

Arc Length and Sector Area - Lesson 1

Arc Length - Calculator

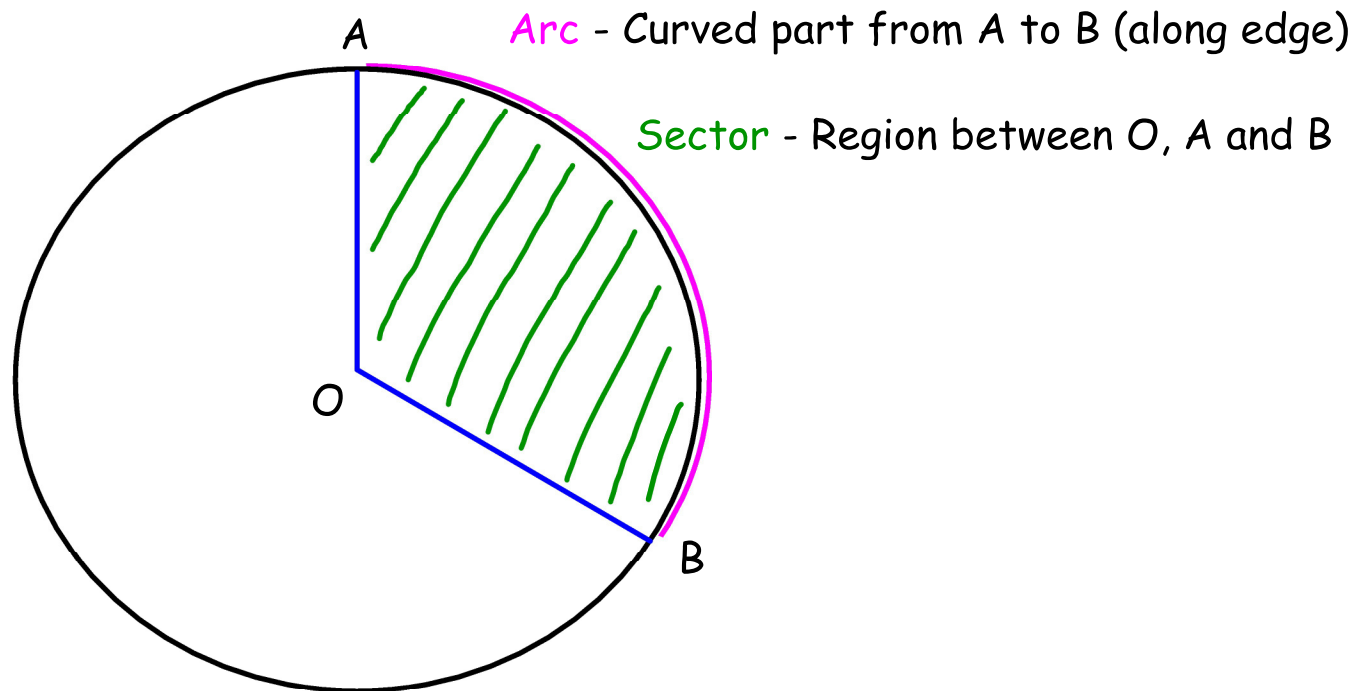
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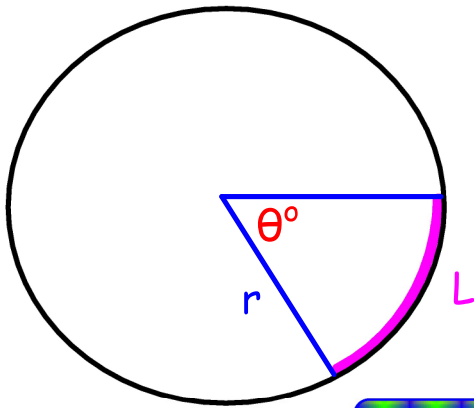
- Calculate the Arc Length of a circle with a calculator.

SC

- Use the Arc Length Formula.

Parts of a Circle





r = Radius

θ° = Sector Angle

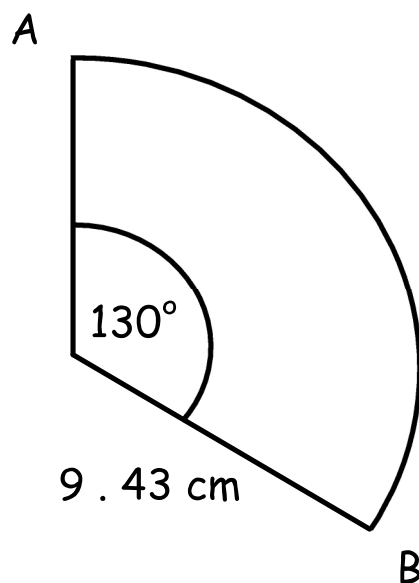
L = Arc Length

The Arc Length (aka Length of Arc)
is calculated using the formula :

$$L = \frac{\theta^\circ}{360^\circ} \times 2 \pi r$$

Example 1

Calculate the length of the arc AB (to 3 significant figures).



$$\theta^{\circ} = 130^{\circ}, r = 9.43 \text{ cm}$$

$$L = \frac{\theta^{\circ}}{360^{\circ}} \times 2\pi r$$

$$\Rightarrow L = \frac{130^{\circ}}{360^{\circ}} \times 2 \times \pi \times 9.43$$

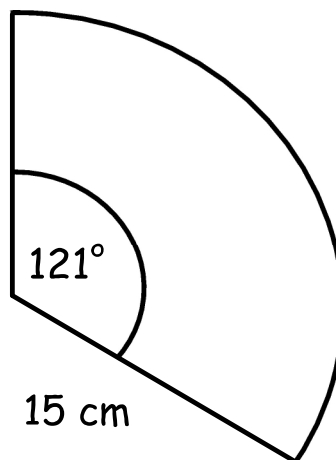
$$\Rightarrow L = 21.39 \dots$$

$$\therefore L = 21.4 \text{ cm}$$

Example 2

A table is made from a circular sector. A border is to be attached to the arc.

Calculate the length of the border required (to the nearest cm).



$$\theta^\circ = 121^\circ, r = 15 \text{ cm}$$

$$L = \frac{\theta^\circ}{360^\circ} \times 2\pi r$$

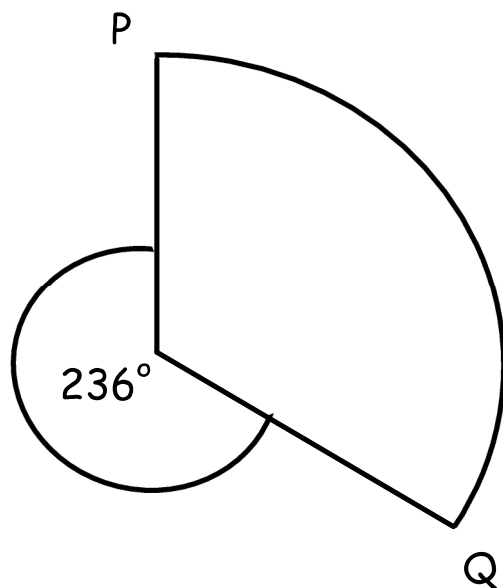
$$\Rightarrow L = \frac{121^\circ}{360^\circ} \times 2 \times \pi \times 15$$

$$\Rightarrow L = 31.67 \dots$$

$$\therefore L = 32 \text{ cm}$$

Example 3

Calculate the length of the arc PQ (to 3 sig. fig.),
made from a circle with diameter 12 mm.



$$\theta^{\circ} = 124^{\circ}, r = 6 \text{ mm}$$

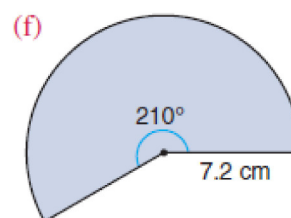
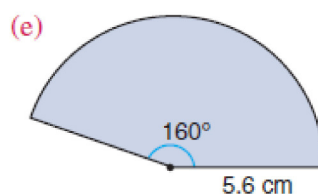
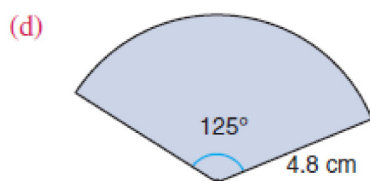
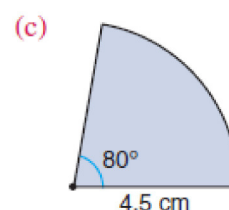
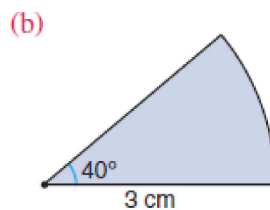
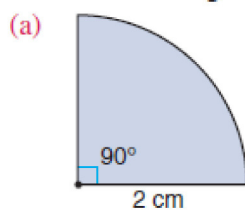
$$L = \frac{\theta^{\circ}}{360^{\circ}} \times 2 \pi r$$

$$\Rightarrow L = \frac{124^{\circ}}{360^{\circ}} \times 2 \times \pi \times 6$$

$$\Rightarrow L = 12.98 \dots$$

$$\therefore L = 13.0 \text{ mm}$$

1. Calculate the length of the arc of each sector.

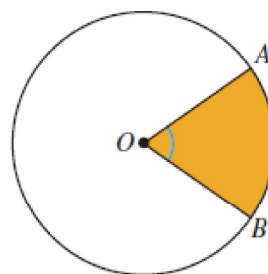


Give answers correct to three significant figures.

2. A and B are two points on the circumference of a circle with centre O . Calculate length of arc AB if:

- (a) $\angle AOB = 20^\circ$ and $OA = 5.4$ cm,
(b) $\angle AOB = 140^\circ$ and $OA = 9.3$ cm,
(c) $\angle AOB = 45^\circ$ and $OA = 3.7$ cm,
(d) $\angle AOB = 120^\circ$ and $OA = 12.7$ cm,
(e) $\angle AOB = 270^\circ$ and $OA = 2.5$ cm.

Give your answers correct to 3 significant figures.



Answers

- | | | | |
|-----------|-------------|-------------|-------------|
| 1. | (a) 3.14 cm | (b) 2.09 cm | (c) 6.28 cm |
| | (d) 10.5 cm | (e) 15.6 cm | (f) 26.4 cm |
| 2. | (a) 1.88 cm | (b) 22.7 cm | (c) 2.91 cm |
| | (d) 26.6 cm | (e) 11.8 cm | |