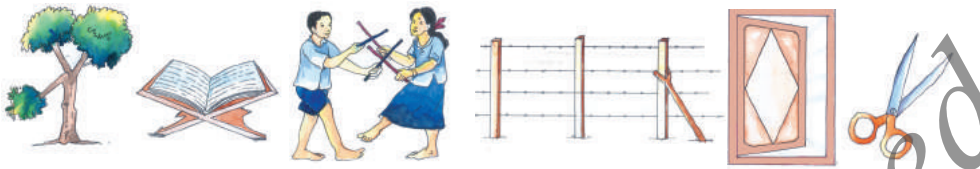
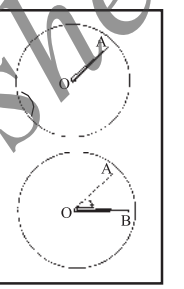
We can observe the same type of angles in the environment and in our daily activities. Identify the angles in the following figures by drawing lines.



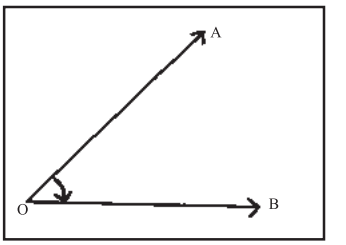
Activity : Cut a piece of cardboard in circular shape. Mark its centre as O. Take a plastic stick and fix it to the centre of the circle. The distance of the stick is marked as OA. Now rotate the plastic stick. Mark the distance of the stick as OB. The stick has moved from the point A to the point B 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

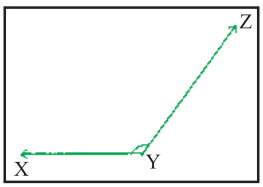
Here OA and OB are the two rays. These are the arms or the sides of the angle. The point **O** is called the vertex of the angle. An angle is represented by the symbol '$\angle$' or $\wedge$ and denoted by capital letters of the English alphabet.



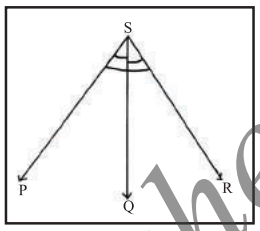
In the above figure AOB is the angle. We can represent the angle AOB as $\angle$**AOB** or $\angle$**BOA**. The middle letter represents the vertex of the angle.

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**.

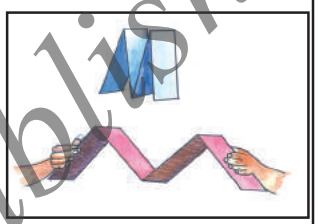
In the adjoining figure, XYZ is the angle. It is represented as $\angle XYZ$ or $\angle ZYX$. It is also represented as $X\hat{Y}Z$ or $Z\hat{Y}X$



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.

Exercise 6.1

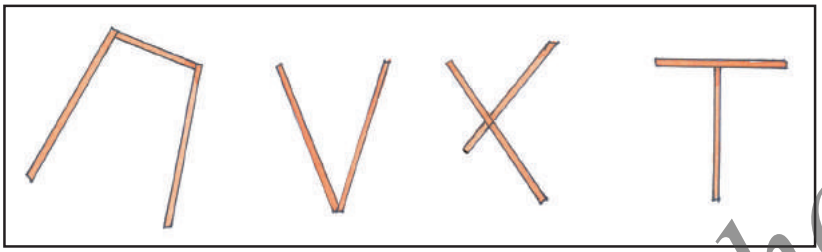
1) Observe your surrounding environment and list the situations where the angles are formed.
2) Observe the angles formed while doing the following yogasana postures.

Trikonasana

Parshvakonasana

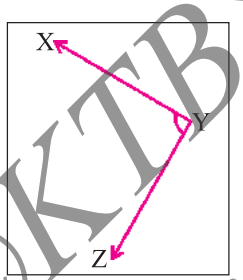
Halasana

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.

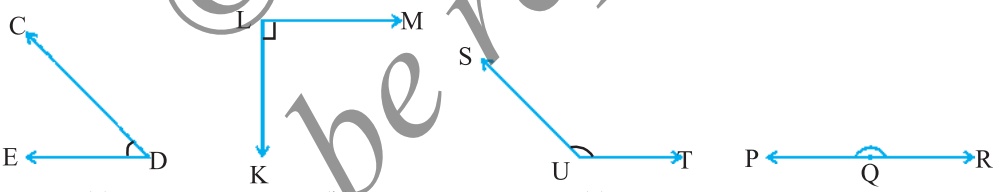
Example :



Angle - $\angle XYZ$

Vertex - Y

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

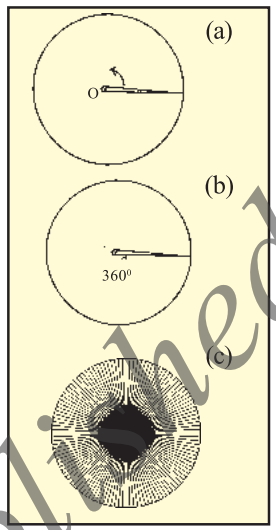


(a) (b) (c) (d)

Measurement of an angle

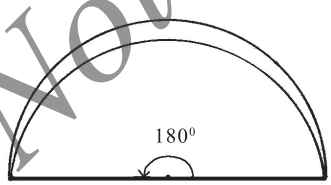
Mamata has got two clocks. In one clock the time shown is 3 hours 30 minutes. In another clock, the time shown is 9 hours 30 minutes. In which clock the angle formed between hour hand and minute hand is greater ?

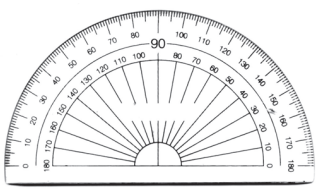
In order to answer the above question, let us understand how to measure an angle. Take a circular cardboard, and fix a plastic needle at the centre. Rotate the needle from a fixed position. When this needle comes back to its original position, one rotation will be completed. We call this rotation as 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 **1^0 (**We read as **one degree).** So the measure of one complete angle is 360^0 (360 degrees).

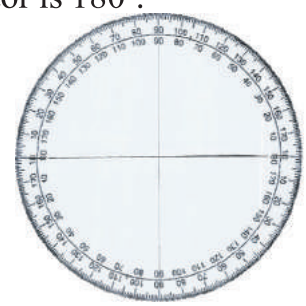


Protractor

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.



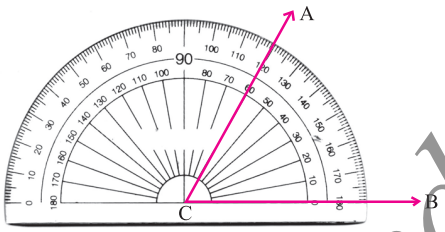




Do you know : There are complete protractors which measure an angle of upto 360^0.

Method of measuring a given angle using protractor :

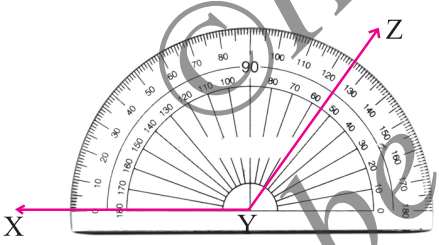
Let us measure ∠ACB with the help of a protractor.

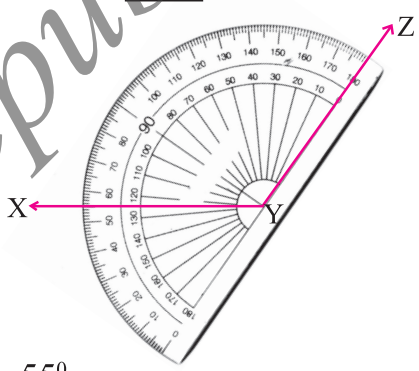


Steps :

1) Place the protractor on ∠ACB as shown in the figure. The point **O** of the protractor should exactly coincide with the vertex C of ∠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 ∠ACB is 60^0.

Activity 1





Ranjit measures and reads the ∠XYZ as 55^0.

Is he correct ? Why ?

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

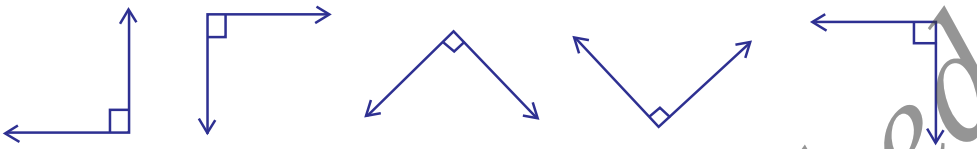
Note : An angle has two arms. While measuring the angle, either of the arms can be coincided with the 0^0 line of the protractor, then the measure of the angle remains the same.

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

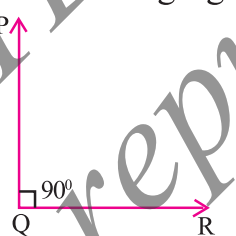
Right angle

Measure the following angles.



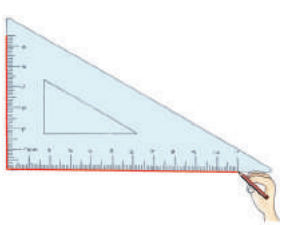
The measure of all the angles are equal to 90^0. The angle having its measure as 90^0 is called **right angle.** In a right angle two sides of an angle are perpendicular to each other.

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).



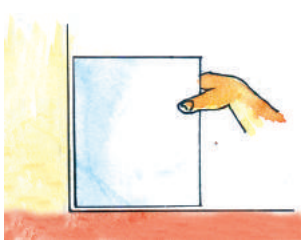
Activity 1 : Fold a circular paper through its centre. The measure of the angle is 180^0. When you fold it through its centre once again, examine whether you get a right angle.

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.

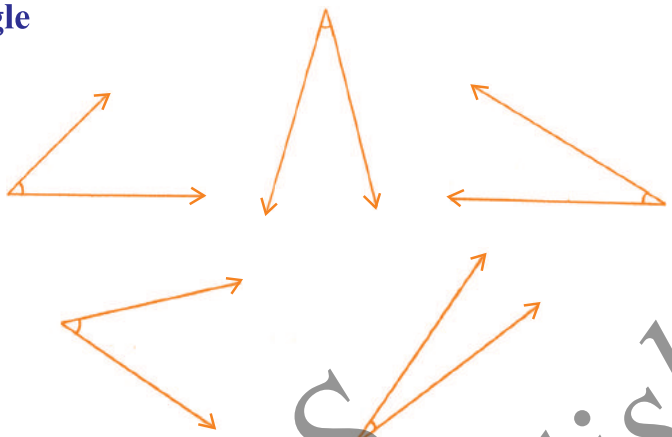


We can observe the formation of many right angles around us.

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.**

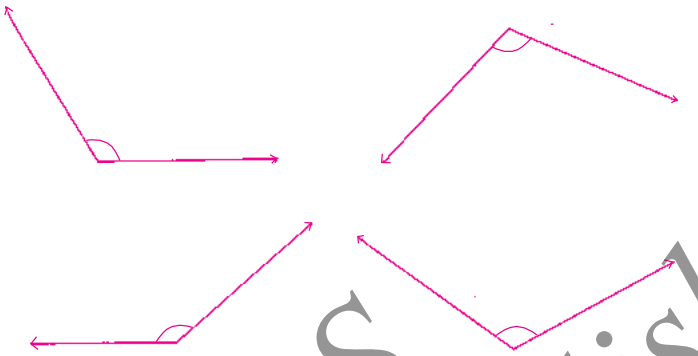
Observe the following examples and mark the acute angles.

- The ladder kept inclined to a wall.

- The angle formed between two hands of a scissors

- The photo kept inclined to a wall.

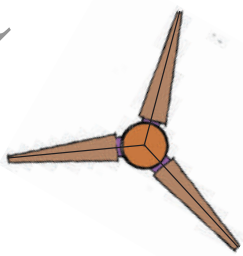
Obtuse angle

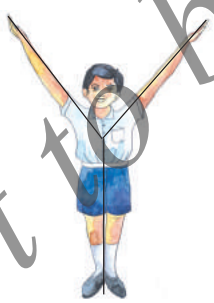


Measure the angles given above and record them. All these angles have measures more than 90^0 or a right angle and less than 180^0 or a straight angle. Such angles whose measures are more than 90^0 and less than 180^0 are called **Obtuse angles.**

Observe the following examples and mark the obtuse angles.

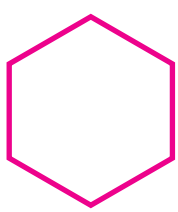
- The fan which has 3 blades.





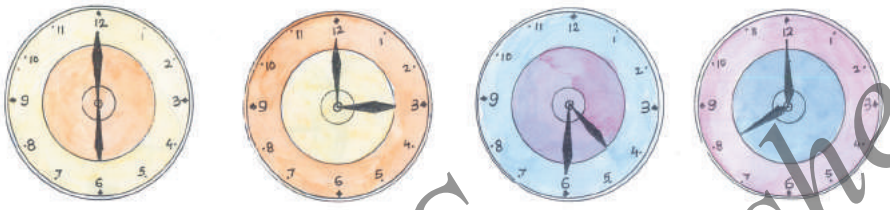
- The boy standing with lifted hands.

- Angles formed in this figure



Angles in a clock

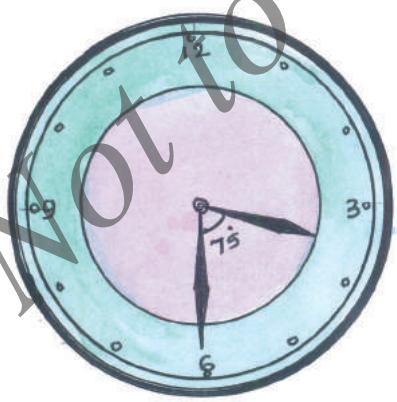
You have observed many types of angles formed between the hour hand and the minute hand in a clock. Observe the angles formed between the hands when the clock shows the following timings.



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.

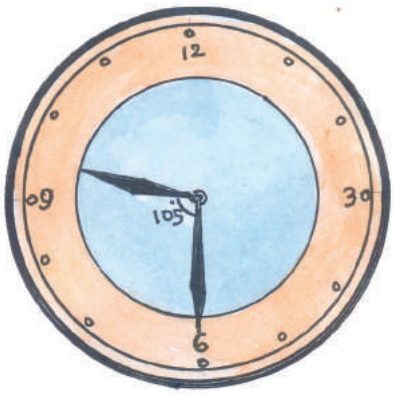
- Among the 12 numbers marked in a clock, what is the angle formed between one number of a clock and its nearest number ?
- What is the angle formed between the two hands when the clock is showing 10 hours 30 minutes ?
- In a day, how many times right angle will be formed between the hour hand and minute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

3 hours 30 minutes



Acute angle

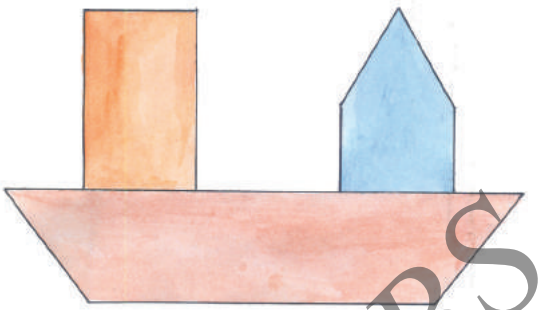
9 hours 30 minutes



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.

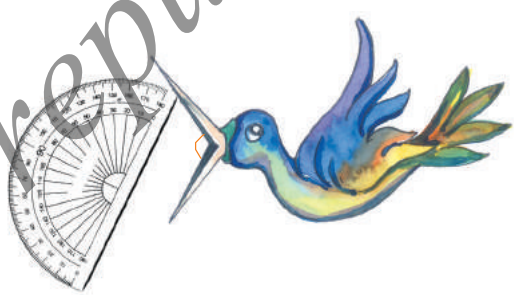


Right angle = ...

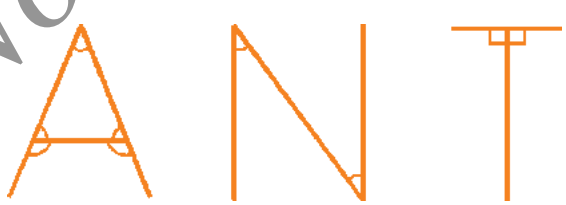
Acute angle = ...

Obtuse angle = ...

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



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

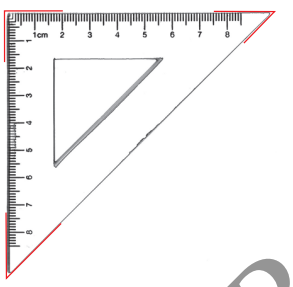


Right angle .....

Acute angle .....

Obtuse angle .....

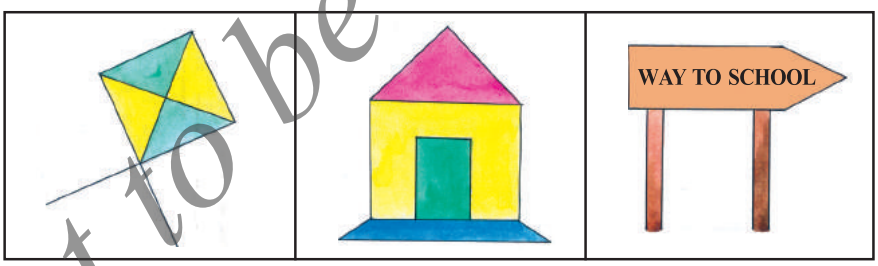
4) Use the set squares from your geometry instrument box and construct angles of measure 90^0, 60^0 and 45^0 as shown in the figure. Verify by measuring them using protractor.

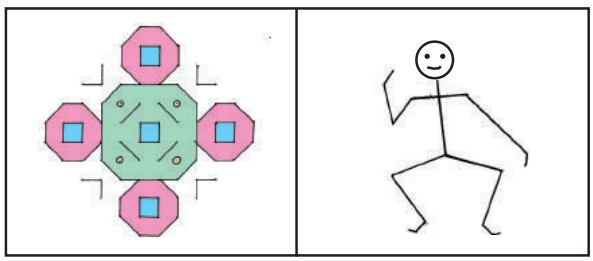


Think : Using set squares, can you construct the angles 15^0, 75^0, 105^0 and 120^0 ? How ?

Exercise 6.2

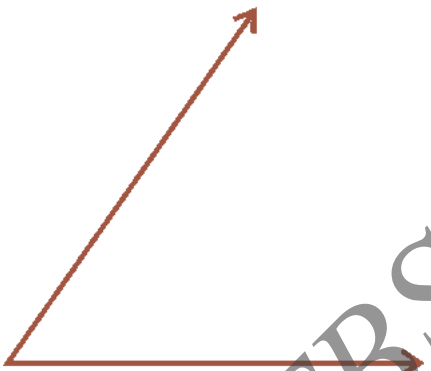
1) Mark the right angle, acute angle and obtuse angle with different colours in the following figures.



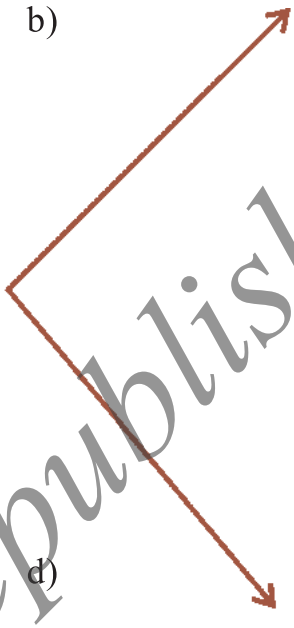


2) Measure the following angles and write the measurement and type of each angle.

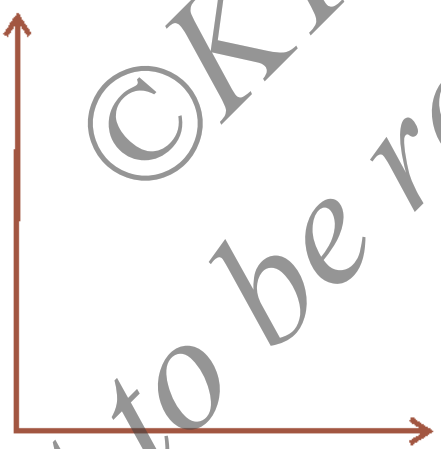
a)



b)



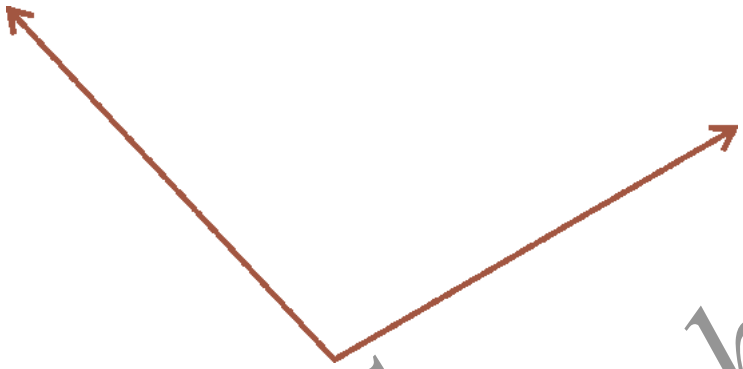
c)



d)

e)

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.

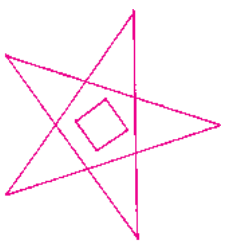
   a) Example for obtuse angle.

   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

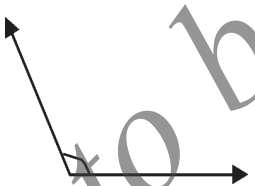
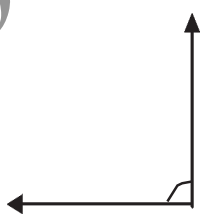


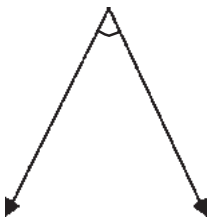
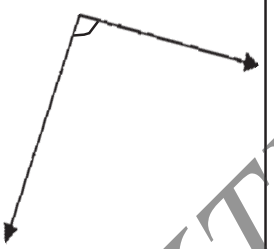
8. Classify the measures of angles given below :

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

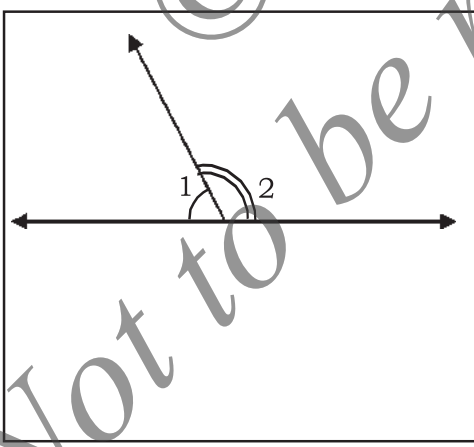
Acute angle	Right angle	Obtuse angle	Straight angle

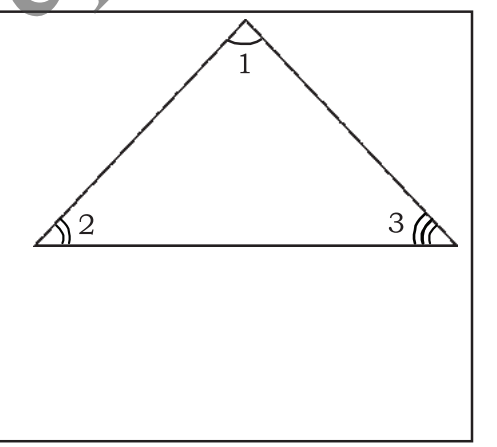
9. Estimate the measure of the following angles. Verify by measuring them. Name the type of angles.

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

3				
4				

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





Chapter - 7

CIRCLES

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.

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 ?

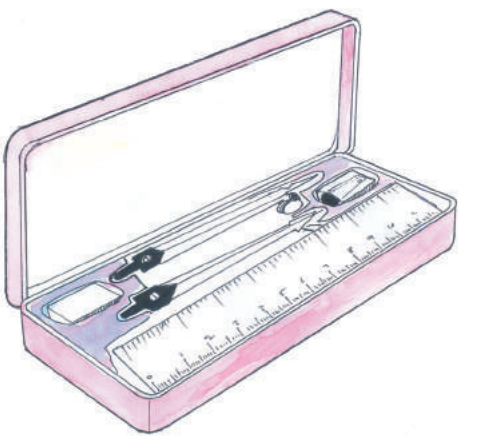
Activity 2 : Circles with radius 1cm, 2.5cm, 4.2cm and 6cm are to be drawn. Can you draw them accurately using bangle, plate and coin? why? Discuss.

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

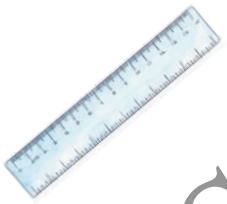
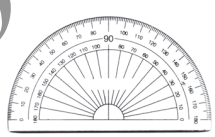
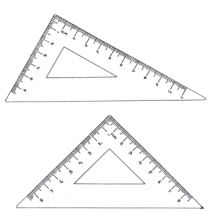
Before this, let us know about the instruments required for it.

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.

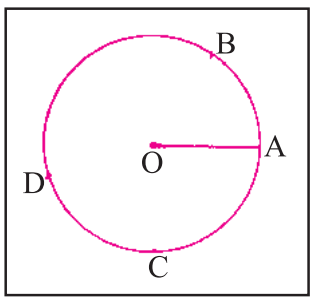
Activity

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?

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.

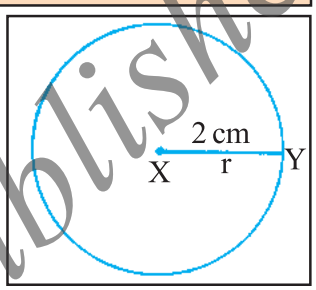
What do you observe from the above measurements ? All the radii of a circle are equal. Radius is denoted by the letter 'r'. In the figure the radius r = ... cm.

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



Exercise 7.1

I. Complete the following using suitable answers.

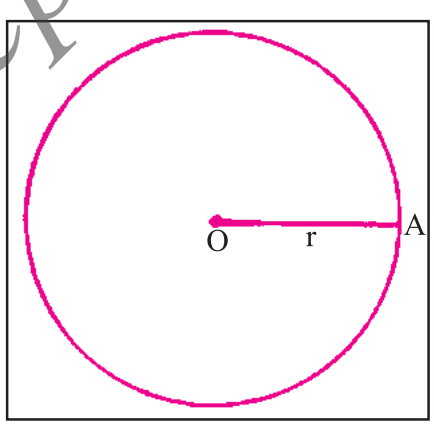
a) The distance between the centre of a circle and a point on the circle is called.....

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 ( )

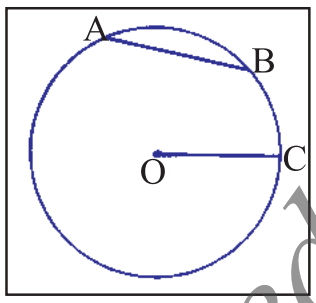
b) All radii of a circle are equal ( )

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 ( )

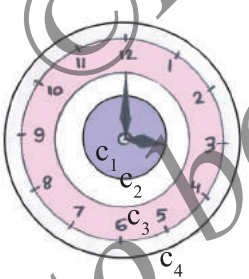


III. i) In each of the following figures, identify the circle, its radius and centre.

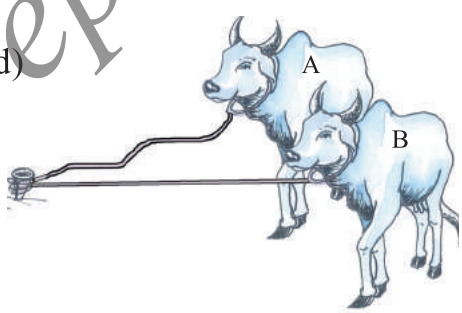
a)

b)

c)



d)



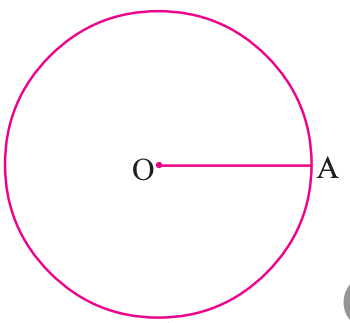
ii) In figure (a), how many circles are there ? Do they have the same centre ? .....

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.

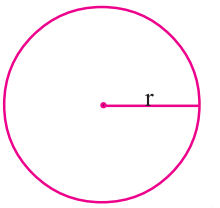
v) In figure (d), which cow's rope will represent the radius of the circle ? .....

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



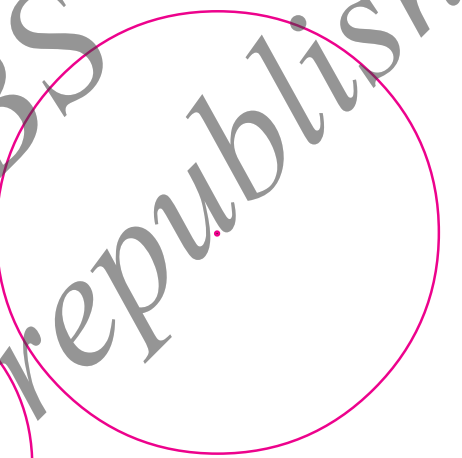
a)

r = ...



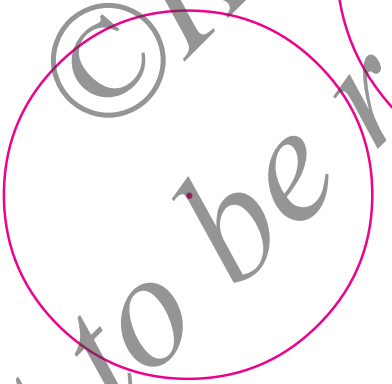
b)

r = ...



c)

r = ...



d)

r = ...

Construction of a circle of given radius

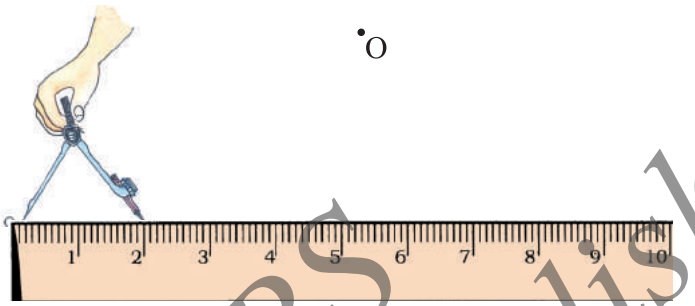
You have learnt to construct circles using compasses. Using only compasses draw circles with different radii.

Now let us construct a circle of radius 2 cm.

Steps of construction

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

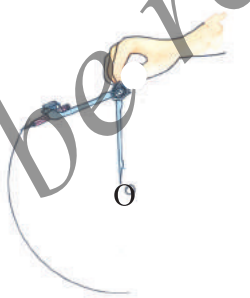
Step 2. Keep the needle of your compasses and the edge of the pencil on a scale as shown in the figure. So that radius = r = 2 cm



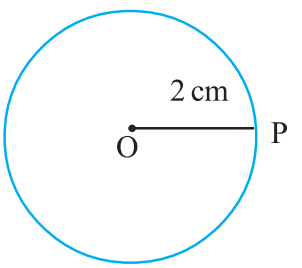
Discuss with your teacher :

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

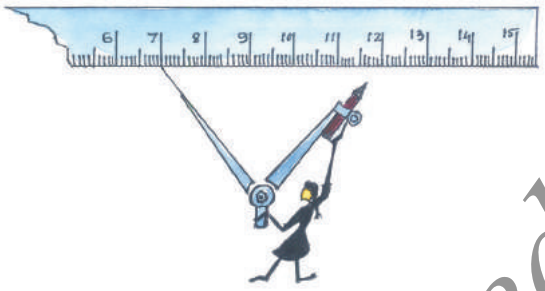
3) Keep the needle of the compasses on **O**. Without changing the position of the compasses, draw the circle.



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.



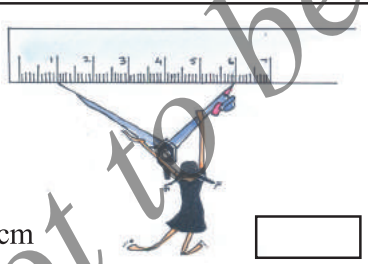
Exercise 7.2

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

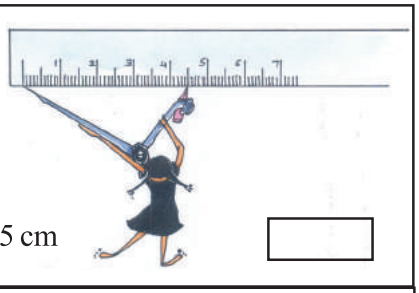
2) The students in the following figures have to draw circles with the given radii. So the students have placed the compasses on the scale as shown. If they have placed the compasses correctly put '✓' if not put '✗'. Take correct measurements and construct the circles in your book.

a)



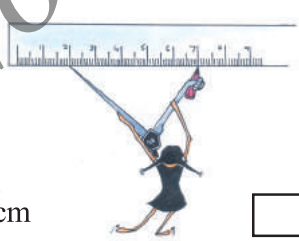
6 cm ☐

b)



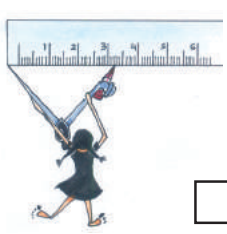
4.5 cm ☐

c)



5 cm ☐

d)



3.3 cm ☐

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.

Think !

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

Chapter - 8

LENGTH

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.

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	1 cm = 10 mm

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 = $1,000 \times 2 = 2,000$ m.

Example 2 : How many centimetre make 4 metre ?

1 metre = 100 cm

$\therefore$ 4 m = $100 \times 4 = 400$ cm.

Example 3 : How many millimetre make 12 cm ?

1 cm = 10 mm

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

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

∴ 3,000m = 3,000 ÷ 1,000 = 3 km.

Example 5 : Convert 575 cm into metre.

100 cm = 1m

∴ 575cm = 575 ÷ 100 = 5.75m.

Example 6 : Convert 400 millimetre into centimetre

10 mm = 1 cm

∴ 400 mm = 400 ÷ 10 = 40 cm.

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.

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.

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

∴ 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.

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 ?

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 ?

Chapter - 9

PERIMETER AND AREA

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.

Length, Breadth and Perimeter of a rectangle

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

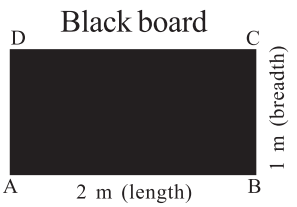


fig. 1

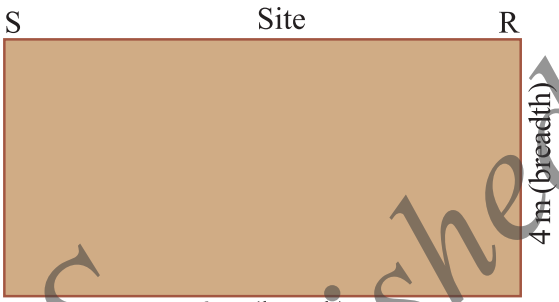


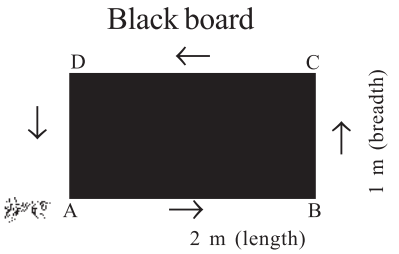
fig. 2

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.

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.

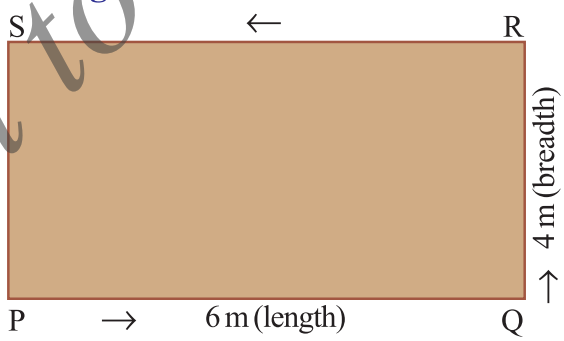
Total distance covered from point -

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

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

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'**.

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 perimater of the site ?

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

P → Q → R → S → P

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

This is the Perimeter of the site

∴ Perimeter of the site = 20 m

This one round of measurement of the rectanglar 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.

∴ 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.

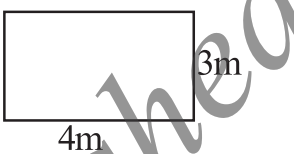
Example 1

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

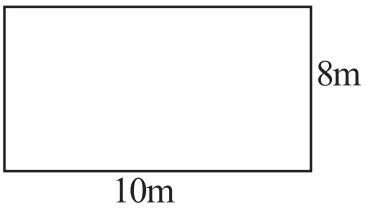
Example 2

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 ?

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

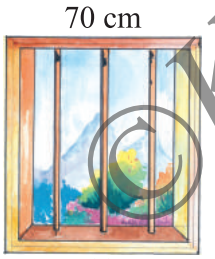
= 144 m

Exercise 9.1

I. Answer oraly :

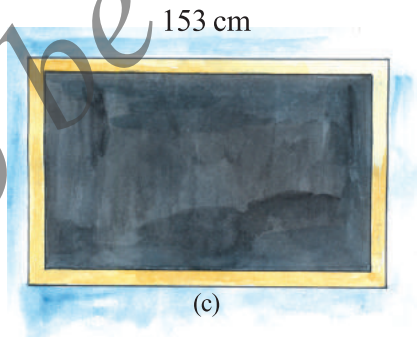
1) What are two dimensional figures called ?
2) Name the two dimensions of a rectangle.
3) How many pairs of opposite sides are there in a rectangle?
4) How are the opposite sides in a rectangle ?
5) How many times is the perimeter of a rectangle to the sum of its length and breadth ?

II. Find the perimeter of the following pictures :



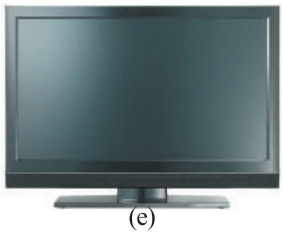
(a)

(b)



(c)

(d)



(e)

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.

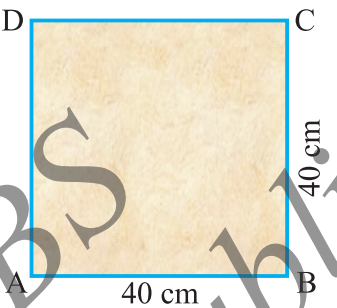
3) A rectangular garden measures 80m in length and 50 m in breadth. Find its perimeter. If the garden has to be fenced 5 rounds with barbed wire, what is the length of the wire required?

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.

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 $= 4l$

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

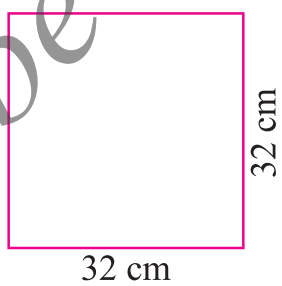
$\therefore$ Perimeter of the playground = $(4 \times l)$ units

= (4×80) m

= 320 m

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

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

Perimeter of the playground = 4×75 = 300 m

Rita covers 300 m in one round.

∴ Total distance she covers in 5 rounds

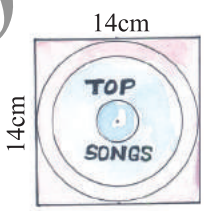
= 300 m $\times$ 5 = 1500 m.

Exercise 9.2

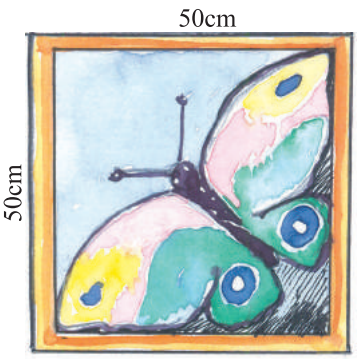
I. Answer orally :

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 ?

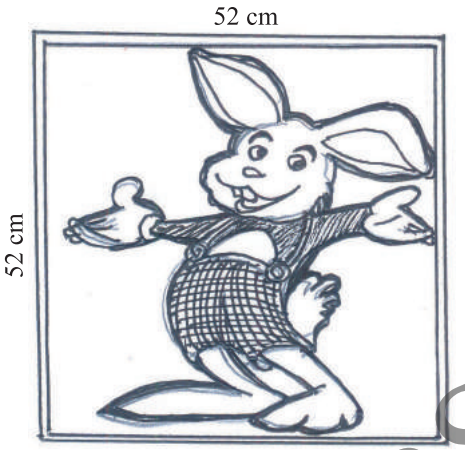
II. Find the perimeter of the following pictures.



(a)



(b)



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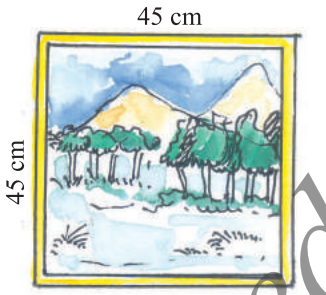

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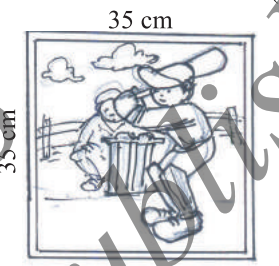


(e)

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.

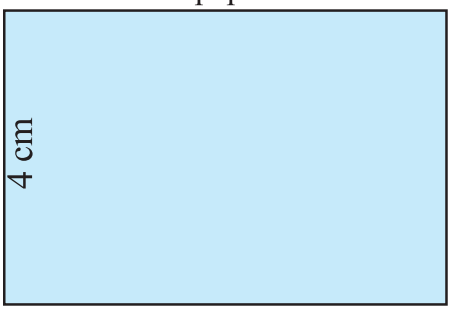
1) The length of a square room is 15 m. Find its perimeter.

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

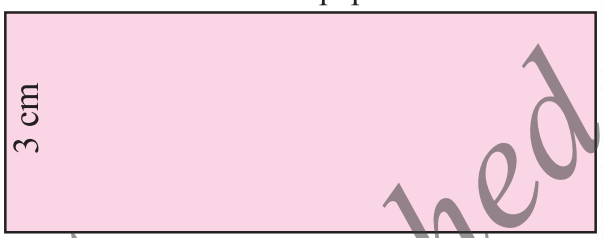
3) The length of a square room is 16 m. The walls of the room should be tied with coloured buntings 4 times. Find the total length of buntings required.

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

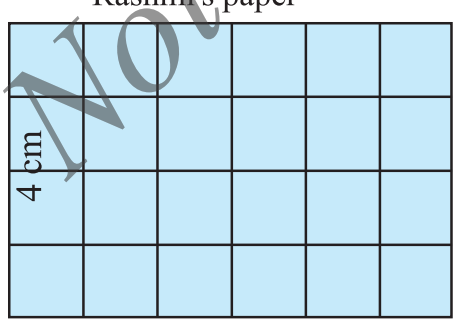


Fig. 1

Rita's paper

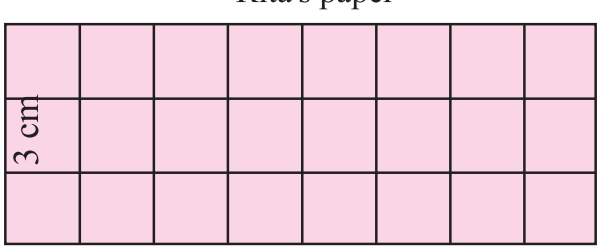


Fig. 2

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.

Notice the length and breadth of fig 1.

Length of the rectangle = 6 cm

Its breadth = 4 cm

∴ Area of the rectangle = ?

Let us multiply length and breadth

Area of the rectangle = $l \times b$

= 6 cm × 4 cm = 24 $(cm)^2$

= 24 sq cm ⇨ 24cm^2

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

Length of the rectangle = 8 cm

Its breadth = 3 cm

∴ Area of the rectangle = ?

Let us multiply length and breadth.

8 cm × 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.

∴ 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.

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

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 = $\frac{\text{Area of the floor}}{\text{Area of the stone slab}}$

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

= 40 stone slabs.

Exercise 9.3

I. Answer the following.

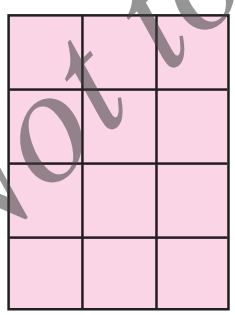
1) What is the unit of area ?

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

3) What is the area of a unit square ?

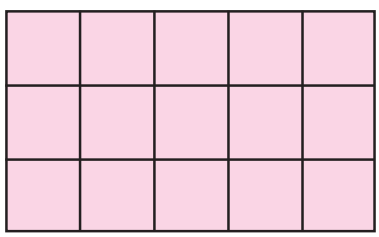
II. The rectangles given below are divided into squares of unit length. Find their areas.

1)

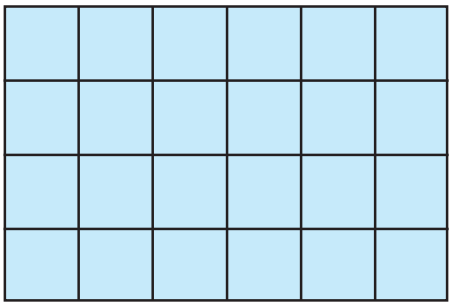


$4x3 = 12cm^2$

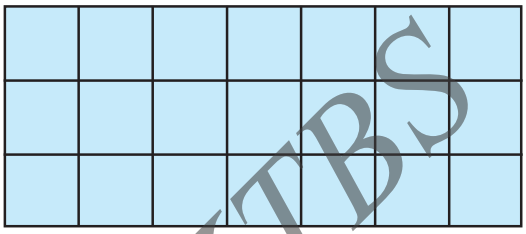
2)



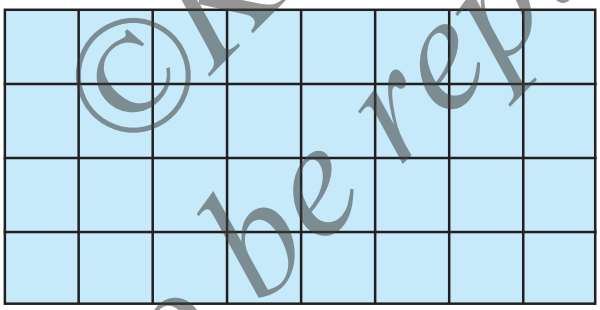
3)



4)



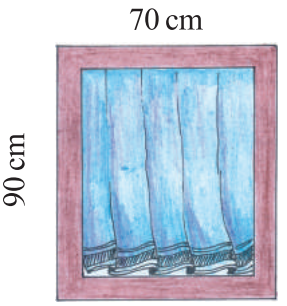
5)



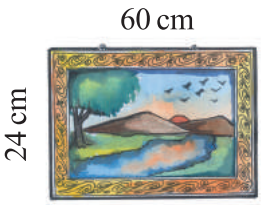
III. The length and breadth of the rectangles are given below. calculate their areas.

	(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										

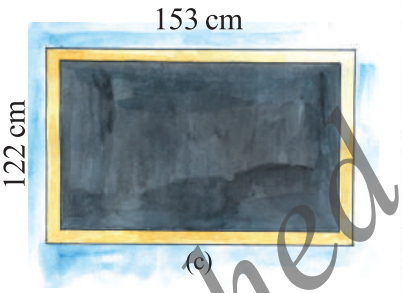
IV. Find the area of the figures given below.



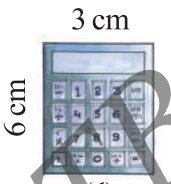
(a)



(b)



(c)



(d)

(e)

V. Solve the following problems.

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

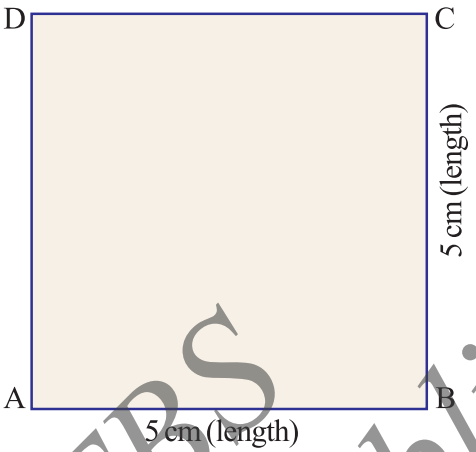
2) A carpet is needed to cover the entire area of a room. If the length of the room is 16m and breadth 5m, find the area of the carpet required.

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 ?

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 = $l \times b$).

∴ **Area of the Square = *(l × l), square units***

Now observe the length of the figure.

length of the square = 5 cm

∴ Area of the square = $l \times l$

= 5 cm × 5 cm = 25 $(cm)^2$

= 25 sq cm

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 = $l \times l$

= $4m \times 4m = 16\ (m)^2$

= 16 sq m

Example 2

The length of a table tennis hall which is square in shape is 9 m. 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 ?

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 :

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

$$= \frac{\overset{27}{\cancel{81}}\ \cancel{\text{Sq. m}}}{\underset{1}{\cancel{3}}\ \cancel{\text{Sq. m}}} = 27 \text{ granite stones}$$

Exercise 9.4

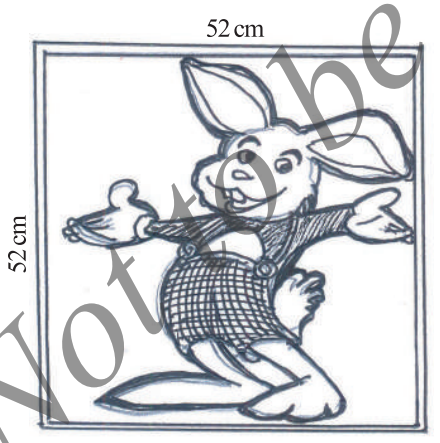
I. Answer orally.

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

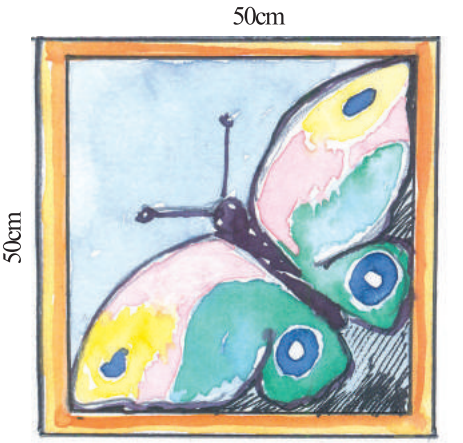
2) What is the unit of area ?

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

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.

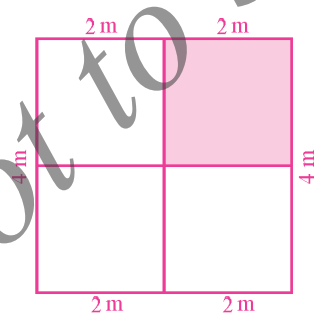
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Measure of the side of a square (in cm)	3	5	11	18	25	30	41	55	63	92
Area of the Square										

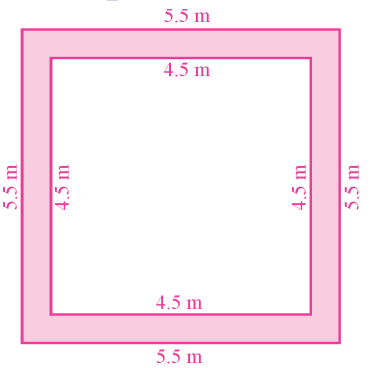
IV. Solve the following problems.

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.

VII. Calculate the area of shaded portion.

1)





Chapter - 10

DATA HANDLING

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.

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

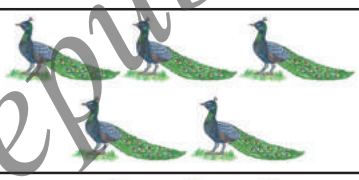
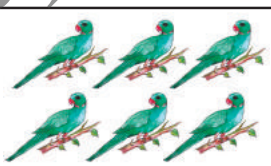
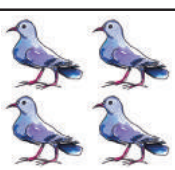
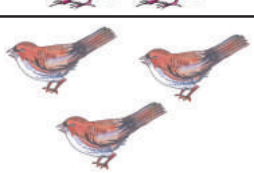
Here is a picture of birds in an album.

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	

Example 2

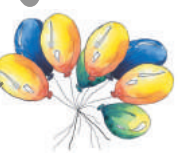
Observe the picture given below. Toys are displayed on the shelf.

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

The same information can be represented pictorially as follows :

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

Let us study more examples

Example 3

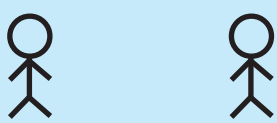
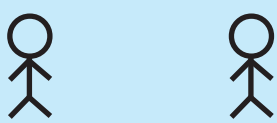
Teacher Mrs. Stella asks the students of class V to tell their mode of travelling to school every day. She put a tally mark as each of the students answered and prepared the following table.

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	

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	

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	

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.

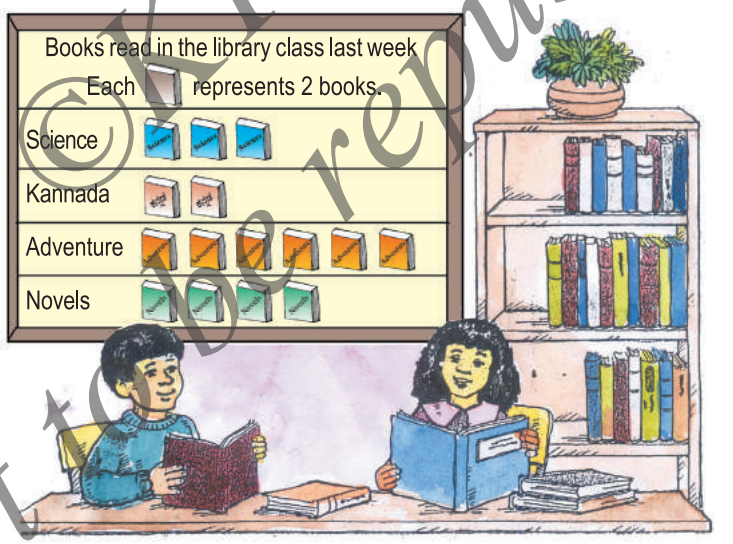
Days	 = 5 students	Number of students present
Monday		30
Tuesday		25
Wednesday		15
Thursday		35
Friday		20
Saturday		10

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 ☐

- 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	

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

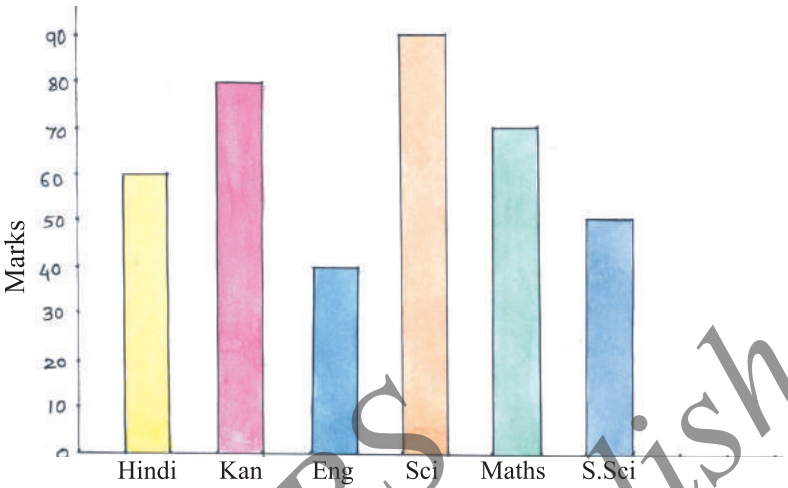
3) The number of bulbs manufactured in a week by a factory is given below. Draw a pictograph to represent the data. (choose a suitable scale)

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.

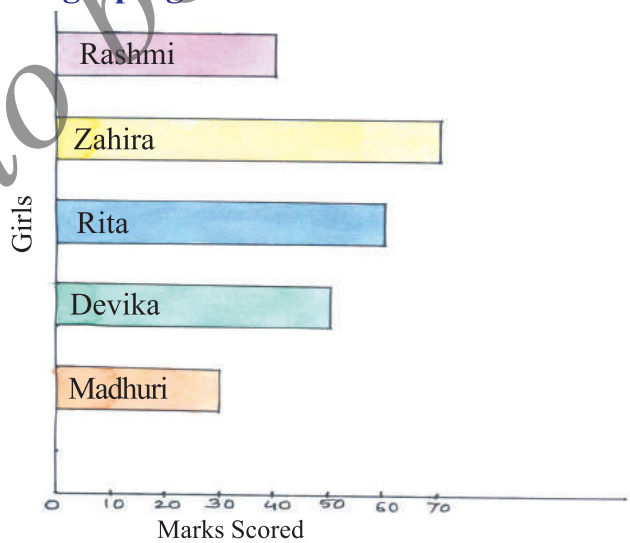
Here, the data is represented in columns by drawing vertical rectangles with uniform space between them.

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.

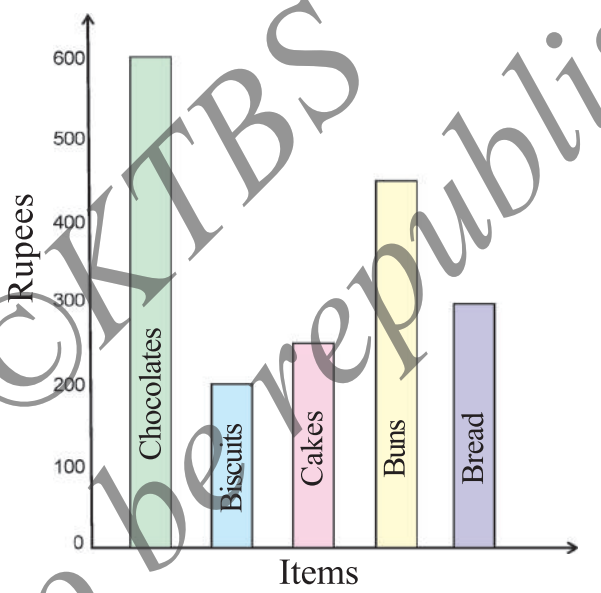


The data is represented in columns by drawing horizontal rectangles, with uniform space between them.

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

Exemple :

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

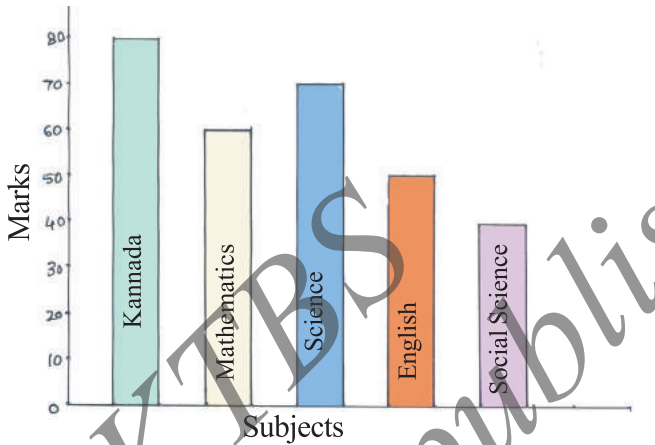


- What is the information given by the bar graph ?
- What is the sale of buns and cakes ?
- Which item has the maximum sale ?
- Which item has the minimum sale ?
- Bar graph represents the relation between sales in a baker's items and the rupees.
- Sale of bun is the more sales compared to cakes.
- Chocolates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

Example 2

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

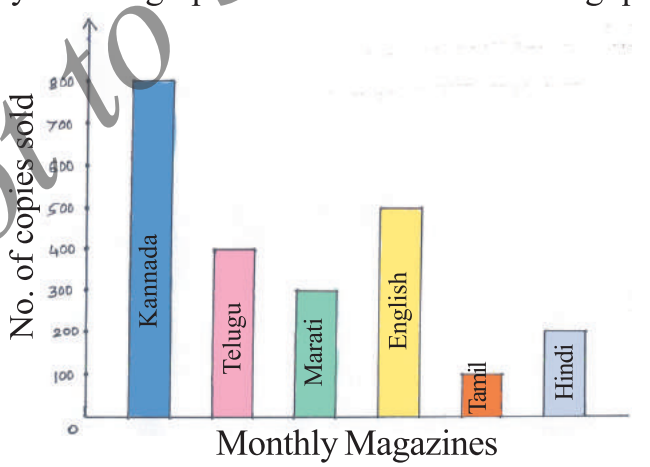
Observe the bar graph and answer the questions.



- 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 3

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.

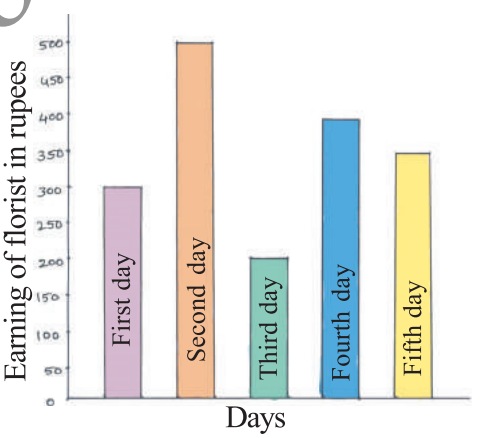
  .....

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.

3) 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 ☐

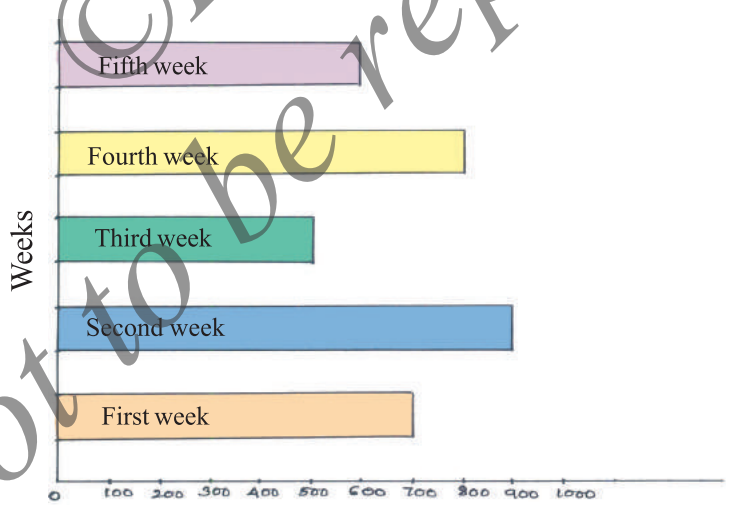
Third day ☐ Fourth day ☐

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.

.....

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

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 ? ☐

6) 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

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	
	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

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

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) $\frac{4}{9}$

9) a) 4 b) 6 c) 6

10) $\frac{4}{7}$, $\frac{2}{9}$, $\frac{7}{10}$

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) $\frac{4}{7}$ 15. a) $\frac{4}{5}$ b) $\frac{3}{7}$ c) $\frac{5}{6}$

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

1. $\frac{2}{7}$ is closer to $\frac{1}{4}$; $\frac{3}{7}$ is closer to $\frac{1}{2}$; $\frac{5}{7}$ is closer to $\frac{3}{4}$.
2. $\frac{2}{9}$ is closer to $\frac{1}{4}$; $\frac{4}{9}$ is close to $\frac{1}{2}$; $\frac{5}{9}$ is closer to $\frac{1}{2}$; $\frac{7}{9}$ is closer to $\frac{3}{4}$.

Exercise 5.5

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

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

Exercise 7.2

3) a) Scale, Compass b) Scale c) Scale, Set squares

d) Scale, Protractor

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

I. 1) Length and Length 2) 4 3) Four times 4) 20 cm

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) 280 m 3) 120 m 4) 1,360 m 5) 256 m

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