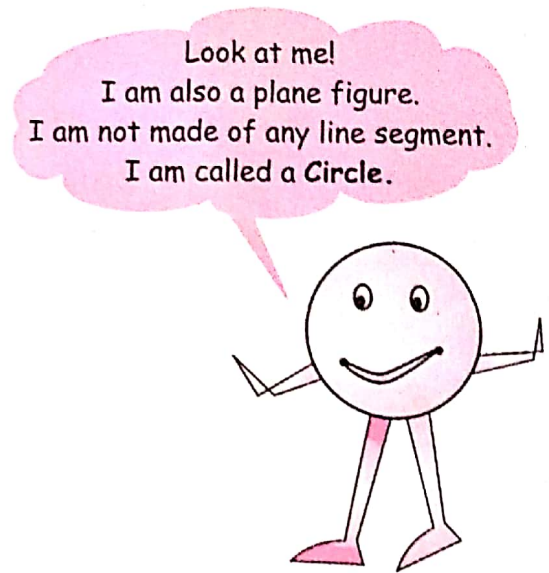
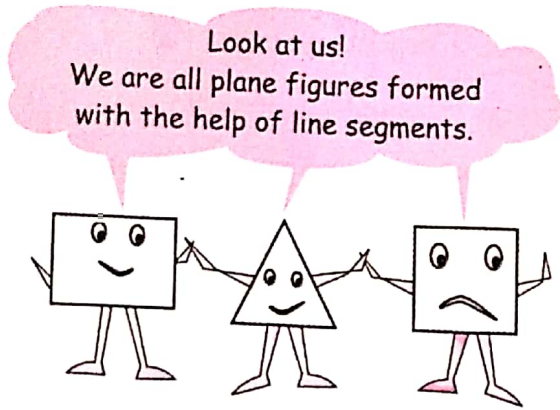
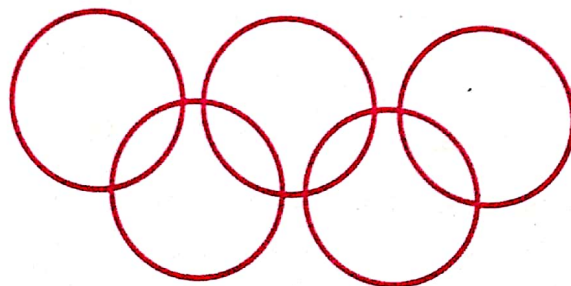
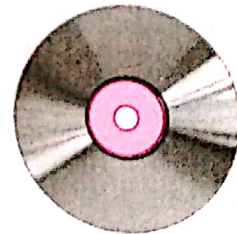
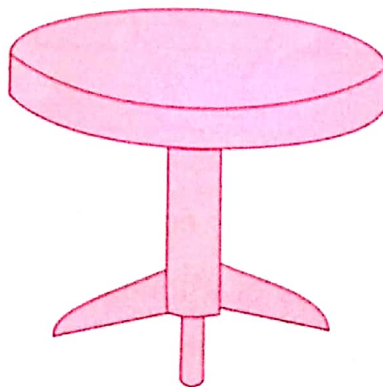
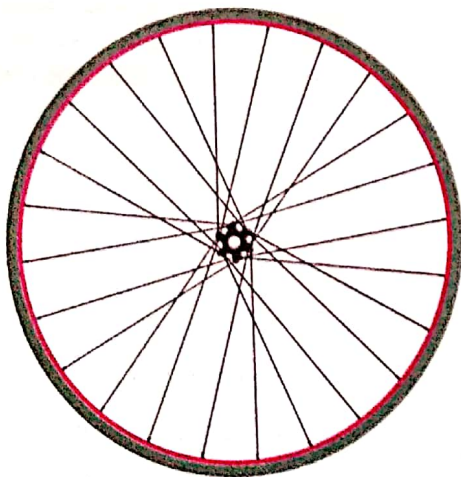


INTRODUCTION

We all are familiar about various kinds of shapes.



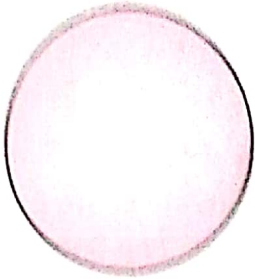
Look at the pictures given below from your day to day life. They all represent circles in one form or the other.



MORE ABOUT CIRCLES

A. ELEMENTS OF A CIRCLE

Using a plate, draw a circle on paper and cut it out.



Now fold the circle in such a manner that you get the half of the circle.



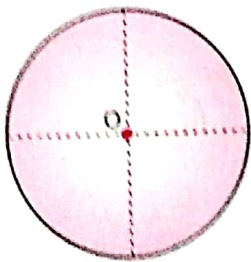
Each half of a circle is called a **semi-circle**.

Fold the semi-circle again to get one-fourth of the circle.



This represents the **quarter** of a circle.

Let us now open the folds and mark the point where the two folds meet each other.

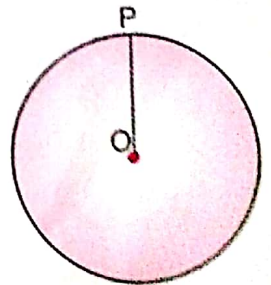


Mark this point O.

The point O is called the **centre** of the circle.

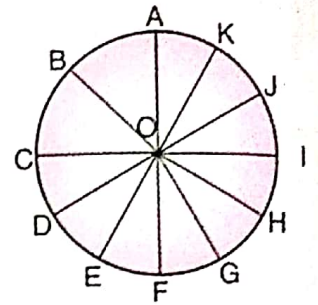
B. RADIUS OF A CIRCLE

Look at the circle given here. 'O' is the centre and 'P' is a point on the circle. Join O and P. The line segment OP is called a **radius** of the circle.

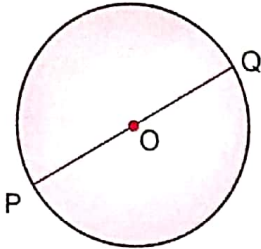


Radius is line segment joining the centre of a circle to any point on the circle.

A circle can have many radii. We can measure and see that all the radii of a circle are of **equal** length.



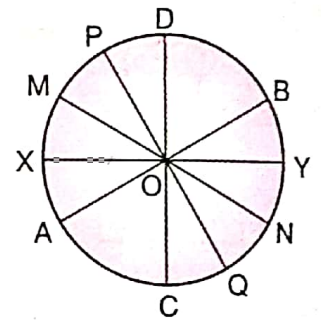
C. DIAMETER OF A CIRCLE



Look at the line segment PQ. The end points P and Q lie on the circle and PQ passes through O, the centre of the circle. The line segment PQ is called a **diameter** of the circle.

Diameter is a line segment whose end points lie on the circle and which passes through the centre of the circle.

A circle can have many diameters. We can measure and see that all the diameters are of equal length.



D. RELATION BETWEEN RADIUS AND DIAMETER OF A CIRCLE

Look at the given circle.

PQ is a Diameter.

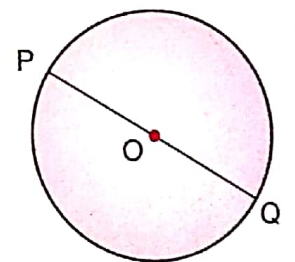
OP and OQ are the Radii.

Let us measure OP, OQ and PQ

$$OP = 1.8 \text{ cm}$$

$$OQ = 1.8 \text{ cm}$$

$$PQ = 3.6 \text{ cm} \rightarrow \text{Diameter}$$



$$3.6 \text{ cm} = 2 \times 1.8 \text{ cm}$$

We observe that the length of a diameter of a circle is **two times** the length of its radius.

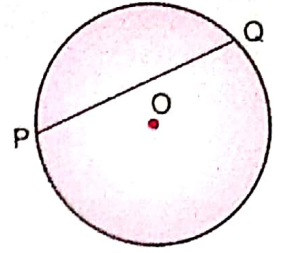
$$\text{Diameter} = 2 \times \text{Radius}$$

We also have

$$\text{Radius} = \frac{1}{2} \text{ Diameter}$$

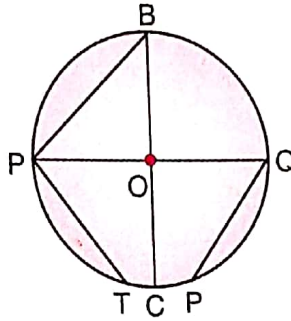
E. CHORD OF A CIRCLE

Look at the given circle. In this circle, PQ is a line segment. Its end points lie on the circle. PQ is called a **chord** of the circle.



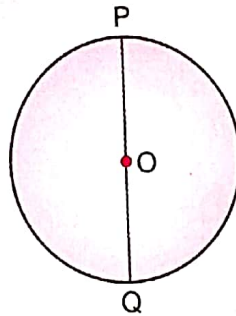
A **chord** is a line segment whose end points lie on the circle.

We can draw many chords of a circle. All the chords are not of equal length and they may or may not pass through the centre of the circle.



See carefully the given circle.

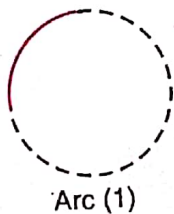
PQ is the chord which passes through the centre of a circle. But PQ is also a diameter of the circle. So, **diameter** is a chord which passes through the centre of a circle.



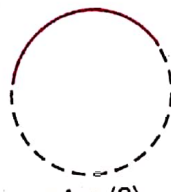
Diameter is the longest chord of a circle.

F. ARC AND SEMI-CIRCLE

See the red portion of the given circles. They are only parts of a circle.



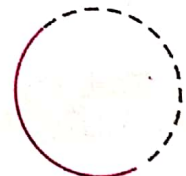
Arc (1)



Arc (2)



Arc (3)

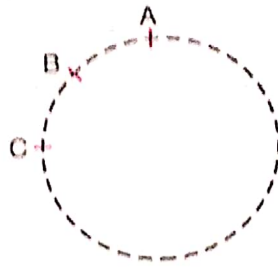


Arc (4)

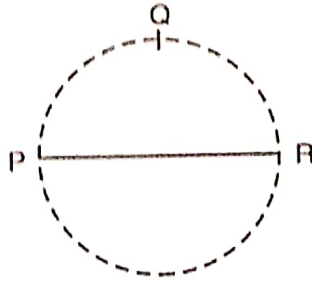
Remember

- Arc is a part of a circle.
- It can be of any size.

ABC is an arc of this circle. We name an arc using three points. Two end points and one point between them. The notation for arc ABC is \widehat{ABC} .



Look at the arc PQR. It is exactly half of this circle.



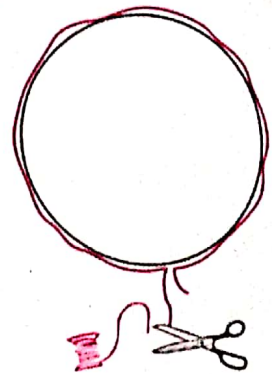
Half of a circle is called the **Semi-circle**.

G. CIRCUMFERENCE OF A CIRCLE

Wrap a thread along the boundary of a circle so that the thread reaches the starting point once again.

Cut the thread from this point and measure it.

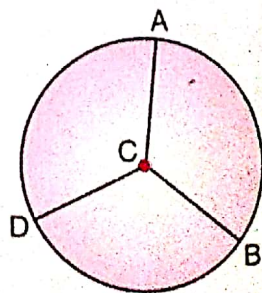
The measurement of this length gives the length of the circle or **perimeter** of the circle.



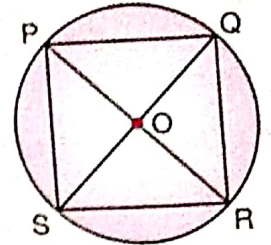
Perimeter of a circle is called the **circumference** of the circle.

Worksheet 1

1. Name three objects that can be used to draw a circle.
2. In the given figure, name the centre and all radii of the circle.

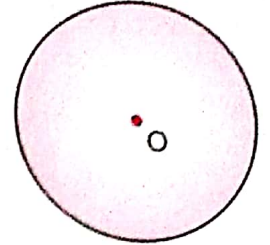


3. Name all the radii, diameters and chords in this circle.



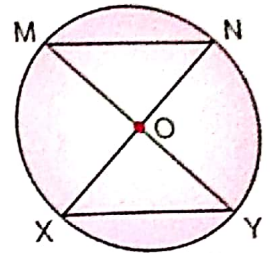
4. Draw the following in this circle.

- (a) Radius OX
- (b) Diameter AB
- (c) Chord AC



5. In this circle,

- (a) MN and XY are _____ .
- (b) XN and MY are _____ .
- (c) OX and OM are _____ .



6. Find the diameter of circles whose radius is given below.

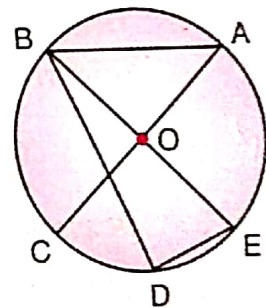
- (a) 4 cm (b) 3.1 cm (c) 4.6 cm (d) 5.4 cm (e) 21 cm

7. Diameter of some circles are given below. Find their radius.

- (a) 8 cm (b) 7 cm (c) 6.4 cm (d) 11.4 cm (e) 26 cm

8. Observe the given circle and answer the following questions.

- (a) Name the centre.
- (b) How many radii are there?
- (c) Name any one diameter.
- (d) Name all the chords.
- (e) Name a semi-circle.

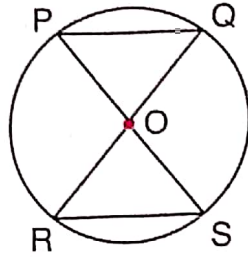


9. Write 'True' or 'False' for the following statements.

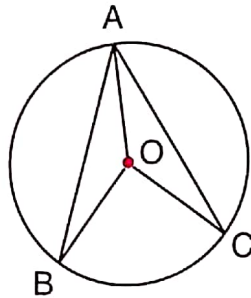
- (a) Diameter of a circle is twice its radius.
- (b) The line segment joining any two points on a circle is called its diameter.
- (c) All the radii of a circle are of equal length.
- (d) We can draw only two diameters of a circle.
- (e) Each circle can have only two semi-circles.

Five empty rectangular boxes for writing answers to question 9.

- (d) In the following figure O is the centre of the circle with $OP = 4$ cm. Find QR.



- (e) In the following figure name the line segments of equal length, where O is the centre of the circle.

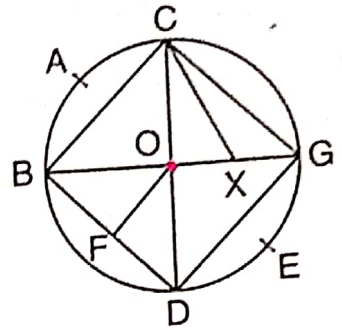


2. Construct a circle of any radius and draw the following in it.
 - (a) Centre O
 - (b) Diameter AB
 - (c) Radius OX
 - (d) Chord AY
 - (e) Any arc XYZ
3. Draw a circle of radius 4.2 cm. Draw its diameter and measure it.
4. Draw a line segment PQ of length 7 cm. At P, draw a circle of radius 4 cm. At Q, draw a circle of radius 3 cm. What do you observe?
5. Draw a line segment XY of length 8 cm. At X, draw a circle of radius 5 cm. At Y, draw a circle of radius 3.8 cm. What do you observe?
6. Write 'True' or 'False' for the following statements.

(a) All chords of a circle are of equal length.	<input type="text"/>
(b) If diameter of a circle is 3 cm, its radius is 6 cm.	<input type="text"/>
(c) Diameter is the longest chord of a circle.	<input type="text"/>
(d) Semi-circle is an arc of the circle.	<input type="text"/>
(e) The centre of a circle lies in the interior of the circle.	<input type="text"/>

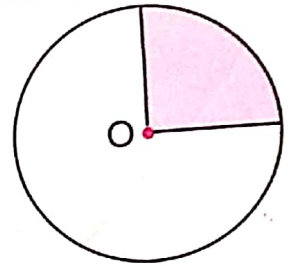
7. Look at the circle carefully and answer the questions.

- Name two diameters.
- How many chords are there?
- Name any three radii.
- Name any two arcs.
- Name one semi-circle.
- Is FO a radius?
- Is CX a chord?



HOTS

- If the circumference of a circle with radius 3.5 cm and centre O is 22 cm. Find the perimeter of the quarter of the circle.

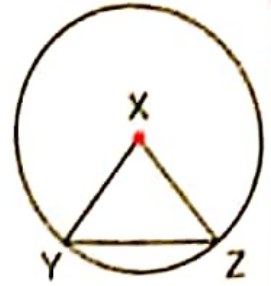


- A wire is in the shape of a square of side 4 cm which is bent to form a circle. What will be the circumference of the circle?

YOU MUST KNOW

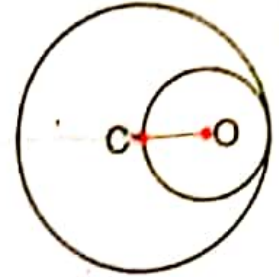
- Circle is a plane figure which is not made of any line segment.
- Radius is a line segment joining the centre of a circle to any point of the circle.
- Chord is a line segment joining any two points of the circle.
- Diameter is a line segment joining any two points of a circle and which passes through the centre of the circle.
- Diameter is the longest chord of the circle.
- Diameter = 2 (radius)
- Arc is a part of a circle.
- Semi-circle is half of a circle.
- Perimeter of a circle is circumference of the circle.
- Compasses is used to draw a circle.

(c) In the given figure if X is the centre of the circle, then ΔXYZ is—



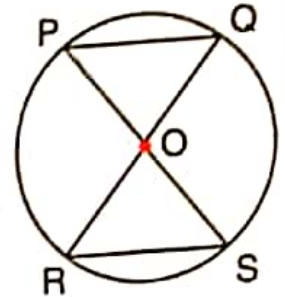
- (i) isosceles
- (ii) equilateral
- (iii) right
- (iv) scalene

(d) In the given figure if radius of inner circle is 2 cm, the diameter of the outer circle will be—



- (i) 4 cm
- (ii) 8 cm
- (iii) 6 cm
- (iv) 10 cm

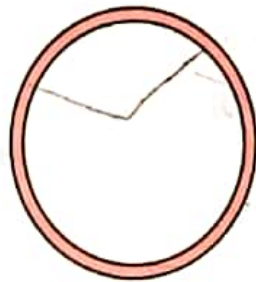
(e) In the figure given below, O is the centre of circle, then—



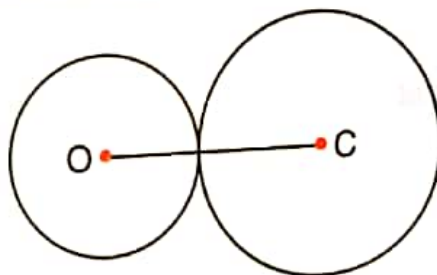
- (i) PQ and RS are always equal.
- (ii) PQ and RS are never equal.
- (iii) PQ and RS may or may not be equal.
- (iv) PQ is greater than RS.

B. Answer the following questions.

- (a) If length of a chord passing through the centre of the circle is 10 cm, what is the radius of the circle?
- (b) What will be the width of the following circular race track with inner diameter 10 cm and outer diameter 14 cm?



(c) If two circles of centres O and C with radii 2 cm and 3 cm touch externally, what is the distance between their centres?



$= 5\text{cm}$

CONSTRUCTION OF A CIRCLE

Recognise this instrument in your geometry box.
Yes, this instrument is called **compasses**.

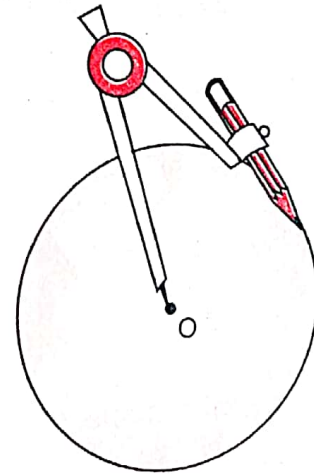
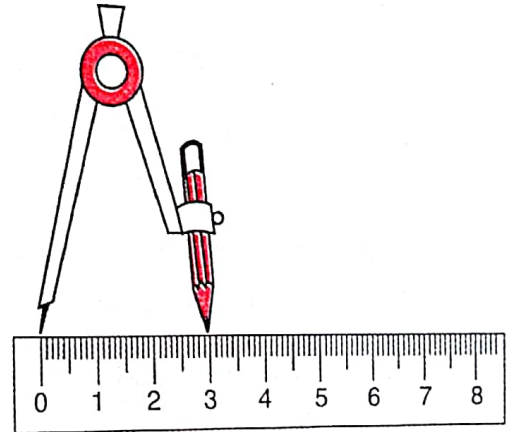
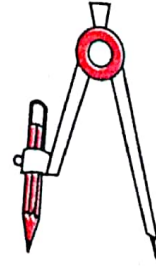
We make use of compasses for drawing a circle.

Example 1 : Draw a circle with radius 3 cm.

Solution :

Check the steps of construction

- First fix small, well sharpened pencil to the pencil holder arm of the compasses.
- Open the arms of the compasses so that the needle like arm and the pencil arm are 3 cm apart.
- Mark a point O on a sheet of paper and keep the needle arm of compasses on the point O.
- Rotate the pencil head around the centre point marked O.



Worksheet 2

1. Draw circles whose radius is given below :
(a) 5 cm (b) 4.5 cm (c) 3.6 cm (d) 6.2 cm
2. Draw circles whose diameters are given below. Also draw one radius for each and measure it.
(a) 6 cm (b) 8 cm (c) 8.4 cm (d) 5.4 cm
3. Draw a circle of radius 4 cm. Draw its longest chord and measure it.