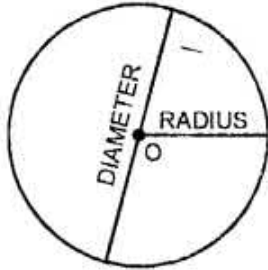


CHAPTER - 29

THE CIRCLE

IMPORTANT POINTS

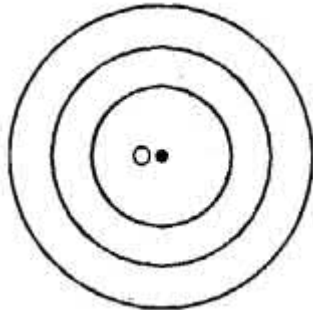
1. A circle is a round enclosed figure, whose mid-point is called its centre.



2. The line segment joining the centre to any point on the circle is called a radius. A centre has infinite radii and all radii of a circle are equal.

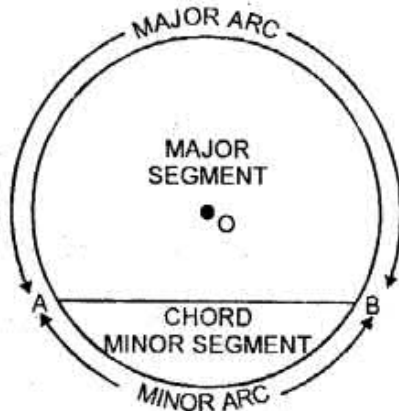
3. A line segment which contains the centre of the circle and whose ends points lie on the circle is called diameter of the circle. Diameters of a circle are also equal.

4. **Parts of a circle:** A circle has three parts (i) Interior (ii) Exterior and (iii) Circle itself.



5. **Concentric circles:** Two or more circles having the same centre but different radii are called concentric circles.

6. **Chord of a circle:** A line which divides the circle into two parts is called chord of the circle. Diameter is the longest chord of the circle.

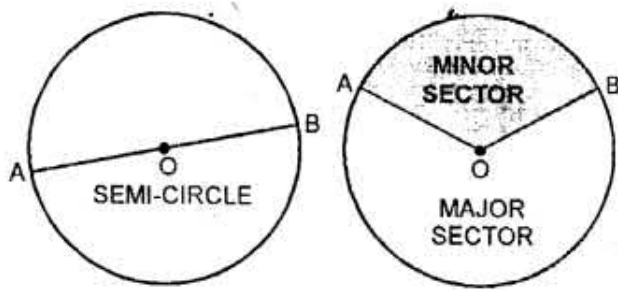


7. **Segment of a circle:** When a chord divides the circle into two unequal parts, the bigger part is called the major segment and smaller part is called the minor segment.

8. **Arc of a circle:** A part of circumference of a circle is called an arc of the circle. Arc greater than half circle is called the major arc and less than half circle is called the minor arc.

9. **Sector of a circle:** A diameter divides the circle into two equal parts and each part is

called a semicircle. Sector greater than a semi-circle is called the major sector and less than semi-circle is called the minor sector of the circle.

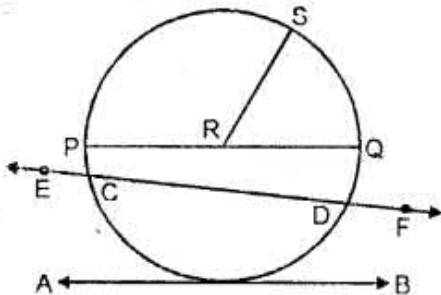


EXERCISE 29 (A)

Question 1.

Use the figure given below to fill in the blanks :

- (i) R is the of the circle.
- (ii) Diameter of a circle is
- (iii) Tangent to a circle is ...
- (iv) EF is a of the circle.
- (v) is a chord of the circle.
- (vi) Diameter = 2 x
- (vii) is a radius of the circle.
- (viii) If the length of RS is 5 cm, the length of PQ =
- (ix) If PQ is 8 cm long, the length of RS =.....
- (x) AB is a of the circle



Solution:

- (i) center
- (ii) PQ
- (iii) AB
- (iv) secant
- (v) CD
- (vi) radius
- (vii) RS
- (viii) 10 cm
- (ix) 4 cm
- (x) tangent.

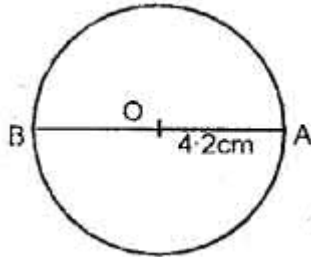
Question 2.

Draw a circle of radius 4.2 cm. Mark its centre as O. Take a point A on the circumference of the circle. Join AO and extend it till it meets point B on the circumference of the circle,

(i) Measure the length of AB.

(ii) Assign a special name to AB.

Solution:



(i) By measurement $AB = 8.4$ cm.

(ii) \therefore AB is the diameter of the circle.

Question 3.

Draw circle with diameter :

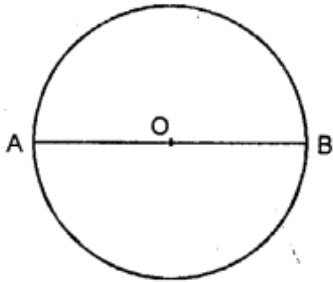
(i) 6 cm

(ii) 8.4 cm.

In each case, measure the length of the radius of the circle drawn.

Solution:

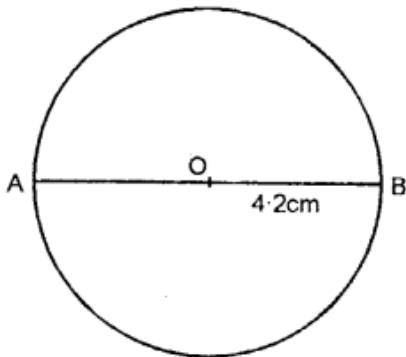
- (i) AB is the diameter of circle
i.e., AB = 6 cm
and OA is the radius of circle



$$= \frac{1}{2} \text{ of diameter} = \frac{6}{2} = 3 \text{ cm}$$

i.e., OA = OB = 3 cm.

- (ii) AB is the diameter of circle
i.e., AB = 8.4 cm



and OA is the radius of circle

$$= \frac{1}{2} \text{ of diameter} = \frac{8.4}{2} = 4.2 \text{ cm}$$

i.e., OA = OB = 4.2 cm.

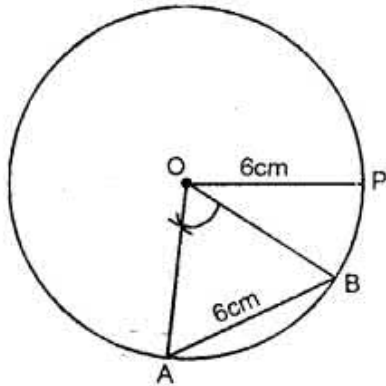
Question 4.

Draw a circle of radius 6 cm. In the circle, draw a chord AB = 6 cm.

- (i) If O is the centre of the circle, join OA and OB.
(ii) Assign a special name to $\triangle AOB$
(iii) Write the measure of angle AOB.

Solution:

(i)



(ii) $\triangle AOB$ is equilateral triangle.

(iii) By measurement $\angle AOB = 60^\circ$.

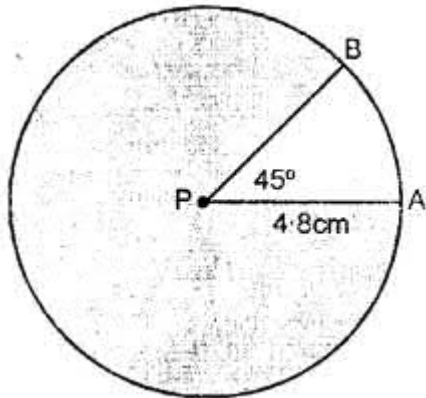
Question 5.

Draw a circle of radius 4.8 cm and mark its centre as P.

(i) Draw radii PA and PB such that $\angle APB = 45^\circ$.

(ii) Shade the major sector of the circle

Solution:



PA is the radius of circle. i.e., $PA = 4.8$ cm.

(i) $\angle APB = 45^\circ$ in which P is the centre of the circle and PA and PB are radii of circle.

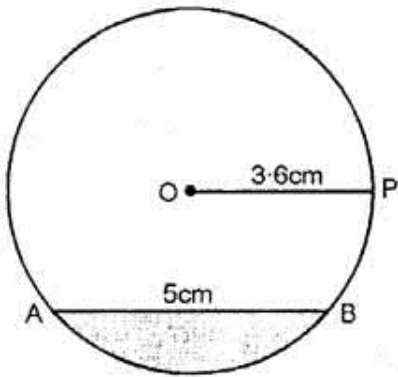
(ii) Major sector of circle is shaded in the figure.

Question 6.

Draw a circle of radius 3.6 cm. In the circle, draw a chord $AB = 5$ cm. Now shade the minor segment of the circle.

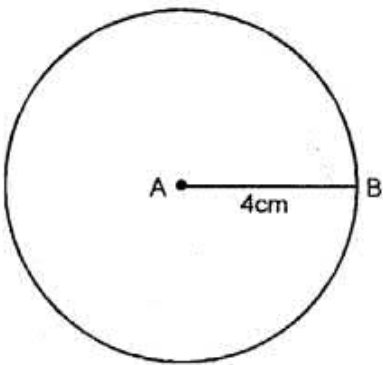
Solution:

Shaded portion of circle is the minor segment of the circle.



Question 7.

Mark two points A and B, 4cm apart, Draw a circle passing through B and with A as a center



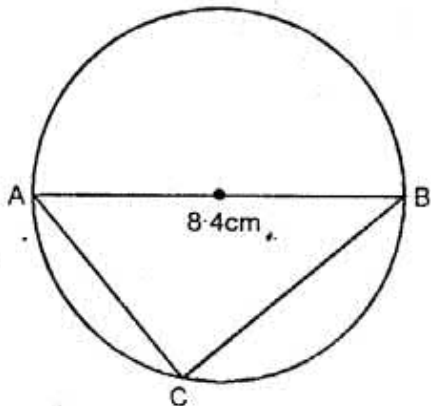
Solution:

In the figure, A is the centre of the circle and $AB = 4 \text{ cm}$ [radius of circle]

Question 8.

Draw a line $AB = 8.4 \text{ cm}$. Now draw a circle with AB as diameter. Mark a point C on the circumference of the circle. Measure angle ACB.

Solution:



By measurement $\angle ACB = 90^\circ$

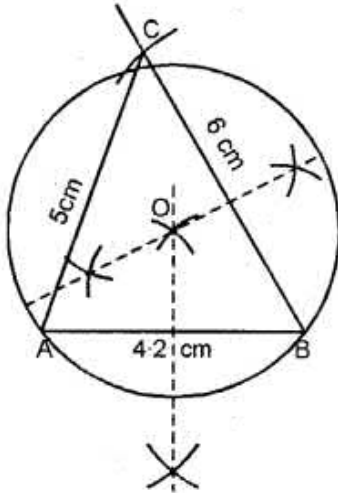
EXERCISE 29 (B)

Question 1.

Construct a triangle ABC with $AB = 4.2$ cm, $BC = 6$ cm and $AC = 5$ cm. Construct the circumcircle of the triangle drawn.

Solution:

Steps of Construction :



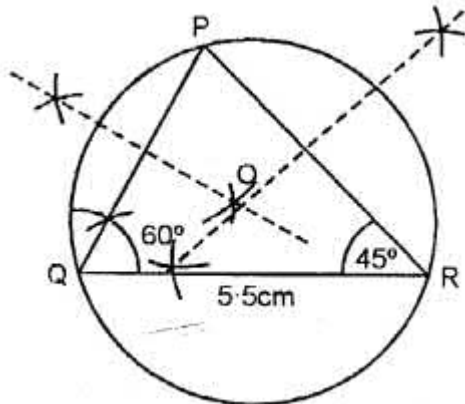
- (i) Draw $\triangle ABC$ in which $AB = 4.2$ cm, $BC = 6$ cm, and $AC = 5$ cm.
- (ii) Draw the perpendicular bisectors of any two sides of the triangle. Let these intersect at O.
- (iii) Taking O as centre and OA or OB or OC as radius draw a circle. This circle will pass through vertices A, B and C.

Question 2.

Construct a triangle PQR with $QR = 5.5$ cm, $\angle Q = 60^\circ$ and angle R = 45° . Construct the circumcircle of the triangle PQR.

Solution:

Steps of Construction :



- (i) Draw a $\triangle PQR$ in which $QR = 5.5$ cm, $\angle Q = 60^\circ$ and $\angle R = 45^\circ$.
- (ii) Draw the arc bisector of PQ and PR which intersect at O.

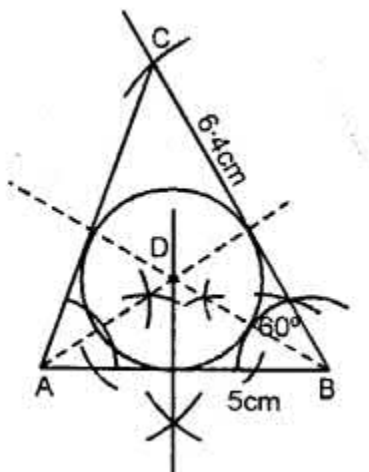
(iii) Taking O as centre and radius OP or OQ or OR draw a circle.
This circle will pass through vertices P, Q and R.

Question 3.

Construct a triangle ABC with $AB = 5$ cm, $\angle B = 60^\circ$ and $BC = 6.4$ cm.
Draw the incircle of the triangle ABC. Sol. Steps of Construction :

Solution:

Steps of Construction:



(i) Draw a line $AB = 5$ cm.

(ii) B as a centre draw an angle with the help of compass $\angle B = 60^\circ$. Cut the line with an arc $BC = 6.4$ cm.

(iii) Join AC.

(iv) Now, from A and B cut the bisector of $\angle A$ and $\angle B$, which intersect each other at point D.

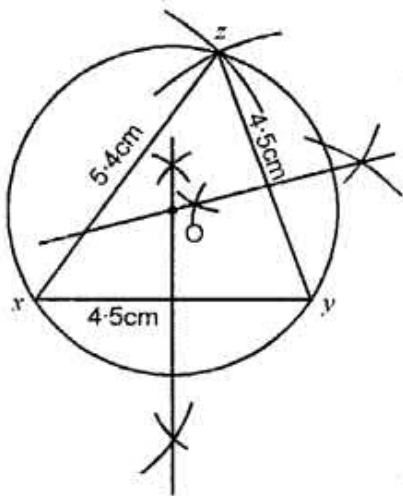
(v) With D as a centre draw an in circle which touches all the three sides of AABC.

Question 4.

Construct a triangle XYZ in which $XY = YZ = 4.5$ cm and $ZX = 5.4$ cm. Draw the circumcircle of the triangle and measure its circumradius.

Solution:

Steps of Construction :



(i) Draw a triangle XYZ in which $XY = YZ = 4.5$ cm and $ZX = 5.4$ cm.

(ii) Draw the bisectors of $\angle X$ and $\angle Z$ which meet at O.

(iii) With O as centre and radius OX or OY or OZ draw a circle.

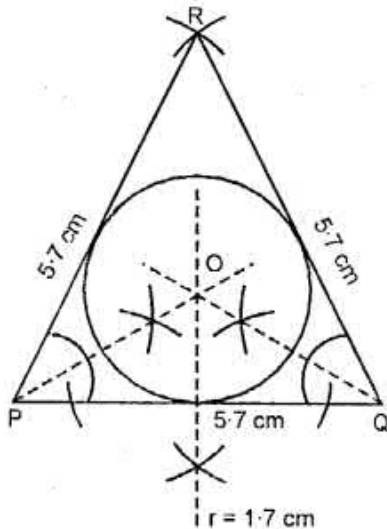
This circle will pass through X, Y and Z.

Question 5.

Construct a triangle PQR in which, $PQ = QR = RP = 5.7$ cm. Draw the incircle of the triangle and measure its radius.

Solution:

Steps of Construction :



(i) Draw an equilateral $\triangle RPQ$ in which $PQ = QR = RP = 5.7$ cm each.

(ii) From P and Q cut the bisector of $\angle P$ and $\angle Q$, which intersect each other at point O.

(iii) With P as a centre draw an in circle which touches all the three sides of $\triangle RPQ$.

REVISION EXERCISE

Question 1.

The centre of a circle is at point O and its radius is 8 cm. State the position of a point P (point P may lie inside the circle, on the circumference of the circle, or outside the circle), when:

(a) $OP = 10.6$ cm

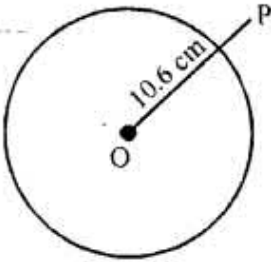
(b) $OP = 6.8$ cm

(c) $OP = 8$ cm

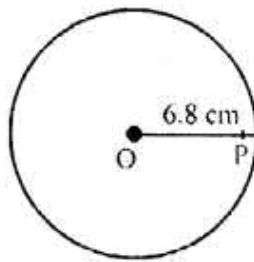
Solution:

(a) Draw circle each of radius 8 cm. With centre O

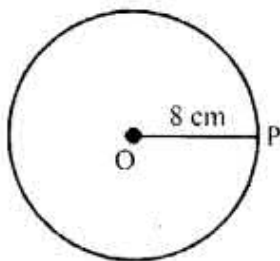
In figure (i) draw $OP = 10.6$ cm



(i)



(ii)



(iii)

We see that point P lies outside the circle as $OP >$ radius of the circle

(b) In figure (ii) $OP = 6.8$ cm. We see that P lies inside the circle as $OP <$ radius of the circle.

(c) In figure, $OP = 8$ cm. We see that P lies on the circle as $OP =$ radius of the circle.

Question 2.

The diameter of a circle is 12.6 cm. State, the length of its radius.

Solution:

Diameter of the circle = 12.6 cm

\therefore Radius = $\frac{1}{2}$ diameter = $\frac{1}{2} \times 12.6$ cm

= 6.3 cm

Question 3.

Can the length of a chord of a circle be greater than its diameter? Explain.

Solution:

No, the length of chord cannot be greater than the diameter of the circle as the diameter of a circle is the greatest chord of that circle.

Question 4.

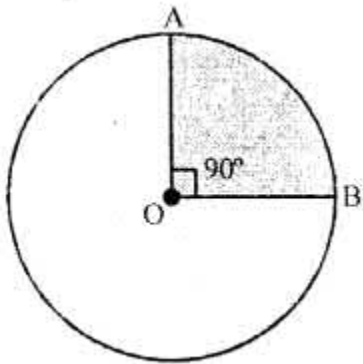
Draw a circle of diameter 7 cm. Draw two radii of this circle such that the angle between these radii is 90° . Shade the minor sector obtained. Write a special name for this sector.

Solution:

Draw a circle with diameter = 7 cm

OA and OB are the radii of the circle such that $\angle AOB = 90^\circ$

Now shade the minor sector AOB This is the quadrant of the circle



Question 5.

State, which of following statements are true and which are false :

- (i) If the end points A and B of the line segment lie on the circumference of a circle, AB is a diameter.
- (ii) The longest chord of a circle is its diameter.
- (iii) Every diameter bisects a circle and each part of the circle so obtained is a semi-circle.
- (iv) The diameters of a circle always pass through the same point in the circle.

Solution:

- (i) False, as AB may be diameter or may not be, it can be chord.
- (ii) True, diameter of a circle is the longest chord.
- (iii) True.
- (iv) True, all the diameter of a circle pass through the same point i.e., centre, of the circle.