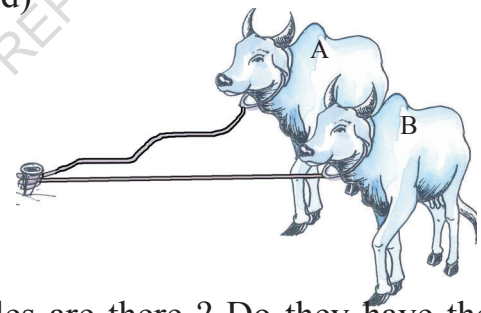
b)



c)



d)



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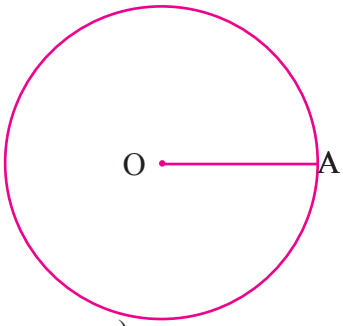
ii) In figure (a), how many circles are there ? Do they have the same centre ? .....

iii) In figure (c), the length of the needle which is showing the hour is the radius of ..... circle.

iv) In figure (c), the length of the needle which is showing the minute is the radius of ..... circle.

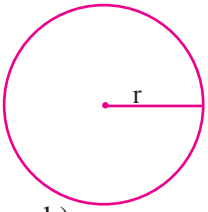
v) In figure (d), which cow's thread will represent the radius of the circle ? .....

IV. Measure the length of the radius of each of the following circles. Write them in the given space.



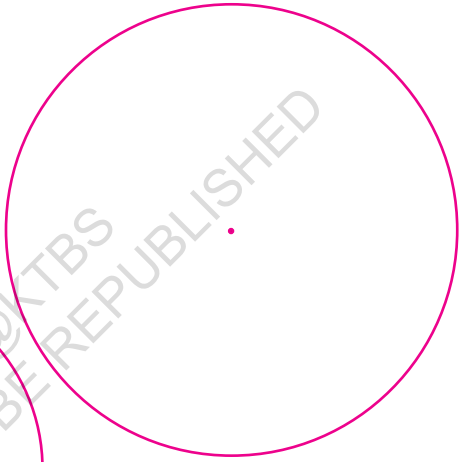
a)

r = ...



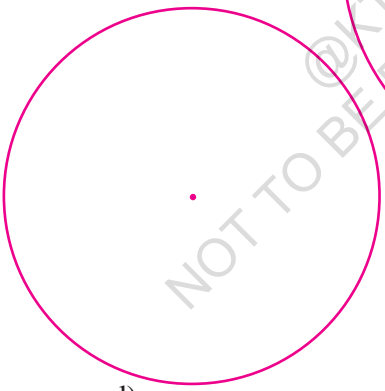
b)

r = ...



c)

r = ...



d)

r = ...

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Construction of a circle of given radius

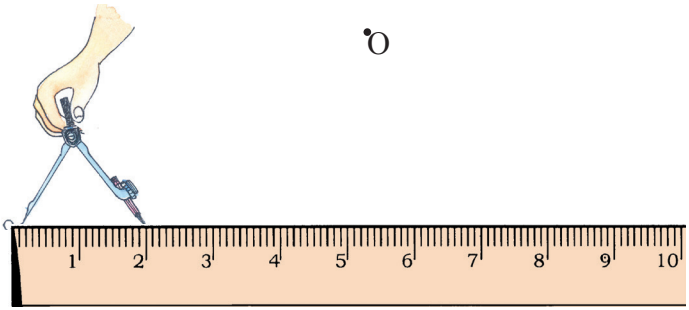
You have learnt to construct circles using compasses. Using only compasses draw circles with different radii.

Now let us construct a circle of radius 2 cm.

Steps of construction

Step 1. Mark a point **O**, the centre of the circle.

Step 2. Keep the needle of your compasses and the edge of the pencil on a scale as shown in the figure. So that radius r = 2 cm

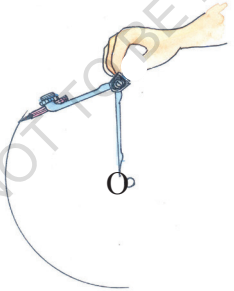


Discuss with your teacher :

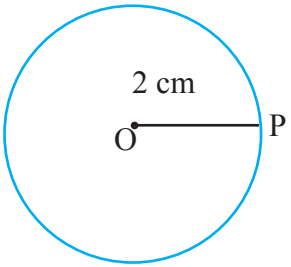
* The convenient method of holding compasses.
* Precautions to be taken while constructing a circle.

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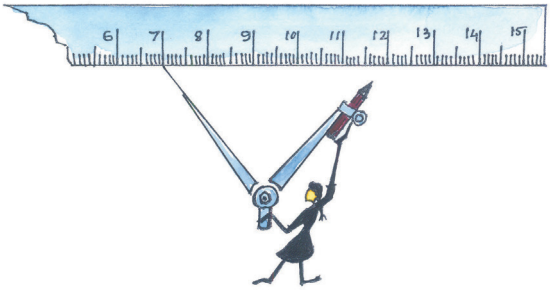
3) Keep the needle of the compasses on **O**. Without changing the position of the compasses, draw the circle.



4) Mark a point **P** on the circle. Join **OP**. Measure **OP**. Write the measurement of the radius on **OP**.



Activity : Rita has to construct a circle of radius 4 cm. But her scale is broken. She has placed the needle of the compasses on the broken scale as shown in the figure. As she has to construct a circle of radius 4 cm, at which point she has to place the tip of the pencil ? Help her by drawing a line on that point.



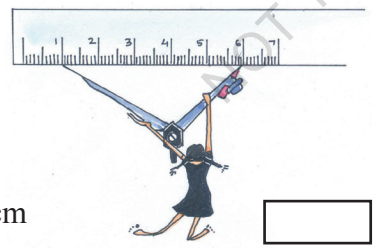
Exercise 7.2

1) Construct circles with the following radii

a) 2 cm b) 2.5 cm c) 3.2 cm d) 3.5 cm e) 3.7 cm

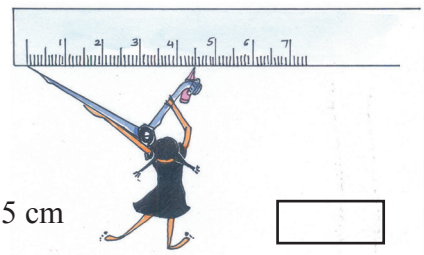
2) The students in the following figures have to draw circles with the given radii. So the students have placed the compasses on the scale as shown. If they have placed the compasses correctly put '✓' if not put '×'. Take correct measurements and construct the circles in your book.

a)



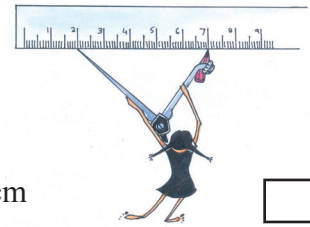
6 cm ☐

b)



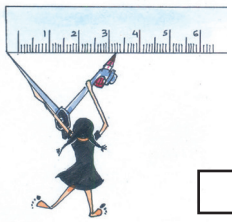
4.5 cm ☐

c)



5 cm ☐

d)



3.3 cm ☐

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3. Mark a point O. With O as centre draw circles with radii 2cm, 3cm, 4cm, 5cm and 6 cm.

Activity :

- Using your compasses, draw very small and very big circles and find their radii.
- What is the measure of the radius of a very big circle that can be drawn in your note book ?
- Construct circles on coloured papers having different radii. Arrange them one above the other.
- Use your teacher's compasses and draw circles of different radii both on black board and on floor.
- By using thread, wire and measuring tapes construct circles of different radii both on floor and on play ground.



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Think !



- Can Puttu construct a circle with the instrument given by Kittu?
- Can you construct a circle with your protractor ? How ?

Chapter - 8

LENGTH

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After studying this Chapter you can,

- identify the length of objects used in daily life,
- compare the objects of long length with short length and find the relationship between them,
- analyse and solve problems of daily life situations involving length.

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Ramesh bought a cricket bat. He wanted to know the length of the bat. He measured the length using hand span. It was 4 times the length of his hand span. His teammate Robert also measured the same bat with his hand span, It was about 4½ times of his hand span. How is it possible ?

Can same object have 2 different lengths ? Then what is the correct method of measuring length ?

In your previous class you have learnt how to measure the length of various objects using hand span, cubit, fathom, foot span etc, They are not standard measurements.

The measures vary when we use non-standard units. Hence, to know the exact length of objects we need a standard unit.

The standard unit of measuring length of objects is 'Metre'. 'Metre' is denoted by 'm'.

To measure long distances the standard units used are decametre, hectometre and kilometre.

To measure short lengths, the standard units used are decimetre, centimetre and millimetre.

Let us know more about these standard units of length.

Usually the word 'deca', 'hecto', 'kilo', 'deci', 'centi' and 'milli' are prefixed before the word 'metre', This shows the place value of the units which represents a part of a 'metre'. Hence, let us first know the meaning of these units.

Standard units of greater length ↓	Standard units of smaller length ↓
1 metre	1 metre
Deca = 10 times	Deci = $\frac{1}{10}$ part
Hecto = 100 times	Centi = $\frac{1}{100}$ part
Kilo = 1,000 times	Milli = $\frac{1}{1,000}$ part

Comparison of greater standard units of length with one metre.

10 times 1 metre	=	10 metre	=	1 decametre
100 times 1 metre	=	100 metre	=	1 hectometre
1000 times 1 metre	=	1000 metre	=	1 kilometre

Comparison of smaller standard units of length with one metre.

$\frac{1}{10}$ of 1 metre	=	$\frac{1}{10}$ metre	=	1 decimetre
$\frac{1}{100}$ of 1 metre	=	$\frac{1}{100}$ metre	=	1 centimetre
$\frac{1}{1,000}$ of 1 metre	=	$\frac{1}{1,000}$ metre	=	1 millimetre

The common standard units of length used in daily life

10mm = 1cm	1000 m = 1km
100 cm = 1m	

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Conversion of length from one unit to the other

To convert greater units of length into smaller units.

Rule :

To convert kilometre into metre, multiply by 1,000.

To convert metre into centimetre, multiply by 100.

To convert centimetre into millimetre, multiply by 10.

Note : To convert greater units of length into smaller units, we should multiply.

Observe the following examples :

Example 1 : How many metre make 2 km ?

1 km = 1,000 m

$\therefore$ 2 km = 1,000 × 2 = 2,000 m.

Example 2 : How many centimetre make 4 metre ?

1 metre = 100 cm

$\therefore$ 4 m = 100 × 4 = 400 cm.

Example 3 : How many millimetre make 12 cm ?

1 cm = 10 mm

$\therefore$ 12 cm = 10 × 12 = 120 mm.

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To convert smaller units of length into greater units

Rule :

To convert metre to kilometre, divide the given number by 1,000.

To convert centimetre to metre, divide by 100.

To convert millimetre to centimetre, divide by 10.

Note : To convert smaller units of length into greater units, we should divide.

Observe the following examples.

Example 4 : Convert 3,000m to kilometre.

1,000m = 1 km

$\therefore$ 3,000m = 3,000 ÷ 1,000 = 3 km.

Example 5 : Convert 575 cm into metre.

100 cm = 1m

$\therefore$ 575cm = 575 ÷ 100 = 5.75m.

Example 6 : Convert 400 millimetre into centimetre

10 mm = 1 cm

$\therefore$ 400 mm = 400 ÷ 10 = 40 cm.

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Activity 1

Using a metre scale, measure the length of the black board in your class room and write it in metre.

Activity 2

Using a metre scale measure the length of the bench you sit in your class room and write in metres.

Activity 3

Measure the length of the room in your house and the length of your class room using a measuring tape and write them as follows:

Sl. No.	Length of the room in	Total Length in cm	Length in m
1	House		
2	Class room		

Exercise 8.1

I. Answer orally.

1) How many millimetres make one centimetre ?
2) How many centimetres make one metre ?
3) How many metres make one kilometre ?
4) How many metres make half a kilometre ?
5) How many centimetres make ¾ of a metre ?

II. Solve the following.

1) Convert 573 cm into metres.
2) Convert 1,378m into kilometres.
3) Convert 1,515cm into millimetres.
4) Radha's school is at a distance of 2,450m from her house. Express this distance in km.
5) The length of a ground is 15 metres. Express the length in centimetres.

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Problems involving measurement of Length

Example 1

The length of shirt cloth sold by a merchant to a person is 5 m 40cm of red colour and 3m 40 cm of white colour. What is the total length of cloth sold ?

Length of red cloth	=	5m 40 cm
Length of white cloth	=	3m 40 cm
Total length of cloth sold	=	8m 80 cm

Example 2

The grampanchayat started to construct a main road from their office to school which is 3 km 300 metres away. It could construct only 2 km 150 m of the road, what length of the road is left unconstructed ?

Total length of the road to be constructed	=	3 km	300 m
Length of the constructed road	=	- 2 km	150 m
∴ Length of the road left unconstructed	=	1 km	150 m

Example 3

The length of wire required to make a flower vase is 2m 30 cm. What is the total length of wire required to make 9 such vases ? Express the length in metres.

Length of wire required to make 1 vase	= 2m 30cm
∴ Total length of wire required to make 9 such vases	= 2m 30cm × 9
	18m 270 cm.

Here we should convert 270 cm into metres

Length of wire required = 18 m 270cm

= 18 m + 200 cm + 70 cm

= 18 m + 2 m + 70 cm (100 cm = 1 m)

= 20 m + 70 cm

= 20.7m.

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Eample 4

5 labourers together purchased 9 m of cloth to stitch a uniform. They divided the cloth among themselves. What is the length of cloth received by each labourer ?

Total length of cloth purchased by 5 labourers = 9 m

$\therefore$ Length of cloth each labourer gets = 9m ÷ 5

= 1.8 m

Here convert 1.8m to cm

1 m = 100 cm

1.8m × 100 cm = 180.0 cm

Length of cloth each labourer gets = 1.8 m

or 1 m 80 cm.

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Activity 1

Measure the length and breadth of the National flag in your school using a metre scale. Measure the breadth of each strip - saffron, white and green and add it up.

Is the sum equal to the breadth of the national flag ?

Activity 2

Measure your height and the height of your tallest classmate in centimetre. Find the difference in the heights.

Exercise 8.2

I. Answer Orally

1) The length of a wire is 3 m. What is the total length of 5 such wires ?

2) Out of a roll of cloth measuring 50 m, 17 m of cloth is sold. Find the length of remaining cloth.

3) 24 m of coloured ribbon is distributed among 8 students equally. What is the length of ribbon that each one gets ?

4) How many centimetres are there in 9 metres ?

5) The length of a wooden plank is 19 m. Out of this 5 pieces of 3 m each is cut off. Find the length of the remaining piece.

II. Add the following.

1) 22 m 71 cm and 14 m 30 cm

2) 4 km 230 m and 22 km 280 m

III. Subtract the following.

1) 68 m 35 cm from 75 m 48 cm

2) 12 km 425 m from 17 km 650 m

IV. Solve the following.

1) The length of a line segment is 12 cm. Into how many line segments of 3 cm each, can it be divided ?

2) Ravi bought 3m 60cm length of pant cloth. He gave 1m 20 cm of cloth to his younger brother. What is the length of the remaining cloth ?

3) The length of cloth purchased by John is as follows : 2m 20cm for shirt, 1m 20 cm for pant and 4m 80cm for coat. What is the total length of cloth purchased by John?

4) 2m 80 cm of cloth is required to stitch a frock. What is the length of cloth required to stitch 12 such frocks ?

5) Length of cloth required to stitch 6 pairs of Kurta and Pyjama is 33 m. What is the length of cloth required to stitch 1 pair of Kurta & Pyjama ?

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6) The total length of 8 bundles of wire is 204 m. Find the length of each bundle of wire.

7) The height of a table is 1m 25 cm and the height of a stool is 50 cm less than the height of the table. Find the height of the stool.

8) A grampanchayat constructed a road to connect the village and the main road. On the first day 3 km 460 m of road was constructed and 4 km 540m of road was constructed on the next day. What is the total length of the road constructed ?

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Chapter - 9

PERIMETER AND AREA

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After studying this Chapter you can,

Perimeter of rectangle and square

- explain the meaning of perimeter,
- find the perimeter of a rectangle by measuring its length and breadth,
- explain that the sum of twice the length and twice the breadth of a rectangle is the perimeter of the rectangle,
- calculate the perimeter of a rectangle by using the formula,
- find the perimeter of a square by measuring its length,
- calculate the perimeter of a square by using the formula,

Area of rectangle and square :

- explain the meaning of 'Area',
- find the area of a rectangle by dividing it into unit squares,
- explain that the area of a rectangle is the product of its length and breadth,
- calculate the area of a rectangle using the formula,
- find the area of a square by dividng it into unit squares,
- explain that the area of a square is the square of its length,
- calculate the area of a square using the formula.

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Length, Breadth and Perimeter of a rectangle

Observe the given figures. Compare them. Note the differences in their measurements.

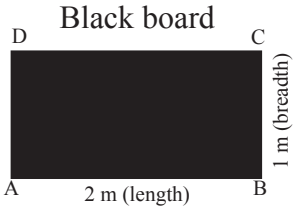


fig. 1

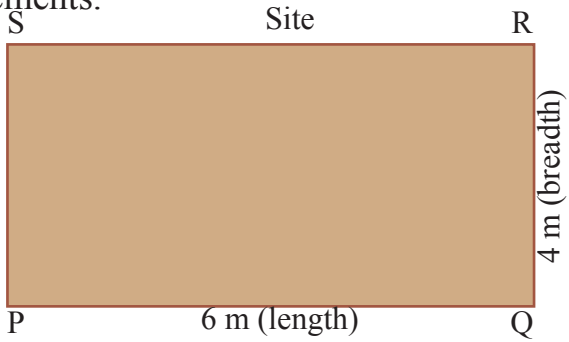


fig. 2

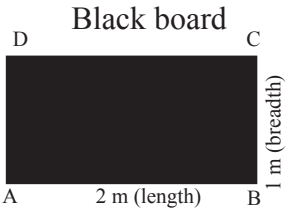
Fig 1	Fig 2
Length 2 m	Length 6 m
Breadth 1m	Breadth 4 m

Now let us see the similarities between the two figures.

1. The two figures, have two dimensions namely 'length' and 'breadth'.
2. Figures having two dimesions are called **'Plane figures'**. Hence, the two given figures are called 'Plane figures'.
3. Figure 1 has 4 sides - AB, BC, CD and DA. Figure 2 has 4 sides - PQ, QR, RS, SP.
4. The two opposite sides of a rectangle are equal in length.
   In fig 1 AB = CD (length = l) BC = DA (breadth = b)
   In fig 2 PQ = RS (length = l) QR = SP (breadth = b)
5. In fig 1, BC and AD are the two opposite sides equal to each other (breadth). In figure 2 - QR and PS are the two opposite sides equal to one another (breadth).
6. These two figures are rectangles.

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Let us observe figure 1



An insect crawls around the rectangular blackboard along its edges, starting from point 'A' to point 'B', from point 'B' to point 'C', from point 'C' to point 'D' and from point 'D' to point 'A' and completes one round. What is the total distance covered by the insect ?

Can you find the total distance covered by the insect ?

Observe the steps followed.

Total distance covered from point -

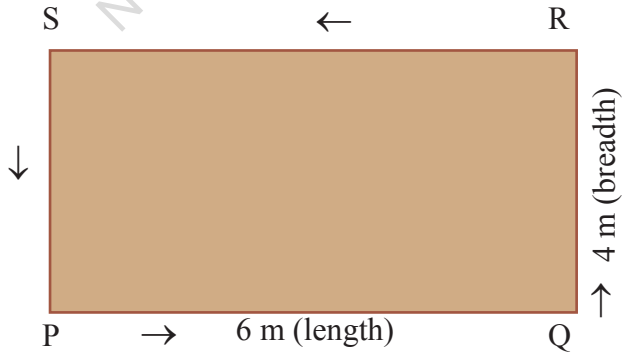
$A \rightarrow B \rightarrow C \rightarrow D \rightarrow A$

$= 2\text{ m} + 1\text{ m} + 2\text{ m} + 1\text{ m} = 6\text{ m}$

Therefore distance covered by the insect along the sides of the rectangular black board is 6 m. The total distance covered in one round of the rectangular black board is called its **'Perimeter'**.

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Now observe figure 2



This rectangular site has to be fenced with barbed wire. To know the perimeter of the site, we should know its length and breadth.

Raju, a worker starts measuring the site from point P to Q ; Q to R ; R to S and S to P and records the total measurement of the site.

Then, what is the perimeter of the site ?

It is the measure of 4 sides of the rectangular site.

$P \rightarrow Q \rightarrow R \rightarrow S \rightarrow P$

6 m + 4 m + 6 m + 4 m = 20 m

This is the Perimeter of the site

$\therefore$ Perimeter of the site = 20 m

This one round of measurement of the rectangular site is its **Perimeter**.

From the above two examples we come to know that :

- A rectangle has 4 sides. The sum of 4 sides of a rectangle is its 'Perimeter'.
- A rectangle has two lengths and two breadths which are opposite to each other, and equal in measurement.

$\therefore$ Perimeter of a rectangle = (2 length + 2 breadth)
= $(2l + 2b)$ units.

Remember : Perimeter is always expressed in the units of length.

Example : Metre (m), Centimetre (cm).

Activity 1

Measure the length and breadth of the cover page of your mathematics text book using a scale and find its perimeter.

Activity 2

Measure the length and breadth of your geometry instrument box using a scale and find its perimeter.

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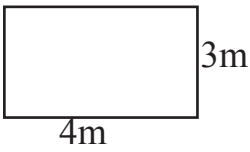
Example 1

The length and breadth of a rectangular room are 4m and 3m respectively. Find the perimeter of the room.

Step 1 :

Given : Length = 4m , Breadth = 3m

Step 2 :



Perimeter of the rectangular room

= $(2l + 2b)$ units.

= $(2 \times 4 + 2 \times 3)$ m

= $(8 + 6)$ m

= 14 m

Example 2

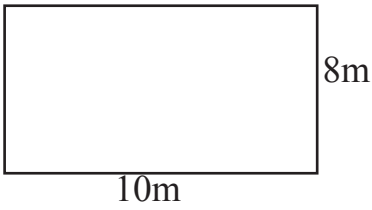
A rectangular garden measuring 10m long and 8 m broad is to be fenced 4 times with barbed wire. Find the length of the barbed wire required ?

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Step 1 :

Given : Length = 10 m , Breadth = 8m

Step 2 :



Perimeter of the rectangular garden

= $(2l + 2b)$ units.

= $(2 \times 10 + 2 \times 8)$ m

= $(20 + 16)$ m

= 36 m

Step 3 :

Length of barbed wire required to fence the garden 4 times

= 4 × perimeter

= 4 × 36 m

= 144 m

Exercise 9.1

I. Answer oraly :

1) What are two dimensional figures called ?
2) Name the two dimensions of a rectangle.
3) How many pairs of opposite sides are there in a rectangle?
4) How are the opposite sides in a rectangle ?
5) How many times is the perimeter of a rectangle to the sum of its length and breadth ?

II. Find the perimeter of the following pictures :

70 cm



90 cm

(a)

60 cm

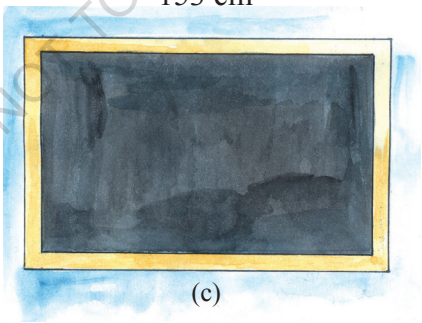
24 cm



(b)

153 cm

122 cm



(c)

3 cm

6 cm



(d)

92 cm

80 cm



(e)

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III. The length and breadth of rectangles are given below. Find their perimeters.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Length (in cm)	2	2	3	5	5	3	4	5	8	7
Breadth (in cm)	3	4	4	4	2	6	6	6	6	9
Perimeter										

IV. Solve the following :

1) A rectangular room measures 6 m in length and 4 m in breadth. Find the perimeter of the room.

2) A rectangular field has a length of 150m and breadth 120m. Find the perimeter of the field.

3) A rectangular garden measures 80m in length and 50 m in breadth. Find its perimeter. If the garden has to be fenced 5 rounds with barbed wire, what is the length of the wire required?

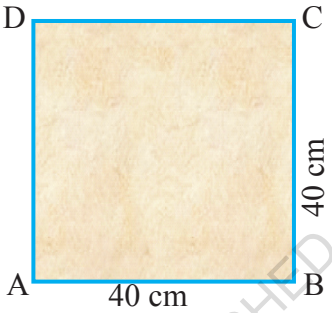
4) An auditorium measures 80 m in length and 30 m in breadth. If the walls of the auditorium have to be decorated with coloured buntings 4 times, find the length of buntings required. If the cost of 1m of buntings is ₹ 15, what is the total cost of the buntings used to decorate the auditorium?

5) Srilatha, during her morning walk goes round a rectangular park 3 times. If the length and breadth of that park are 320 m and 210 m respectively, calculate the distance she has covered.

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Perimeter of a Square

Rahim has a hand towel. He measures the length and breadth of the hand towel. He finds that both length and breadth measures 40 cm each. He draws a figure of the hand towel with length and breadth 40 cm each. Since both length and breadth are same, he writes as length and length.



He lists the properties of the hand towel as follows :

1) Length and length are the two dimensions.
2) There are 4 sides of equal length. (AB, BC, CD and DA - sides)
3) All the 4 sides are equal. So it is a 'Square'.

Rahim measures all the four sides. He starts measuring from point A to B ; B to C ; C to D and D to A and adds it up.

The total length of the square hand towel

$= A \rightarrow B \rightarrow C \rightarrow D \rightarrow A$

40 cm + 40 cm + 40 cm + 40 cm = 160 cm

i.e., the total length of all the 4 sides of the hand towel = 160 cm
This one round of total length is the 'perimeter of the square'.

Here, the 4 sides are of equal length of 40 cm each. We can find the perimeter in the following way.

Perimeter of the Square = $4 \times l = (4 \times 40)$ cm

= 160 cm

$\therefore$ Perimeter of a Square = $4 \times$ length = $4l$

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Activity 1 :

Collect pictures which are square in shape found in nature and find their perimeter.

Activity 2 :

Take different coloured papers, cut squares of side 5 cm, 6.5 cm, 7 cm and 7.5 cm. Paste each of them in the drawing book and find their perimeter.

Example 1

The length of a square playground is 80 m. Find its perimeter.

Length of the playground = 80 m

$\therefore$ Perimeter of the playground = $(4 \times l)$ units

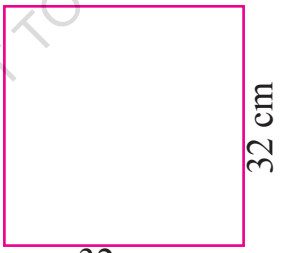
= (4×80) m

= 320 m

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Example 2

Find the perimeter of the given figure.



length of the square = 32 cm.

Perimeter of the square = $(4 \times l)$ units.

4×32 cm

= 128 cm

Example 3

A square playground measures 75 m in length. Rita runs 5 times around the playground. Find the total distance covered by her.

Given

Length of the playground = 75 m

Number of rounds Mary runs = 5 rounds

$\therefore$ Perimeter of the Square = $(4 \times l)$ units

Perimeter of the playground = 4×75 = 300 m

Rita covers 300 m in one round.

$\therefore$ Total distance she covers in 5 rounds

= 300 m $\times$ 5 = 1500 m.

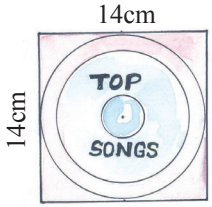
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Exercise 9.2

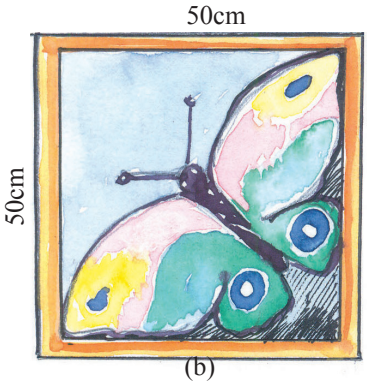
I. Answer orally :

1) Mention the two dimensions of a square.
2) How many equal sides are there in a square ?
3) How many times is the perimeter of a square to its length ?
4) what is the perimeter of a square of length 5 cm ?

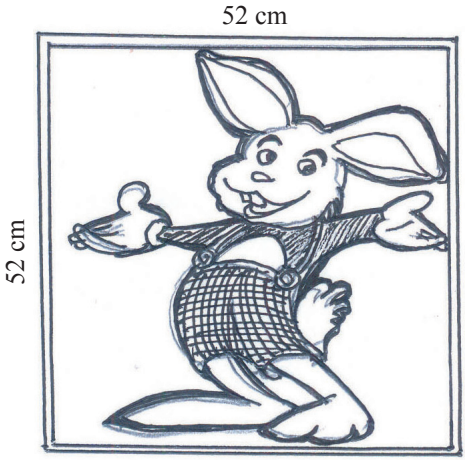
II. Find the perimeter of the following pictures.



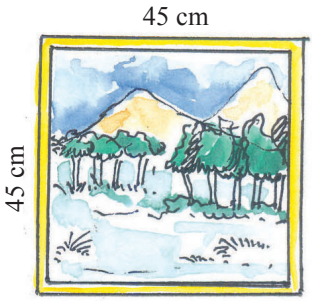
(a)



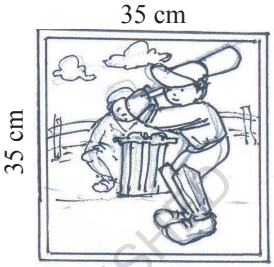
(b)



(c)



(d)



(e)

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III. Lengths of the squares are given in the following table. Find their perimeters.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Measure of the length in cm	3	5	11	18	25	30	41	55	63	92
Perimeter of the square										

IV. Solve the following problems.

1) The length of a square room is 15 m. Find its perimeter.

2) Rama, runs 4 times around a square park of length 85 m. What is the total distance he covers ?

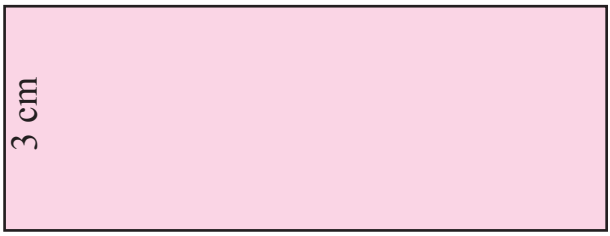
3) The length of a square room is 16 m. The walls of the room should be tied with coloured buntings 4 times. Find the total length of buntings required.

Area of a Rectangle

Rashmi's paper



Rita's paper



Rashmi and Rita are classmates. Each one of them brought a coloured sheet of paper to make paper flowers.

Seeing Rita's paper Rashmi says her paper is broader than Rita's, hence the size of her paper is bigger than Rita's paper.

Then Rita observes Rashmi's paper and says her paper is longer than Rashmi's. Hence, her paper is bigger in size than Rashmi's paper.

Actually whose paper is bigger in size ? How to find out the size of each paper ?

To find whose paper is bigger, we have to find the whole space occupied by the paper.

With the help of a scale make 6 equal parts of the length and 4 equal parts of the breadth of Rashmi's paper.

Similarly make 8 equal parts of the length and 3 equal parts of the breadth of Rita's paper. We get the figures as follows.

Rashmi's paper

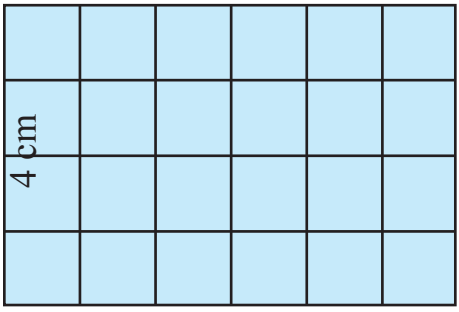


Fig. 1

Rita's paper

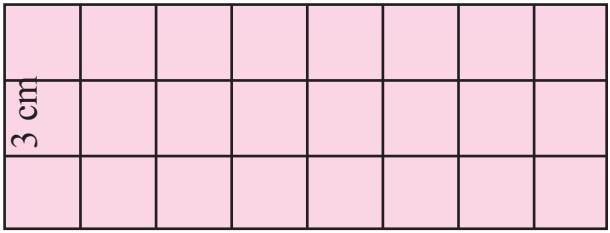


Fig. 2

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Observe both fig 1 and fig 2. There are several squares in each paper. Measure the size of each square. We find each square is of 1cm length and 1 cm breadth.

The length of 1 unit × breadth of 1 unit makes one square unit. Here, it is 1cm × 1 cm = 1 square cm.

One square unit = 1 unit length × 1 unit breadth

= 1 cm × 1 cm

= 1 square cm

The product of two equal dimensions of the same unit is called square unit.

Count the number of squares in fig 1. We get 24 squares.

∴ The size of Rashmi's paper is 24 sq cm.

Now count the number of squares in fig. 2

Here also, we get 24 squares.

∴ the size of Rita's paper is also 24 sq cm.

Though the length and breadth of the papers of Rashmi and Rita are different, the space occupied is same.

In the same way to find the total space within the rectangle we have to divide it into equal number of unit squares. The number of unit squares we get in a rectangle is the total space occupied by the rectangle.

The space occupied by a plane figure is called its 'Area'.

It is not possible to find the area always by dividing the rectangle into equal number of squares, as the numbers given might be big and it consumes more time.

Observe the figures 1 and 2 where the area is already found.

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Notice the length and breadth of fig 1.

Length of the rectangle = 6 cm

Its breadth = 4 cm

$\therefore$ Area of the rectangle = ?

Let us multiply length and breadth

Area of the rectangle = $l \times b$

= 6 cm $\times$ 4 cm = 24 $(cm)^2$

= 24 sq cm $\Rightarrow$ $24cm^2$

In the same way observe the length and breadth of fig. 2.

Length of the rectangle = 8 cm

Its breadth = 3 cm

$\therefore$ Area of the rectangle = ?

Let us multiply length and breadth.

8 cm $\times$ 3 cm = $24(cm)^2$

= 24 sq cm

Thus when we multiply both length and breadth, we get the area of a rectangle.

Area of a rectangle = ($l \times b$) sq units.

$\therefore$ Area is always expressed in square units.

Note : Square metre - sq m
Square centimetre - sq cm

Activity 1 :

Take a sheet of plain white paper. Measure the length and breadth of the paper. Then divide its length and breadth into equal number of squares. Colour each square with different colours. Count the number of squares. Write the area of the paper.

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Activity 2 :

Measure the length and breadth of the first page of your maths text book and find its area.

Activity 3 :

Measure the length and breadth of the top surface of the table in your class room and find its area.

Example 1 :

The floor of a rectangular room measures 4 m in length and 3 m in breadth. Find the area of the floor.

Step 1 :

Given : Length = 4 m

Breadth = 3 m

Step 2 : Area of the floor = $(l \times b)$ sq units

= 4 m × 3 m = 12 $(m)^2$

= 12 sq m

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Example 2

The length and breadth of an auditorium are 10m and 8m respectively. How many slabs of stone measuring 2m × 1m are required to cover the floor ?

Step 1 : Given :

Length of the Auditorium = 10 m

Its breadth = 8 m

Size of the stone slab = 2m × 1m

Step 2 : Area of the Auditorium = $(l \times b)$ sq units

10 m × 8m = 80 $(m)^2$

= 80 sq m

Step 3 : Area of the stone slab = $(l \times b)$ sq units

= (2×1) sq m

= 2 sq m (m^2)

Step 4 :

No. of stone slabs required to cover the floor = $\frac{\text{Area of the floor}}{\text{Area of the stone slab}}$

= $\frac{\cancel{80 \text{ sq m}}^{40}}{\cancel{2 \text{ sq m}}_{1}}$

= 40 stone slabs.

Exercise 9.3

I. Answer the following.

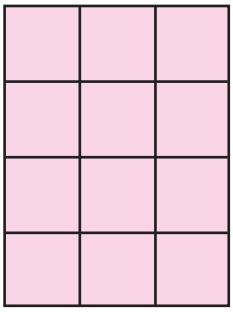
1) What is the unit of area ?

2) What is the space within the boundary of a plane figure called?

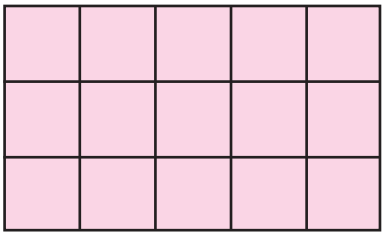
3) What is the area of a unit square ?

II. The rectangles given below are divided into squares of unit length. Find their areas.

1)

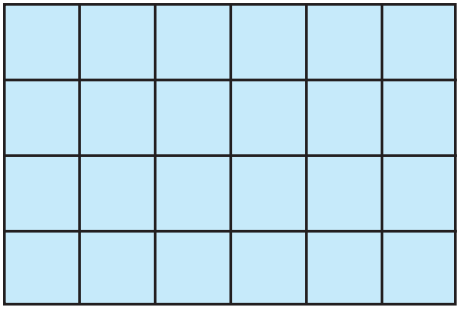


2)

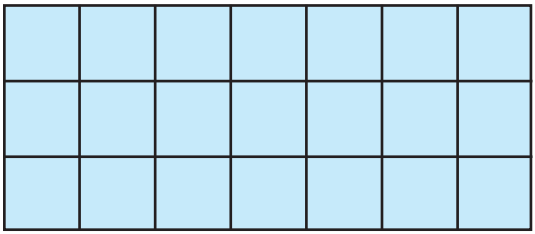


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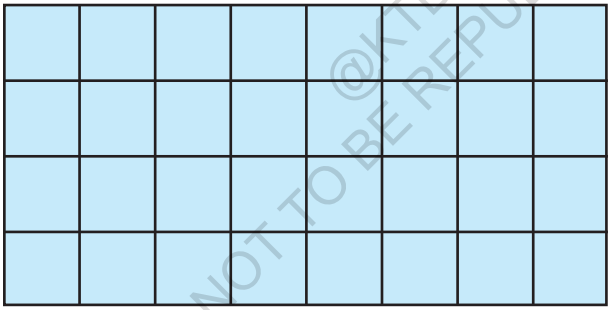
3)



4)



5)



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III. The length and breadth of the rectangles are given below. calculate their areas.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Length (in cm)	2	2	3	5	5	3	4	5	8	7
Breadth (in cm)	3	4	4	4	2	6	6	6	6	9
Area										

IV. Find the area of the figures given below.



V. Solve the following problems.

1) A farmer has a rectangular land of length 250m and breadth 180m. Find the area of the land.

2) A carpet is needed to cover the entire area of a room. If the length of the room is 16m and breadth 5m, find the area of the carpet required.

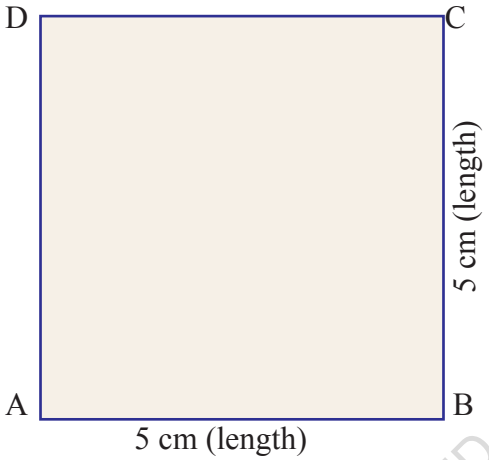
3) An auditorium measures 25 m in length and 18 m in breadth. How many slabs of stones of 3m × 1m are required to cover the floor of the auditorium ?

4) A rectangular plot's length is 25m and its breadth is 15 m. Find the area of the plot. If 1 square metre of the plot costs ₹ 250, what is the total value of the plot ?

5) A rectangular room's length is 20m and its breadth is 11m. How many tiles of 2m × 1m are required to cover the floor of the room ?

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Area of a Square



Observe the given figure.

It has 2 dimensions of equal length.

When the 2 equal lengths are multiplied we get the area of a square (remember : area of a rectangle = $l \times b$).

$\therefore$ **Area of the Square = *(l × l), square units***

Now observe the length of the figure.

length of the square = 5 cm

$\therefore$ Area of the square = $l \times l$

= 5 cm × 5 cm = 25 $(cm)^2$

= 25 sq cm

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Activity 1

With the help of a scale draw a square of length 5 cm. Divide the 4 sides of the square into 5 equal parts. Squares of 1 unit is formed. Count the number of square units. Compare the square units with the area of the figure. Write your conclusion.

Activity 2

With the help of a scale draw a square of length 6 cm. Divide the square into equal parts of 1 cm each. Colour each of the square units with different colours. Count the square units and write the area.

Example 1

The length of a square floor is 4m. What is its area ?

Step 1 : Given : Length of the floor = 4m

Step 2 :

Area of the floor = $l \times l$

= 4m × 4m = 16 $(m)^2$

= 16 sq m

Example 2

The length of a table tennis hall which is square in shape is 9m. The floor of the hall is to be covered with granite stones each measuring 3m × 1m. How many granite stones are required to cover the floor of the hall ?

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Step : Given :

Length of the hall = 9m

Size of the granite stone = 3m × 1m

Step 2 :

Area of the hall = $l \times l$

= 9m × 9m = 81 sq m

Step 3 :

Area of 1 granite stone = $l \times l$

= 3m × 1m = 3 sq m

Step 4 :

$$\text{No. of granite stones required} = \frac{\text{Area of the hall}}{\text{Area of the granite stone}}$$

$$= \frac{27\cancel{81}\ \cancel{\text{Sq. m}}}{\cancel{7}_1\ \cancel{\text{Sq. m}}} = 27 \text{ granite stones}$$

Exercise 9.4

I. Answer orally.

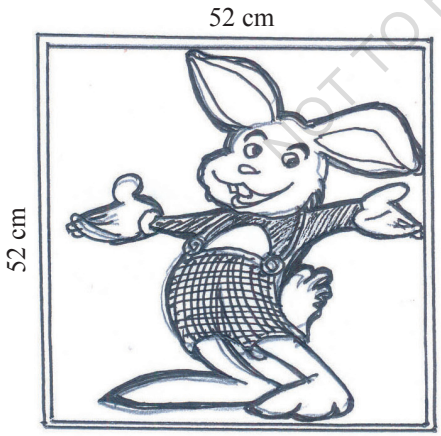
1) What is the total space within the boundary of a square called ?

2) What is the unit of area ?

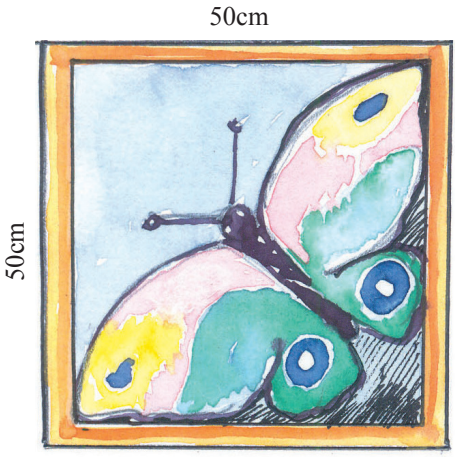
3) What is the formula to find the area of a square ?

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II. Find the area of the figures given below.



(a)



(b)

III. The measure of one side of the squares are given below. Find their areas.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Measure of the side of a square	3	5	11	18	25	30	41	55	63	92
Area of the										

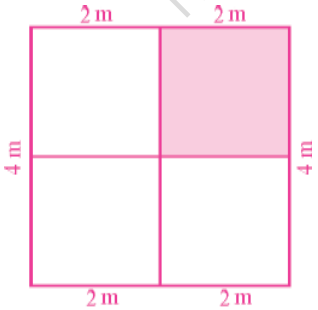
IV. Solve the following problems.

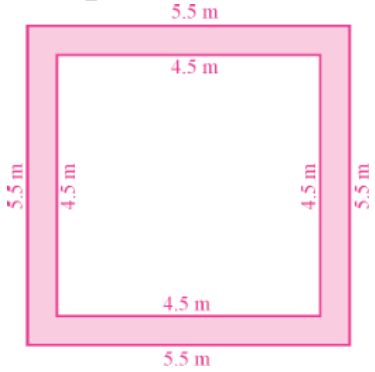
1) The length of a square room is 6 m. What is the area of the floor of the room ?
2) The length of a square paper is 21 cm. What is its area ?
3) The length of a square canvas cloth is 15 m. Find the area of the cloth ?
4) The length of a square room is 8 m. How many granite stones of 2m × 1m are required to cover the floor of the room.
5) The length of a square room is 400 cm. How many square tiles of 10 cm in length, are required to cover the floor of the room.

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V. Calculate the area of shaded portion.

1)





Chapter - 10

DATA HANDLING

V1X8Q9

After studying this Chapter you can,

- collect information and interpret the data in tabular form,
- represent the data graphically,
- represent data through pictograph and bar graph,
- take suitable scale to draw the graph,
- know the need for a scale to be taken to draw graph,
- explain the steps to be followed while drawing a graph.

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In the previous classes you have learnt to collect data and represent the same through pictograph and bar graph. Let us see a few examples.

Example 1



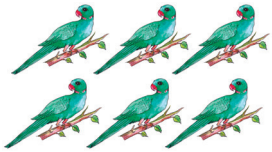
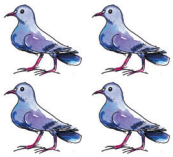
Here is a picture of birds in an album.

Asha counted the number of each type of bird and made a tally for each bird as shown in the table.

BIRDS	TALLIES	NUMBERS
Peacock	𝍸	5
Parrot	𝍸 I	6
Eagle	II	2
Pigeon	IIII	4
Sparrow	III	3

This helped her in counting each type of bird quickly and represent this data through pictograph.

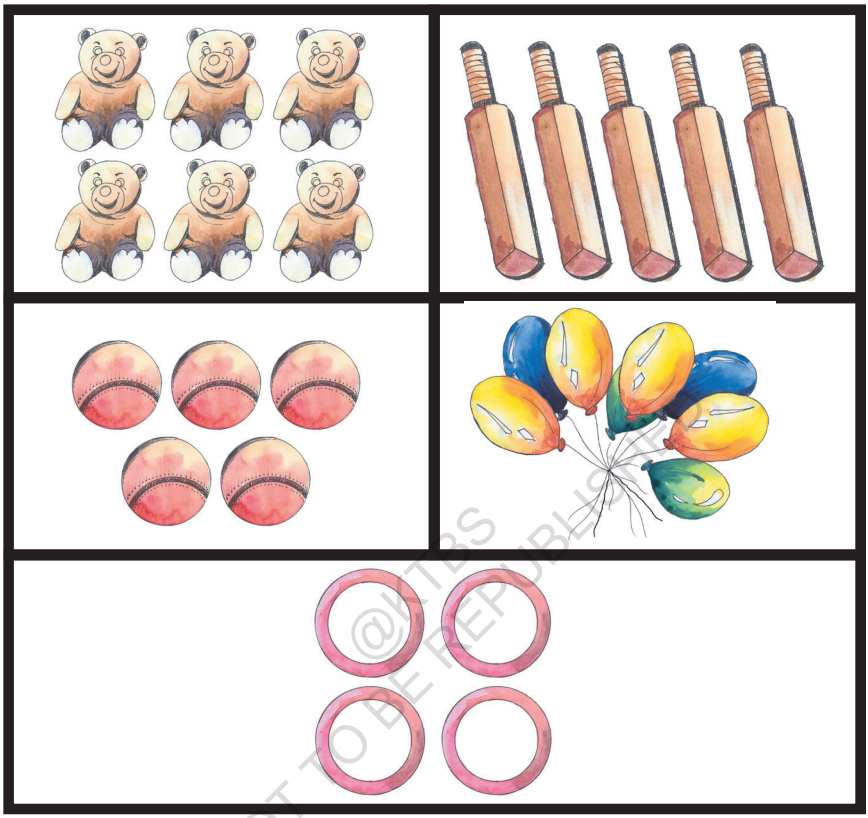
Here is the pictorial representation.

Name of the bird	Number of birds
Peacock	
Parrot	
Eagle	
Pigeon	
Sparrow	

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Example 2

Observe the picture given below. Toys are displayed on the shelf.



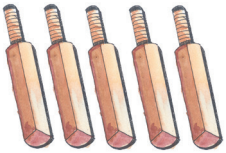
The number of each type of toy is counted by marking tallies.

Note the entries made in the table.

Name of the toy	Tallies	Number
Doll	𝍸 I	6
Bat	𝍸	5
Ball	𝍸	5
Balloon	𝍸 III	8
Ring	IIII	4

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The same information can be represented pictorially as follows :

Name of the toy	Number of toys
Doll	
Bat	
Ball	
Balloon	
Ring	

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Let us study more examples

Example 3

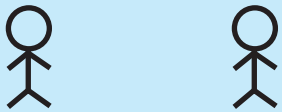
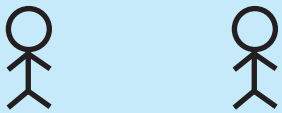
Teacher Mrs. Stella asks the students of class V to tell their mode of travelling to school every day. She put a tally mark as each of the students answered and prepared the following table.

Mode of transport	Tallies	Number of students
walk	𝍸 𝍸 𝍸	15
bus	𝍸 𝍸	10
van	𝍸 𝍸	10
bicycle	𝍸	05

The number of students are large in number. Hence, it takes more time to draw so many pictures.

She decided to draw one symbol to represent 5 students.

Let  represent 5 students

Mode of transport	Number of students
Walk	
Bus	
Van	
Bicycle	

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Example 4

Rahim buys fruits for his mother on her birthday. He picks up various kinds of fruits from the fruit seller. He prepares a table for the data about the number of fruits bought.

Name of the fruit	Tallies	Number of fruits
Banana	𝍸 𝍸 𝍸 𝍸 IIII	24
Orange	𝍸 𝍸 𝍸 I	16
Apple	𝍸 𝍸 II	12
Mango	𝍸 𝍸 𝍸 𝍸	20

This data can be represented through pictograph.

Scale : Let 1 fruit represent 4 fruits

Name of the fruit	Number of fruits
Banana	
Orange	
Apple	
Mango	

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When the number to be represented is large, we choose a symbol to represent a certain number of objects.

Example 5

The following data shows the number of pens sold by a shopkeeper during the first five months of a year.

Months	Number of pens
January	35
February	25
March	40
April	30
May	20

The same is represented as follows through pictograph

Scale : Let one  represent 5 pens.

Months	Number of pens sold
January	
February	
March	
April	
May	

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Note : Divide the quantity of each item by the scale taken to get the number of symbols to be written or drawn.

In example 5, we have obtained the values as follows.

$35 \div 5 = 7$

$25 \div 5 = 5$

$40 \div 5 = 8$

$30 \div 5 = 6$

$20 \div 5 = 4$

Interpretation of a pictograph :

Example

1. The following pictograph shows the number of students present in a class of 35 students during the week.

Days	 = 5 students	Number of students present
Monday		30
Tuesday		25
Wednesday		15
Thursday		35
Friday		20
Saturday		10

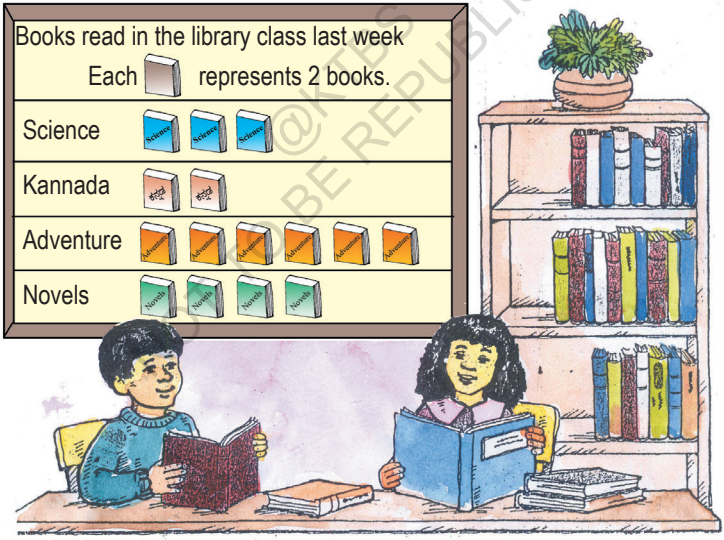
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Study the pictograph and answer the following questions.

- On which day were the maximum number of students present ?
- On which day were the minimum number of students present ?
- How many students were present on Monday ?
- What is the difference in the number of students present on Tuesday and Friday ?
- How many students were absent on Wednesday ?

Exercise 10.1

1) Observe the pictograph and answer the questions.



Each  stands for 2 books.

- Number of Science books read ____
- Number of Kannada books read ____
- Number of Adventure books read ____

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- Number of novels read ☐
- Total number of books read ☐

2) The following pictograph shows the number of cars in 5 villages of a taluk.

Villages	 = 5 Cars
Village 1	
Village 2	
Village 3	
Village 4	
Village 5	

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Observe the pictograph and answer the following questions:

- Which village has the maximum number of cars ? ☐
- Which village has the minimum number of cars ? ☐
- What is the total number of cars in five villages ? ☐
- How many more cars are there in village 3 than in village 5 ? ☐
- Which two villages have the same number of cars ? ☐

3) Ramu had 5 pens, 3 erasers, 6 books, 2 pencils and one sharpener in his bag.

Write the data in tabular form and represent the same through a pictograph.

Name of the article	Number of articles

Name of the article	Pictograph

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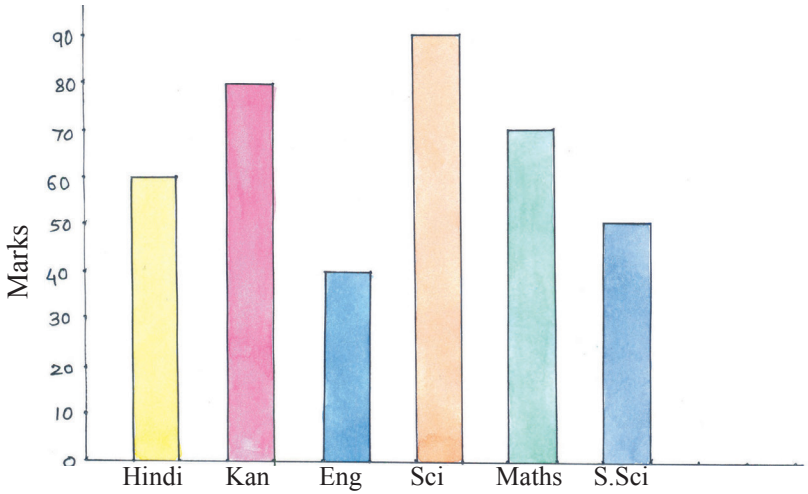
3) The number of bulbs manufactured in a week by a factory is given below. Draw a pictograph to represent the data. (choose a suitable scale)

Days of the week	Mon	Tue	Wed	Thu	Fri	Sat
Number of bulbs manufactured	50	40	60	20	30	40

Bar Graph : Study the given examples.

Example 1 : The marks Scored by Rajeev in the annual examination are as follows.

Subjects	Hindi	Kannada	English	Science	Mathematics	S.S
Marks	60	80	40	90	70	50



Study the type of graph drawn.

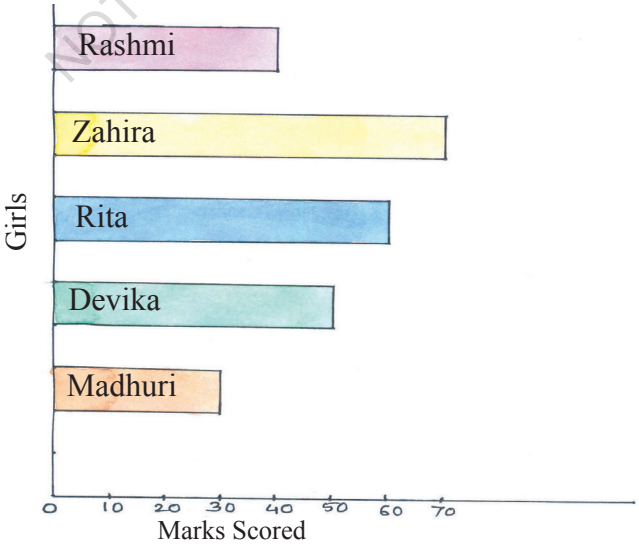
Here, the data is represented in columns by drawing vertical rectangles with uniform space between them.

Example 2

Marks scored by 5 girls in mathematics is given below.

Madhuri	Devika	Rita	Zahira	Rashmi
30	50	60	70	40

Study the type of graph given here.



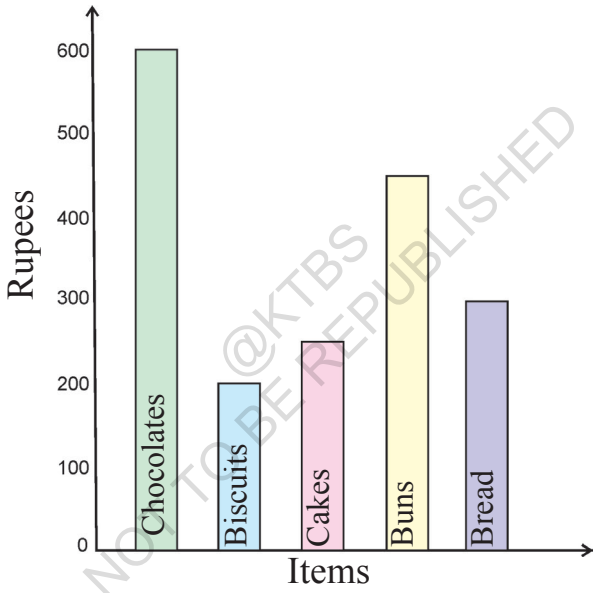
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The data is represented in columns by drawing horizontal rectangles, with uniform space between them.

The representation of data in columns by drawing vertical or horizontal rectangles with uniform space between them is called a "**Bar Graph'.**

Interpretation of Bar Graph

The following bar graph shows the sales in a baker's shop in a day.



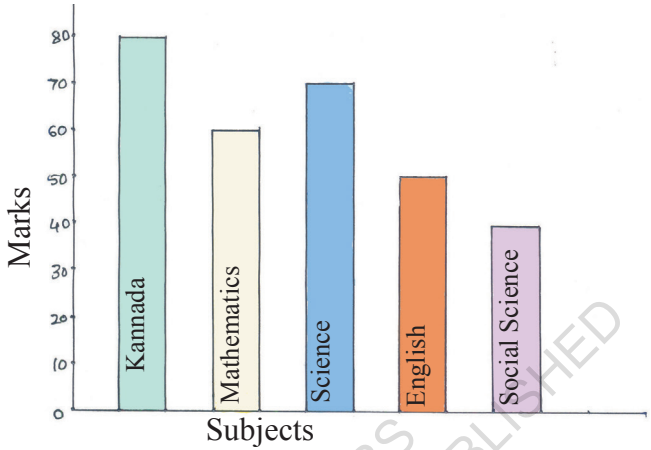
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- What is the information given by the bar graph ?
- What is the sale of buns and cakes ?
- Which item has the maximum sale ?
- Which item has the minimum sale ?
- Bar graph represents the relation between sales in a baker's items and the rupees.
- Sale of Bun is the more sales compared to cakes.
- Chocolates item nos the maximum sale.
- Biscuits item has the minimum sale.

Example 1

Marks obtained by Aziz in a half yearly examination in different subjects is given below.

Observe the bar graph and answer the questions.

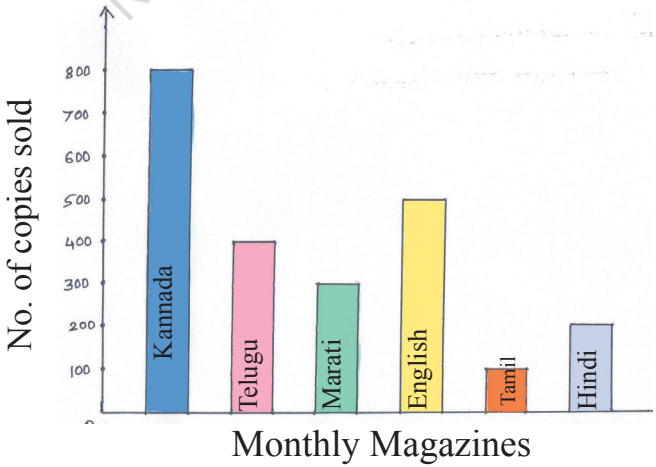


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- What is the information given in the bar graph ?
- Make a list of the subjects and marks scored in each of them.
- Name the subject in which Aziz has scored the highest marks.
- Name the subject in which he has scored the least marks.

Example 2

Study the bar graph and answer the following questions.



- What information is given in the bar graph ? .....
- Mention the scale taken in this bar graph. .....
- Write number of magazines sold in each language.

  Kannada ☐ Telugu ☐ Marati ☐

  English ☐ Tamil ☐ Hindi ☐
- Mention the total number of magazines sold. ☐
- Arrange the number of copies of magazines sold in different languages in the ascending order.

  .....

Note :

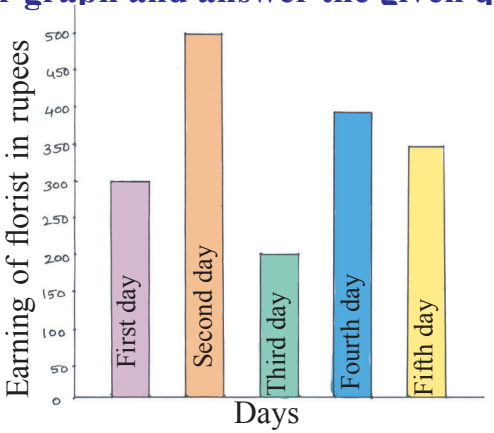
1. Draw two lines one vertical and the other horizontal such that they intersect at right angles.
2. Take equal spaces on the horizontal line to draw the columns.
3. The columns should be of equal thickness/width.

- On the vertical line, make equal divisions to represent the numerical data given.
- Choose a suitable scale.
- Give a title for the graph.
- Colour or shade each bar.

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Exercise 10.2

1) Read the bar graph and answer the given questions.



- What is the information given in the bar graph?
- Mention the scale taken.
- Mention the earnings on each day.

First day ☐ Second day ☐

Third day ☐ Fourth day ☐

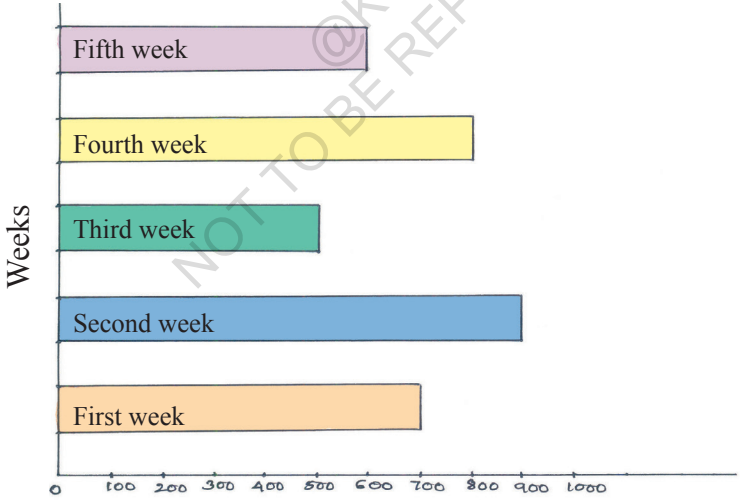
Fifth day ☐

- What is the total earnings in five days?
- What is the difference in the amount earned on the second day and the fifth day ? ☐
- Arrange the amount earned on each day in the descending order.

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2) Study the bar graph and answer the questions given.



Number of saplings planted by a farmer

- What is the information given in the bar graph? .....
- Mention the scale taken. .....
- Mention the number of saplings planted in each week.

First week ☐ Second week ☐ Third week ☐

Fourth week ☐ Fifth week ☐

- What is the total number of saplings planted in the five weeks ? ☐
- In which week did the farmer plant the maximum number of saplings ? ☐
- In which week did he plant the minimum number of saplings? ☐

3) A survey of 120 school students was done to find the activity they prefer to do in their free time.

Preferred activity	Number of students
Playing	45
Reading story books	30
Watching T.V.	20
Listening to music	10
Painting	15

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Draw a bar graph to illustrate the above data.

scale : 1 cm = 5 students

Which activity is preferred by most of the students other than playing?

4) The number of belts sold by a shopkeeper on six consecutive days of a week is as follows.

Days	Mon	Tue	Wed	Thu	Fri	Sat
Number of belts sold	20	30	45	35	25	20

Draw a bar graph to represent the data.

scale : 1 cm = 5 belts

What is the total number of belts sold in 6 days ? ☐

5) The following table shows the number of bicycles manufactured in a factory during the year 2005 - 2009. Illustrate the data using a bar graph.
(choose a suitable scale)

Year	Number of bicycles manufactured
2005	800
2006	600
2007	900
2008	500
2009	700

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a) In which year was the maximum number of bicycles manufactured ? ☐

b) In which year was the minimum number of bicycle manufactured? ☐



Answers

Chapter - 1 Exercise 1.1

II. 1) 45,618 2) 82,003 3) 13,709 4) 94,314

III. 1) $1 \times 10,000 + 9 \times 1,000 + 2 \times 100 + 0 \times 10 + 3 \times 1$

2) $7 \times 10,000 + 7 \times 1,000 + 7 \times 100 + 7 \times 10 + 7 \times 1$

3) $3 \times 10,000 + 8 \times 1,000 + 2 \times 100 + 9 \times 10 + 4 \times 1$

IV. 1) 72,838 2) 40,001 3) 63,517 4) 11,474

V.

	greatest number	**smallest number**
1)	97,431	13,479
2)	86,521	12,568
3)	76,310	10,367
4)	76,540	40,567
5)	75,432	23,457

VI. 1) 57,838, 57840 2) 18,376, 18,377

3) 40,779 40,780 4) 88,889, 88,891 5) 13,584, 13,585

VII. 1) 23,644 23,744 2) 75,790 95,790

3) 58,888 48,888 4) 33,453 42,453

5) 70,600 74,600

VIII. 1) 20,411 30,435 40,623 70,533

2) 40,044 40,444 44,044 44,444

3) 63,148 63,184 63,481 63,841

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	4) 50,006	50,060	50,500	55,000
	5) 20,302	20,325	20,413	20,825
IX	1) 45,678	34,567	23,456	12,345
	2) 45,604	45,064	40,564	40,456
	3) 13,244	12,344	12,340	12,304
	4) 77,777	77,770	77,077	7,0777
	5) 62,134	61,234	21,364	12,364

X. 1) = 2) > 3) < 4) < 5) >

Chapter - 2 Exercise 2.1

I. 1) 68,949 2) 89,796 3) 58,989 4) 75,766 5) 76,869

II 1) 90,520 2) 61,174 3) 80,028 4) 44,359 5) 67,655

III 1) 40,601 2) 32,035 3) 29,784 4) 42,862 5) 66,134

Chapter - 3 Exercise 3.1

I. 1) 25,310 2) 22,161 3) 25,272 4) 21,464 5) 14,051

II. 1) 21,949 2) 14,447 3) 23,457 4) 18,888 5) 11,375

III. 1) 9,989 2) 16,088 3) 21,579 4) 15,317 5) 6,738

IV. 1) 53,697 2) 38,274 3) 37,339 4) 8,823 5) 12,333

Exercise 3.2

I. 1) 39,809 2) 20,533 3) 46,669

II. 1) 15,341 2) ₹ 10,855 3) ₹ 19,472 4) 24,625

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Chapter - 4 Exercise 4.1

1) Multiples of 4 are 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96 and 100.

Multiples of 6 are 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90 and 96.

Multiples of 9 are 9, 18, 27, 36, 45, 54, 63, 72, 81, 90 and 99.

2) 7, 14, 21, 35, 42

3) 12, 24, 36, 48, 60, 72

4) 52, 54, 56, 58

5) 60, 75, 90

6) 5 Multiples of 15 are 15, 30, 45, 60 and 75.
5 Multiples of 17 are 17, 34, 51, 68 and 85.
5 Multiples of 19 are 19, 38, 57, 76 and 95.
5 Multiples of 23 are 23, 46, 69, 92 and 115.

7) 1, 2, 3, 4, 6, 8, 12 and 24

8) Any two factors of 6 are 2 and 3.
Any two factors of 18 are 2 and 9.
Any two factors of 28 are 2 and 14.
Any two factors of 36 are 3 and 12.
Any two factors of 42 are 2 and 21.
Any two factors of 48 are 2 and 24.
Note : The other answers are also possible.

9) All the factors of 9 are 1, 3 and 9.
All the factors of 13 are 1 and 13.
All the factors of 20 are 1, 2, 4, 5, 10 and 20.
All the factors of 26 are 1, 2, 13 and 26.
All the factors of 40 are 1, 2, 4, 5, 8, 10, 20 and 40

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Chapter - 5 Exercise 5.1

1. (b), (c)

3. a) $\frac{1}{2}$ b) $\frac{2}{3}$ c) $\frac{2}{10}$ d) $\frac{5}{7}$ e) $\frac{5}{16}$
   f) $\frac{5}{12}$ g) $\frac{8}{9}$ h) $\frac{4}{9}$ i) $\frac{3}{4}$ j) $\frac{2}{5}$

4) a) Two-fifth b) Three-fourth c) Seven-tenth
   d) Eleven-twelveth e) Two-third f) Four-fifth
   g) Five-eighth h) Three-seventh i) Five-sixth
   j) Seven-nineth

5) a) $\frac{2}{3}$ b) $\frac{2}{4}$ c) $\frac{5}{8}$ d) $\frac{7}{12}$ e) $\frac{7}{15}$ f) $\frac{6}{18}$

6) a) 8 b) 2 c) denominator d) numerator
   e) numerator

7) a) $\frac{1}{5}$ b) $\frac{2}{4}$ c) $\frac{4}{12}$ d) $\frac{3}{6}$ e) $\frac{4}{9}$

8) $\frac{4}{7}, \frac{2}{9}, \frac{7}{10}$

10) a) 4 b) 6 c) 6

12) fig 2, fig 6, fig 7

13) fig b and d. 5 objects out of 12 are shaded

14) a) $\frac{3}{10}$ b) $\frac{2}{5}$ c) $\frac{4}{7}$ 14. a) $\frac{4}{5}$ b) $\frac{3}{7}$ c) $\frac{5}{6}$

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Exercise 5.2

(1) > (2) < 3) < (4) > (5) > (6) < (7)< (8) < (9) > (10) > (11) > (12) >

Exercise 5.3

I. 1) $\frac{\boxed{6}}{9}, \frac{8}{\boxed{12}}$ 2) $\frac{\boxed{10}}{14}, \frac{15}{\boxed{21}}, \frac{\boxed{30}}{42}$

II. 1) $\frac{6}{15}, \frac{8}{20}, \frac{10}{25}$ 2) $\frac{9}{24}, \frac{12}{32}, \frac{15}{40}$ 3) $\frac{27}{33}, \frac{36}{44}, \frac{45}{55}$

III. 1) Yes 2) No 3) No 4) Yes

IV. 1) $\frac{16}{28}$ 2) $\frac{24}{42}$ 3) $\frac{12}{21}$ 4) $\frac{48}{84}$

Exercise 5.4

I. 1) $\frac{1}{2}$ 2) $\frac{1}{2}$ 3) $\frac{1}{2}$ 4) $\frac{1}{5}$ 5) $\frac{1}{5}$

6) $\frac{3}{4}$ 7) $\frac{1}{3}$ 8) $\frac{3}{4}$ 9) $\frac{3}{7}$ 10) $\frac{1}{3}$

Chapter - 6 Exercise 6.1

4)

Angle	Vertex	Sides
a) $\angle CDE$	D	$\overrightarrow{DE}$ and $\overrightarrow{DC}$
b) $\angle KLM$	L	$\overrightarrow{LK}$ and $\overrightarrow{LM}$
c) $\angle SUT$	U	$\overrightarrow{US}$ and $\overrightarrow{UT}$
d) $\angle PQR$	Q	$\overrightarrow{QP}$ and $\overrightarrow{QR}$

Exercise 6.2

2) a) 55^0 = acute angle b) 95^0 = obtuse angle

c) 90^0 = right angle d) 32^0 = acute angle

e) 180^0 = straight angle f) 103^0 = obtuse angle

6) a) 90^0 = right angle b) 30^0 = acute angle

c) 150^0 = obtuse angle d) 105^0 = obtuse angle

e) 130^0 = obtuse angle

7) a) 3) 178^0 b) 2) 4, 15, 10

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Chapter - 7 Exercise 7.1

I. a) radius b) 1) O 2) OA 3) 2.5 cm

IV. a) 2.4 cm b) 1.6 cm c) 3.6 cm d) 2.9 cm

Chapter - 8 Exercise 8.1

II. 1) 5.73 m 2) 1.378 km 3) 15150 mm
4) 2.450 km 5) 1,500 cm

Exercise 8.2

II. 1) 37m 01 cm 2) 26 km 510 m

III. 1) 7m 13 cm 2) 5 km 225 m

IV. 1) 4 2) 2 m 40 cm 3) 8 m 20 cm
4) 33 m 60 cm 5) 5.5 m 6) 25.5 m
7) 75 cm 8) 8 km

Chapter - 9 Exercise 9.1

I. 1) Plane figures 2) Length and breadth
3) Two pairs 4) Equal 5) Twice

II. a) 320 cm b) 168 cm c) 550 cm d) 18 cm e) 344 cm

III. 1) 10 cm 2) 12 cm 3) 14 cm 4) 18 cm 5) 14 cm
6) 18 cm 7) 20 cm 8) 22 cm 9) 28 cm 10) 32 cm

IV. 1) 20 m 2) 540 m 3) 260 m;1,300m
4) 880 m ; ₹ 13,200 5) 3,180 m

Exercise 9.2

II. a) 56 cm b) 200 cm c) 208 cm d) 180 cm e) 140 cm

III. 1) 12 cm 2) 20 cm 3) 44 cm 4) 72 cm 5) 100 cm
6) 120 cm 7) 164 cm 8) 220 cm 9) 252 cm 10) 368 cm

IV. 1) 60 m 2) 1,360 m 3) 256 m

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Exercise 9.3

II. 1) 12 sq.units 2) 15 sq.units 3) 24 sq.units
4) 21 sq.units 5) 32 sq.units

III. 1) 6 sq.cm 2) 8 sq.cm 3) 12 sq.cm 4) 20 sq.cm.
5) 10 sq.cm 6) 18 sq.cm 7) 24 sq.cm 8) 30 sq.cm.
9) 48 sq.cm 10) 63 sq.cm.

IV. a) 6,300 sq.cm b) 1,440 sq.cm c) 18,666 sq.cm
d) 18 sq.cm e) 7,360 sq.cm

V. 1) 45,000 sq.m 2) 80 sq.m 3) 150
4) 375 sq.m ; ₹ 9,37,50 5) 110

Exercise 9.4

II. a) 2,704 sq.cm b) 2,500 sq.cm

III. 1) 9 sq.cm 2) 25 sq.cm 3) 121 sq.cm
4) 324 sq.cm 5) 625 sq.cm 6) 900 sq.cm
7) 1,681 sq.cm 8) 3,025 sq.cm 9) 3,969 sq.cm
10) 8,464 sq.cm

IV. 1) 36 sq.m 2) 441 sq.cm 3) 225 sq.m
4) 32 5) 1,600

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