ಎಸ್ಎಸ್ಎಲ್ಸಿ–ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ

MATHEMATICS

AREAS RELATED TO CIRCLES

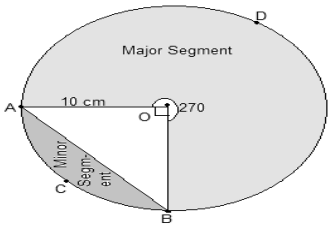
Exercise: 11.1

4. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding:

(i) minor segment

(ii) major sector. (Use $\pi = 3.14$)

Soln:



Here, AB is the chord which is subtending an angle 90° at the centre O.

It is given that the radius (r) of the circle = 10 cm

(i) Area of minor sector = $(90/360°)\times\pi r^2$

$= (¼)\times(22/7)\times10^2$

Or, the Area of the minor sector = 78.5 cm^2

Also, the area of $\Delta AOB = ½\times OB\times OA$

Here, OB and OA are the radii of the circle, i.e., = 10 cm

So, the area of $\Delta AOB = ½\times10\times10 = 50\ cm^2$

Now, area of minor segment =

= area of the minor sector – the area of ΔAOB

$= 78.5 – 50$

$= 28.5\ cm^2$

(ii) Area of major sector = Area of the circle – Area of he minor sector

$= (3.14\times10^2)-78.5$

$= 235.5\ cm^2$

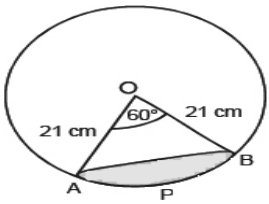
5. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find:

(i) the length of the arc

(ii) area of the sector formed by the arc

(iii) area of the segment formed by the corresponding chord

Soln:



Given,

Radius = 21 cm

$\theta = 60°$

(i) Length of an arc = $\theta/360°\times$Circumference$(2\pi r)$

$\therefore$ Length of an arc AB = $(60°/360°)\times2\times(22/7)\times21$

$= (1/6)\times2\times(22/7)\times21$

Or Arc AB Length = 22cm

(ii) It is given that the angle subtended by the arc = 60°

So, the area of the sector making an angle of 60° =

$= (60°/360°)\times\pi\ r^2\ cm^2$

$= 441/6\times22/7\ cm^2$

Or, the area of the sector formed by the arc APB is 231 cm^2

(iii) Area of segment APB =

= Area of sector OAPB – Area of ΔOAB

Since the two arms of the triangle are the radii of the circle and thus are equal, and one angle is 60°, ΔOAB is an equilateral triangle.

So, its area will be $\sqrt{3}/4\times a^2$ sq. Units.

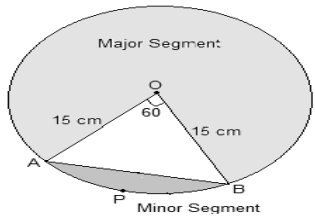
The area of segment APB = $231-(\sqrt{3}/4)\times(OA)^2$

$= 231-(\sqrt{3}/4)\times21^2$

Or, the area of segment APB= $[231-(441\times\sqrt{3})/4]\ cm^2$

6. A chord of a circle of radius 15 cm subtends an angle of 60° at the centre. Find the areas of the corresponding minor and major segments of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

Soln:



Given,

Radius = 15 cm

$\theta = 60°$

So,

Area of sector OAPB = $(60°/360°)\times\pi r^2\ cm^2$

$= 225/6\ \pi cm^2$

Now, ΔAOB is equilateral as two sides are the radii of the circle and hence equal and one angle is 60°

So, Area of $\Delta AOB = (\sqrt{3}/4)\times a^2$

Or, $(\sqrt{3}/4)\times15^2$

$\therefore$ Area of $\Delta AOB = 97.31\ cm^2$

Now, the area of minor segment APB =

= Area of OAPB – Area of ΔAOB

Or, the area of minor segment APB =

$= ((225/6)\pi – 97.31)\ cm^2 = 20.43\ cm^2$

And,

Area of major segment =

= Area of the circle – Area of the segment APB

Or, area of major segment = $(\pi\times15^2) – 20.4$

$= 686.06\ cm^2$

7. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

(Contd……)