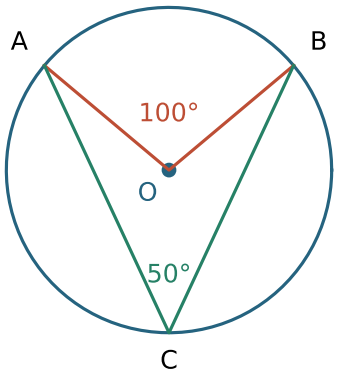
Exercise walk-through

4.2.5
Circle Measure

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Figure: Congruence, similarity and circles (3)

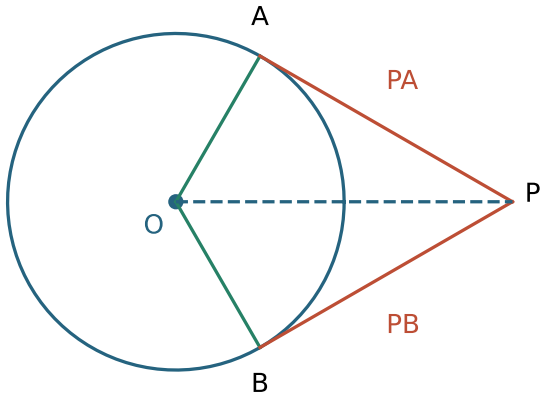
Angles on the same upper arc: centre = twice circumference



- The **angle at the centre**, 100°, is twice the angle at the **circumference**, 50°
- Match each part of the diagram to the text.

Figure: Congruence, similarity and circles (4)

Shared OP and equal radii → RHS → PA = PB



- Equal radii, shared OP and right angles give congruent triangles (RHS), so PA = PB
- Match each part of the diagram to the text.

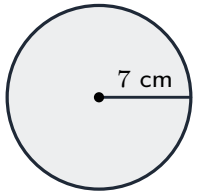
Perimeter, area and volume

- Triangle: $\frac{1}{2} \times b \times h$, where h is the **perpendicular height** .
- Parallelogram: $b \times h$.
- Trapezium: $\frac{1}{2}(a+b)h$, where a and b are the parallel sides.
- Circle: $A = \pi r^2$, and the **circumference** is $C = 2\pi r = \pi d$.

$$\text{arc length} = \frac{\theta}{360} \times 2\pi r \qquad \text{sector area} = \frac{\theta}{360} \times \pi r^2$$

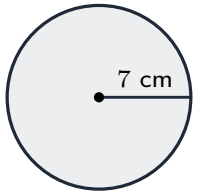
Exercise 2.1

2.1 A circle has a radius of 7 cm. Work out its circumference and its area. Give your answers in terms of π. [2]



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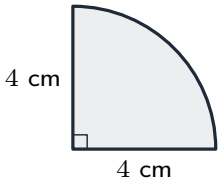


2.1

- $C = \mathbf{14}\pi$ cm
- $A = \mathbf{49}\pi$ cm^2

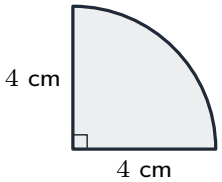
Exercise 2.2

2.2 The shape is a quarter circle with a radius of 4 cm. Work out its area and its perimeter. Give your answers to 1 decimal place. [2]



Exercise 2.2

2.2 The shape is a quarter circle with a radius of 4 cm. Work out its area and its perimeter. Give your answers to 1 decimal place. [2]



2.2

- area $\frac{1}{4}\pi \times 16 = \mathbf{12.6}$ cm^2
- perimeter $2\pi + 8 = \mathbf{14.3}$ cm

Exercise 3.1

3.1 A circle has an area of 200 cm^2. Work out its radius and its circumference. [3]



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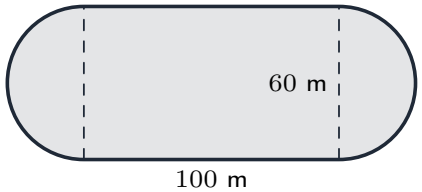
3.1

- $r = \sqrt{200 \div \pi}$
- $r = \mathbf{7.98}$ cm
- $C = \mathbf{50.1}$ cm

Exercise 3.2 (a)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(a) Work out the length of the inside line of the track. [2]

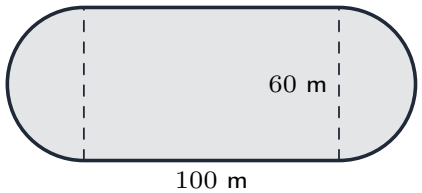



wheel, 70 cm across

Exercise 3.2 (a)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(a) Work out the length of the inside line of the track. [2]




wheel, 70 cm across

(a) $2 \times 100 + \pi \times 60 = \mathbf{388.5}$ m

Exercise 3.2 (b)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(b) Work out the area inside the track. [3]

Exercise 3.2 (b)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(b) Work out the area inside the track. [3]

(b) $100 \times 60 = 6000$; $\pi \times 30^2 = 2827$; **8827** m^2

Exercise 3.2 (c)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(c) A bicycle wheel has a diameter of 70 cm. How many complete turns does the wheel make in one lap of the inside line? [4]

Exercise 3.2 (c)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(c) A bicycle wheel has a diameter of 70 cm. How many complete turns does the wheel make in one lap of the inside line? [4]

(c) $\pi \times 0.7 = 2.199$ m; $388.5 \div 2.199 = 176.7$, so **176** complete turns

Exercise 3.2 (d)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(d) The outside lane is 1.2 m further out all the way round, so its semicircles have a diameter of 62.4 m. Work out the length of one lap of the outside lane. How much further is it than the inside line? [5]

Exercise 3.2 (d)

3.2 A running track has two straight sides of 100 m and two semicircle ends. The inside line of the track has a width of 60 m.

(d) The outside lane is 1.2 m further out all the way round, so its semicircles have a diameter of 62.4 m. Work out the length of one lap of the outside lane. How much further is it than the inside line? [5]

(d) $\pi \times 62.4 = 196.0$ m; $200 + 196.0 = \mathbf{396.0}$ m; $396.0 - 388.5 = \mathbf{7.5}$ m further