Circles

Circle

A circle can be defined as a simple closed curve all of which points are equidistant (at an equal distance) from the fixed point called its centre.
A bangle, a one rupee coin and a cycle tyre are all examples of circular objects.

Terms Related to Circle

(i) The fixed point in the centre of a circle is called its centre.
(ii) Diameter is a line segment that has its endpoints on the circle and passes through the centre.
Diameter = AB
AB = (OA + OB) = 2 × OA or 2 × OB
Radius is half of the diameter.

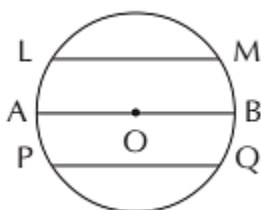(iii) Radius is the distance between the centre of a circle and a point on the circumference.
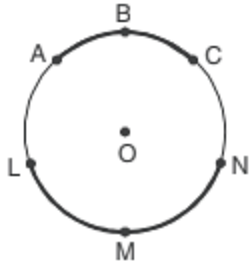Radius = OA = OB
Diameter = 2 × Radius
Radius = Diameter ÷ 2

(iv) Chord is a line segment whose endpoints lie on the circle.
LM, PQ, AB are all chords of the circle. The diameter is the longest chord of the circle.
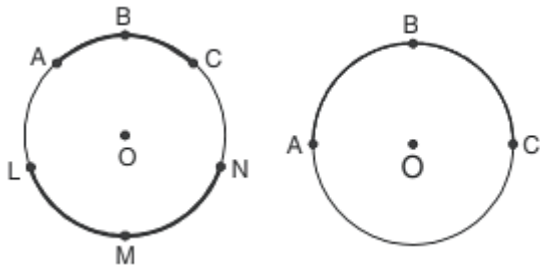

(v) Arc is any part of a circle. An arc is usually named by three points out of which two are the endpoints and the third point lies between them. ABC is an arc and is denoted by $\overparen{ABC}$.

(vi) Minor arc is shorter and the major arc is longer.
ABC is a minor arc of the circle. LMN is a major arc of the circle.
Half of a circle is called a semicircle. ABC is a semicircle.

(vii) Circumference is the perimeter or boundary of a circle.
Circumference = π × diameter =22/7 × diameter
= 22/7 x 2 x radius
= 2 x 22/7 x radius of the circle
A semicircle is alsoan arc.

Interior and exterior of a circle
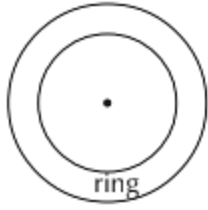Look at the circle given:
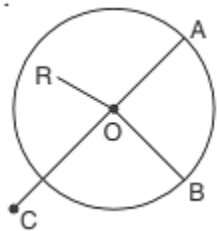
It is clear that

- R lies in the interior of the circle.
  Thus, OR < OA.
- C lies in the exterior of the circle.
  Thus, OC > OA.
- B lies on the circle.
  Thus, OA = OB.

Concentric circles are circles with the same centre but different radii.

ring

Example 1: Find the diameter of a circle whose radius is 1.4 cm.
Note: The region enclosed between two concentric circles is called a ring.

Radius = 1.4 cm
Diameter of a circle = 2 × radius = 2 × 1.4 cm = 2.8 cm.

Example 2: Find the radius of a circle whose diameter is 6.8 cm.
Diameter = 6.8 cm
Radius = Diameter ÷ 2 = 6.8 cm ÷ 2 = 3.4 cm.

Example 3: Find the circumference of a circle whose radius is (a) 7 cm (b) 3.5 cm. [Take π = 22/7]
(a) Radius = 7 cm
Circumference of the circle = 2 × π × radius = 2 × 22/7 × 7 = 44 cm.
(b) Radius = 3.5 cm = 7/2 cm.
Circumference of the circle = 2 × π × radius
= 2 × 22/7 x 7/2 cm = 44/2 = 22 cm.

**Example 4: The length of the diameter of a circle is 2.8 cm. Find the circumference of the circle.**
Diameter = 2.8 cm = 28/10 .
Circumference of the circle = π × diameter = 22/7 x 28/10
= 22 x 4/10 = 88/10
= 8.8 cm.

Drawing a Circle with Compass
(i) To draw a circle with a compass, fix a pointed pencil in the compass.
(ii) Place a ruler on the table and fix the metal tip of the compass at 0 of the ruler and open the compass to fix the end of the pencil at the given measure (say = 3 cm.)
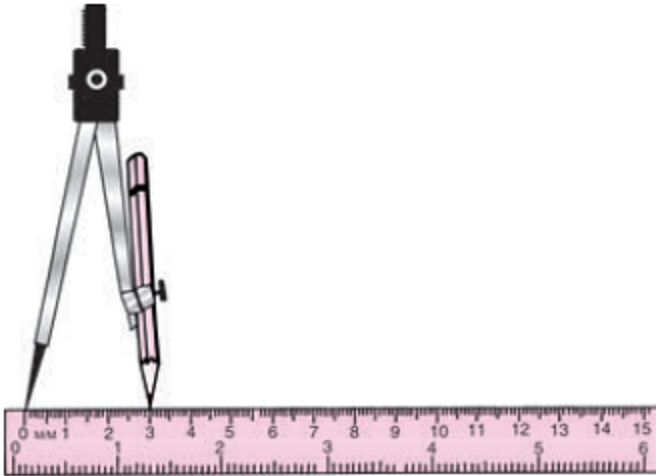
(iii) Next, take a point 'O' on a plane paper and rest the metal tip of the compass at point 'O'.

(iv) Hold the head of the compass firmly and move the pencil around to form a circle of radius 3 cm.