

The Circle

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Graduate Bsc (Hons) MathsSci (Open) GIMA

Circumference $C = 2\pi r$ or $C = \pi D$

To find the length of an arc (part of a circle) we simply have to know the radius of the circle and the angle made by the sector.

1. If we know the radius r then we can find the circumference C .
2. If we know the angle made by the sector, then the length of the arc is simply a fraction of the whole circle.

$$Arc_{length} = \frac{angle}{360^{\circ}} \times 2\pi r$$

The area of a circle is given by

$$A = \pi r^2$$

We can apply what we have learn above in the exactly the same way to find the area of part of a circle.

To find the area of a sector (part of a circle) we simply have to know the radius of the circle and the angle made by the sector.

1. If we know the radius r then we can find the area of the circle C .
2. If we know the angle made by the sector then the area of the sector is simply a fraction of the whole circle.

$$Arc_{length} = \frac{angle}{360^{\circ}} \times \pi r^2$$

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Other points to note are:-

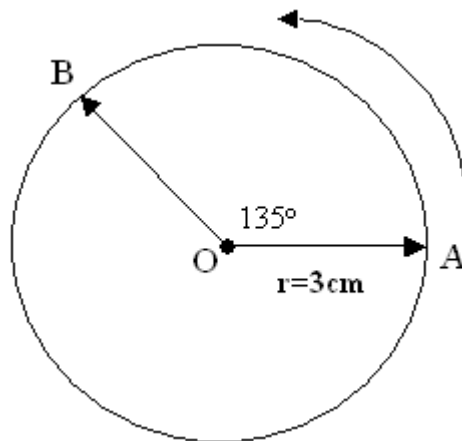
A line that touches the circle at one point is called a tangent.

The angle between the tangent line and the point of contact radius is 90° .

The angle at the circumference made by a triangle that has hypotenuse equal to the diameter of the circle is 90 degrees.

Example

From the diagram find the length of the arc AB and the area of sector AOB.



Whole circle has circumference (length!).

$$C = 2\pi r = 2\pi \times 3 = 18.85\text{cm}$$

Hence AB has arc length

$$\text{Arc}_{\text{length}} = \frac{135^\circ}{360^\circ} \times 2\pi \times 3 = 7.07\text{cm}$$

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Area of the whole circle is

$$A = \pi r^2 = 9\pi = 28.27\text{cm}^2$$

Area of sector AOB is

$$A_{\text{sector}} = \frac{135^\circ}{360^\circ} \times 9\pi = 10.6\text{cm}^2$$