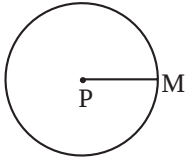


7. Circles



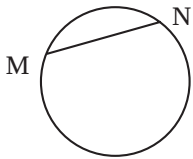
Radius, chord and diameter



1. The line joining the centre of the circle to any point on the circle is called a **radius** of the circle.

In the diagram, P is the centre of the circle while M is a point on the circle. PM is a radius of the circle.

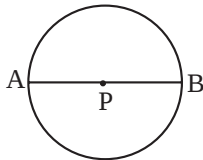
A circle has many radii. They are all of the same length.



2. A line joining any two points on a circle is called a **chord**.

In the diagram, M and N are two points on the circle.

Line MN is a chord of the circle.

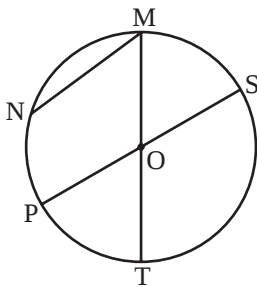


3. A chord passing through the centre of the circle is called a **diameter**.

In the diagram, chord AB passes through the centre P. Therefore, chord AB is also a diameter of the circle.

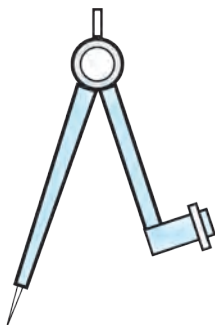
A circle has many chords and diameters.

- The centre of the circle below is O. There are other points and lines given in the diagram. Find the radii, chords and diameters in the diagram and write their names in the box provided.



Radius	
Diameter	
Chord	

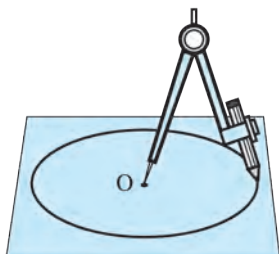
Drawing a circle



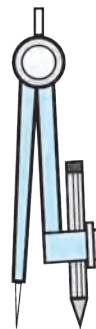
We use a compass to draw a circle. One arm of the compass has a metal point while the other arm has a place to fix a pencil. A pencil of a suitable length is fixed to the compass.

□ How to draw a circle using a compass

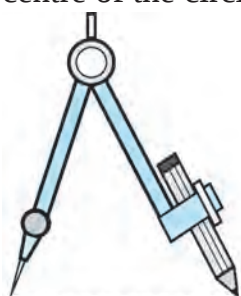
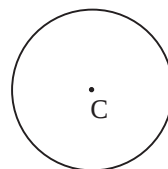
- First fix the pencil to the compass. Align the metal tip of the compass with the pencil point as shown in the picture on the right.



- Take a convenient distance between the pencil point and the metal tip.
- Take any point on a piece of paper.
- Hold the metal tip steady on the chosen point and turn the pencil point around it on the sheet of paper. The shape created by the pencil point will be a circle.



The point at which the metal tip of the compass is held is the **centre** of the circle. In this diagram, C is the centre of the circle.



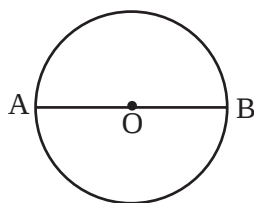
To draw a circle of a given radius, a distance equal to the radius is kept between the pencil point and the metal tip of the compass. In the accompanying diagram, this distance is 3 cm. Therefore, the radius of the circle drawn using this distance is 3 cm.



Problem Set 28

1. Draw circles with the radii given below.
(1) 2 cm (2) 4 cm (3) 3 cm
2. Draw a circle of any radius. Show one diameter, one radius and one chord on that circle.

□ Relationship between radius and diameter



Study the circle given alongside. Think over the following questions.

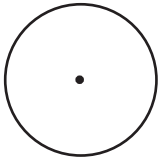
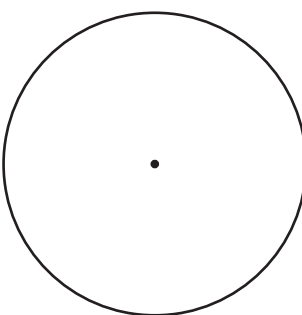
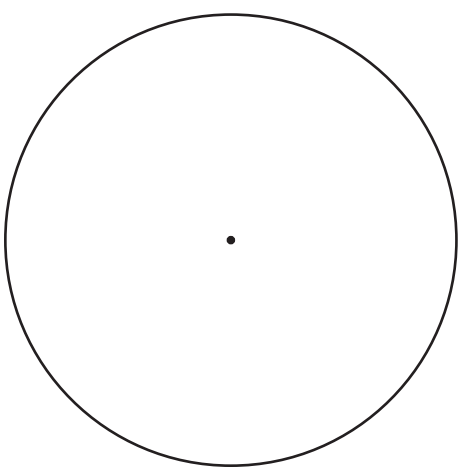
- Which are the radii in the circle?
- How many radii make up diameter AB?
- If the length of one radius is 3 cm, what is the length of the diameter?
- How long is the diameter as compared to the radius?

The diameter of a circle is twice the length of its radius.

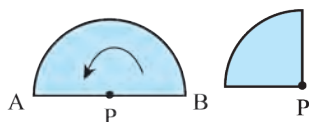
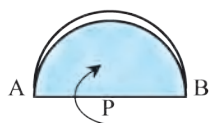
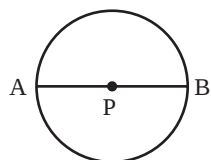
- If another diameter CD is drawn on the same circle, will its length be the same as that of AB?

All the diameters of a circle are of the same length.

Test 1 : Measure the diameters and radii of the circles given below with a ruler and verify the relationship between their lengths.

Diagram			
Radius	1 cm		
Diameter	2 cm		

Test 2 :



1. Draw a circle on a piece of paper and cut it out.
2. Name the centre of the circle P.
3. Draw the diameter of the circle and name it AB. Note that PA and PB are radii of the circle.
4. Fold the circular paper along AB as shown in the picture.

Fold the paper at P in such a way that point B will fall on point A. Radius PB falls exactly on radius PA. In other words, they coincide.

From this, we can see that every radius of a circle is half the length of its diameter.

Problem Set 29

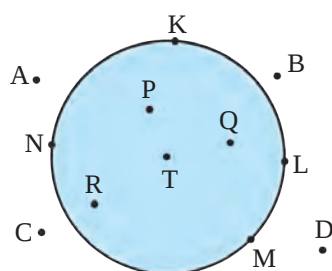
1. If the radius of a circle is 5 cm, what will its diameter be?
2. If the diameter of a circle is 6 cm, what will its radius be?

3. Complete the following table by filling in the blanks.

Radius	4 cm		9 cm	
Diameter		16 cm		22 cm

☐ The interior and the exterior of a circle

We play 'Land and Sea' inside a circle on the playground. In this game, the children inside the circle are in the 'sea', while the children outside the circle are on 'land'.



In the picture alongside, K, L, M and N are points on a circle with centre T.

The coloured area inside the circle in the picture is the interior of the circle. P, Q, R and T are points in the interior of the circle.

A, B, C and D are points in the exterior of the circle.

☐ Problem Set 30

In the table below, write the names of the points in the interior and exterior of the circle and those on the circle.

Diagram	Points in the interior of the circle	Points in the exterior of the circle	Points on the circle

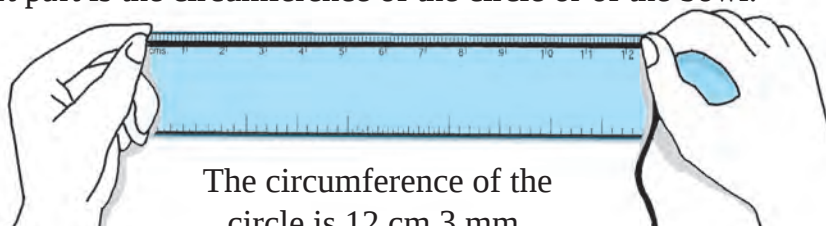
☐ The circumference of a circle

Take a bowl with a circular edge.

Wind a string once around the bowl and make a full circle around it.

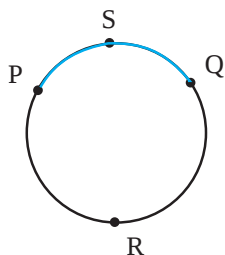
Unwind this circle and straighten it out as shown.

Measure the straightened part with a ruler. The length of that part is the circumference of the circle or of the bowl.



The circumference of the circle is 12 cm 3 mm.

Each of these parts is an **arc of a circle**.

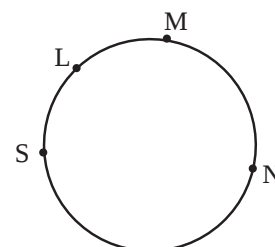


This means that P and Q have created two arcs. P and Q are the end points of both arcs.

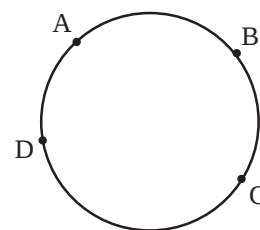
From the name ‘arc PQ’, we cannot say which of the two arcs we are speaking of. So, an additional point is taken on each arc. This point is used to give each arc a three-letter name. In the figure, there are two arcs, arc PSQ and arc PRQ.

1. In the figure given alongside, points S, L, M and N are on the circle. Answer the questions with the help of the diagram.

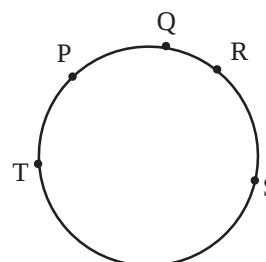
- (1) Write the names of the arcs with end-points S and M.
- (2) Write the names of the arcs with the end-points L and N.



2. Write the names of arcs that points A, B, C and D in the given circle give rise to.



3. Give the names of the arcs that are made by points P, Q, R, S and T in the figure.



4. Measure and note down the circumference of different circular objects. (It is convenient to use a measuring tape for this purpose.)