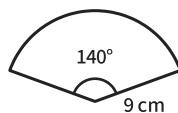


1 Arc length

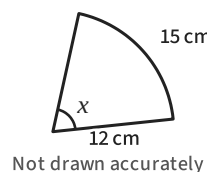
- a) Work out the arc length of this sector. Give your answer to 1 decimal place.
- b) Work out the perimeter of the sector.



$$\begin{aligned} \text{a) } 140 \div 360 \times \pi \times 18 &= 22.0 \text{ cm} \\ \text{b) } 21.99... + 9 + 9 &= 40.0 \text{ cm} \end{aligned}$$

2 Arc length

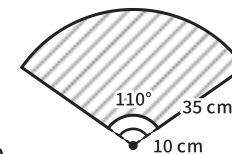
- a) The arc of this sector is 15 cm long. Work out angle x .
- b) A quarter circle has a perimeter of 50 cm. Work out its radius.



$$\begin{aligned} \text{a) } 15 \div 24\pi \times 360 &= 71.6^\circ \\ \text{b) } 2r + 0.5\pi r &= 50 \\ r &= 50 \div (2 + 0.5\pi) = 14.0 \text{ cm} \end{aligned}$$

3 Area of a sector

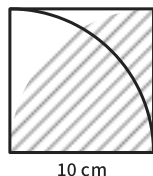
- a) Find the area of a sector of radius 8 cm and angle 75° , in terms of π .
- b) A wiper turns through 110° . Find the shaded area it clears, to 3 significant figures.



$$\begin{aligned} \text{a) } 75 \div 360 \times 64\pi &= \frac{40\pi}{3} \text{ cm}^2 \\ \text{b) } 110 \div 360 \times \pi \times (35^2 - 10^2) &= 1847.9 = 1850 \text{ cm}^2 \end{aligned}$$

4 Area of a sector

- a) A sector has radius 7 cm and area 30 cm^2 . Work out its angle.
- b) The arc is a quarter circle centred on a corner of the square. Work out the shaded area in terms of π .



$$\begin{aligned} \text{a) } 30 \div 49\pi \times 360 &= 70.2^\circ \\ \text{b) } 10 \times 10 - \pi \times 10^2 \div 4 &= 100 - 25\pi \text{ cm}^2 \end{aligned}$$

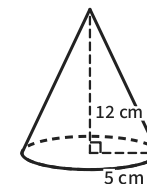
Area and volume 2 revision mat answers

Higher A

5 Volume of cones, spheres and pyramids

Cone: $V = \frac{1}{3}\pi r^2 h$ Sphere: $V = \frac{4}{3}\pi r^3$

- a) Work out the volume of this cone in terms of π .
- b) A sphere has the same volume. Work out its radius.

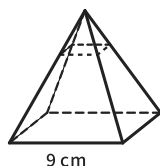


$$\begin{aligned} \text{a) } \pi \times 25 \times 12 \div 3 &= 100\pi \text{ cm}^3 \\ \text{b) } 4\pi r^3 \div 3 &= 100\pi, r^3 = 75 \\ r &= \text{cube root of } 75 = 4.22 \text{ cm} \end{aligned}$$

6 Volume of cones, spheres and pyramids

Pyramid: $V = \frac{1}{3} \times \text{area of base} \times \text{height}$
A square based pyramid is 14 cm high.

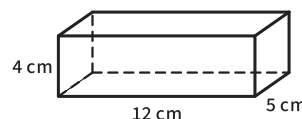
- a) Find its volume.
- b) The top third of its height is cut off, parallel to the base. Find the volume left.



$$\begin{aligned} \text{a) } 81 \times 14 \div 3 &= 378 \text{ cm}^3 \\ \text{b) small pyramid: } 378 \div 3^3 &= 14 \\ 378 - 14 &= 364 \text{ cm}^3 \end{aligned}$$

7 Surface area of cuboids

- a) Work out the surface area of this cuboid.
- b) A cuboid has a square base of side 6 cm. Its surface area is 192 cm^2 . Find its height.

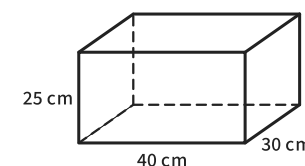


$$\begin{aligned} \text{a) } 2 \times (60 + 20 + 48) &= 256 \text{ cm}^2 \\ \text{b) } 2 \times 36 + 4 \times 6h &= 192 \\ 24h &= 120, h = 5 \text{ cm} \end{aligned}$$

8 Surface area of cuboids

A box with no lid is made from card.

- a) Work out the area of card it needs.
- b) How many of these boxes can be made from 3 m^2 of card?



$$\begin{aligned} \text{a) } 1200 + 2 \times 1000 + 2 \times 750 &= 4700 \text{ cm}^2 \\ \text{b) } 3 \text{ m}^2 &= 30\,000 \text{ cm}^2, 30\,000 \div 4700 = 6.38... \\ &= 6 \text{ boxes} \end{aligned}$$