

AREA + CIRCUMFERENCE OF CIRCLES

1

A circular pond has a radius of 6.5 m.

- (a) Find the circumference of the pond, giving your answer to an appropriate degree of accuracy.

$$\begin{aligned}C &= 2\pi r \\ &= 2\pi \times 6.5 \\ &= 40.8 \text{ m}\end{aligned}$$



[3]

- (b) Calculate the area of the surface of the pond, stating clearly the units of your answer.

$$\begin{aligned}A &= \pi r^2 \\ &= \pi \times 6.5^2 \\ &= 132.7 \text{ m}^2\end{aligned}$$

[3]

2

In both parts (a) and (b) of this question you should state the units of your answer and give your answer to an appropriate degree of accuracy.

A circular pond has a radius of 8.2 m.

- (a) Find the perimeter of the pond.

circumference

$$\begin{aligned}C &= 2\pi r \\ &= 2\pi \times 8.2 \\ &= 51.5 \text{ m}\end{aligned}$$

[3]

- (b) Calculate the area of the surface of the pond.

$$\begin{aligned}A &= \pi r^2 \\ &= \pi \times 8.2^2 \\ &= 211.2 \text{ m}^2\end{aligned}$$

[3]

A gardener is making a circular lawn of radius 6 m.

3

(a) Calculate the area of the lawn.

$$\begin{aligned} A &= \pi r^2 \\ &= \pi \times 6^2 \\ &= 113.7 \text{ m}^2 \end{aligned}$$



[2]

(b) The gardener wishes to put an edging around the circumference of the lawn. Calculate the length of edging needed.

$$\begin{aligned} C &= 2\pi r \\ &= 2\pi \times 6 \\ &= 37.7 \\ &= 38 \text{ m} \end{aligned}$$

[2]

4

In both parts (a) and (b) of this question you should give your answer to an appropriate degree of accuracy.

A circular disc has a radius of 7.5 cm.

(a) Calculate the area of one surface of the disc.

$$\begin{aligned} A &= \pi r^2 \\ &= \pi \times 7.5^2 \\ &= 176.7 \text{ cm}^2 \end{aligned}$$

[2]

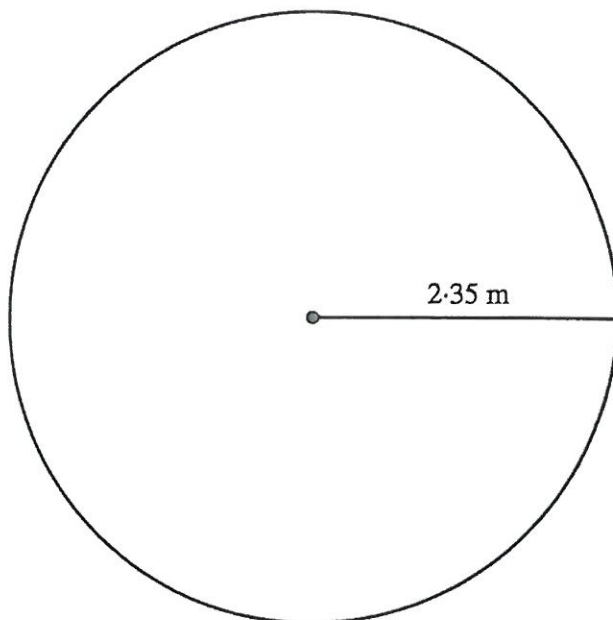
(b) Calculate the perimeter of the disc.

$$\begin{aligned} C &= 2\pi r \\ &= 2\pi \times 7.5 \\ &= 47.1 \text{ cm} \end{aligned}$$

[3]

5

A circular table has a radius of 2.35 m. The top of the table is painted with varnish. One litre of varnish covers 4m^2 .



(a) How many litre tins of varnish must be bought to paint the top of the table?

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= \pi \times 2.35^2 \\ &= 17.3 \text{ m}^2 \end{aligned}$$

So I need $17.3 \div 4 = 4.325$ tins.
need to buy 5 tins.

[4]

(b) What is the circumference of the top of the table?

$$\begin{aligned} C &= 2\pi r \\ &= 2\pi \times 2.35 \\ &= 14.8 \text{ m} \end{aligned}$$

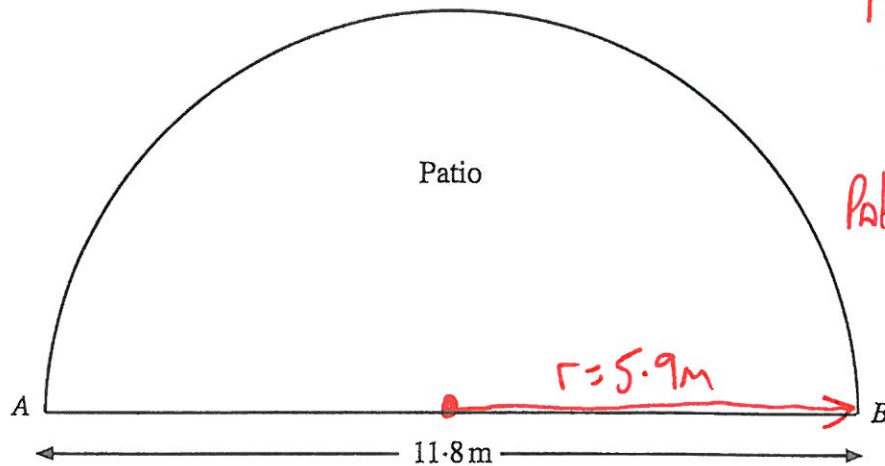
[2]

- 6 (a) Find the circumference of a wheel that has a radius of 16.7 cm, giving your answer to an appropriate degree of accuracy.

$$\begin{aligned}
 C &= 2\pi r \\
 &= 2\pi \times 16.7 \\
 &= 104.9 \\
 &= 105 \text{ cm}
 \end{aligned}$$

[3]

- (b) AB represents the front wall of a house, 11.8 m long. The house has a semicircular patio in front of it, as shown in the diagram. Calculate the area of the patio.



$$\begin{aligned}
 A &= \pi r^2 \\
 &= \pi \times 5.9^2 \\
 &= 109.4 \text{ m}^2 \\
 \text{Patio} &= 109.4 \div 2 \\
 &= 54.7 \text{ m}^2
 \end{aligned}$$

2

- 7 A circular mirror is mounted on a square wooden frame of side 12 cm so that it touches the sides of the frame as shown in the diagram. Calculate the area of the wooden frame not covered by the mirror (the shaded part of the diagram). Give your answer to an appropriate degree of accuracy.

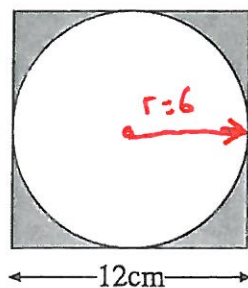


Diagram not drawn to scale

$$\begin{aligned}
 \text{Area} &= \pi r^2 \\
 &= \pi \times 6^2 \\
 &= 113.1 \text{ cm}^2
 \end{aligned}$$

$$\text{Area of square} = 12 \times 12 = 144 \text{ cm}^2$$

$$\text{Area of shaded} = 144 - 113.1 = 30.9 \text{ cm}^2$$

[3]

Turn over.

8

A sports ground is in the shape of a rectangle of length 100 m with a semi-circle of radius 40 m at each end as shown in the diagram.

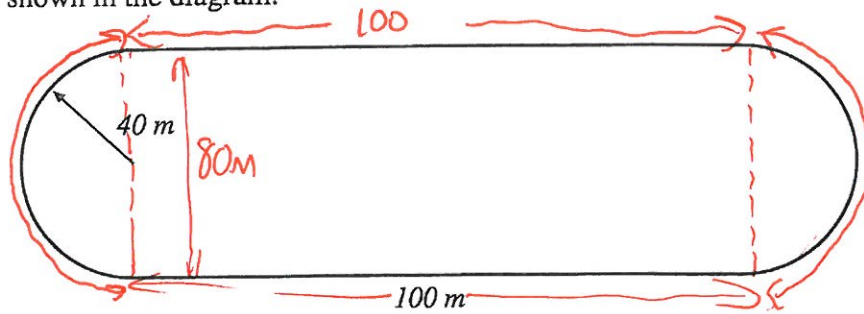


Diagram not drawn to scale.

- (a) Calculate the perimeter of the sports ground. State clearly the units of your answer.

$$\begin{aligned}C &= 2\pi r \\ &= 2\pi \times 40 \\ &= 251.3 \text{ m} + 100 + 100 = 451.3 \text{ m}\end{aligned}$$

[3]

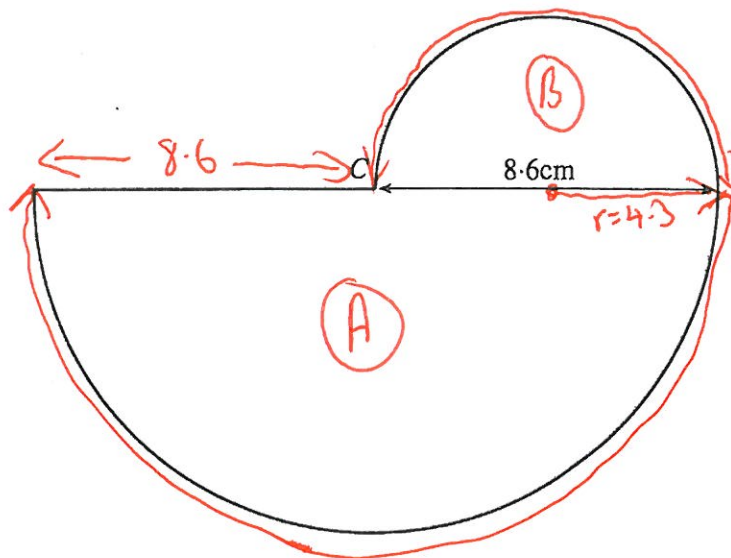
- (b) Calculate the area of the sports ground. State clearly the units of your answer.

$$\begin{aligned}A &= \pi r^2 \\ &= \pi \times 40^2 \\ &= 5026.5 + (100 \times 80) \\ &= 13026.5 \text{ m}^2\end{aligned}$$

[4]

9

The shape shown below is made up of two semicircles.
The diameter of the smaller semicircle is 8.6 cm.
C is the mid-point of the diameter of the larger semicircle.



Stating clearly the units of your answers, calculate

(a) the perimeter of the shape, giving your answer to an appropriate degree of accuracy,

circ of small semi circle + circ of large semi-cir + 8.6

$$\left(2\pi \times 4.3 \times \frac{1}{2} \right) + \left(2\pi \times 8.6 \times \frac{1}{2} \right) + 8.6$$
$$\approx 13.5 + 27.0 + 8.6 = 49.1 \text{ cm}$$

[3]

(b) the area of the shape, giving your answer to the nearest whole number.

$$\begin{aligned} \text{Area of (A)} &= \pi \times 8.6^2 \times \frac{1}{2} = 116.2 \\ \text{Area of (B)} &= \pi \times 4.3^2 \times \frac{1}{2} = 29.0 \\ &+ \\ &145.2 \text{ cm}^2 \\ &= 145 \text{ cm}^2 \end{aligned}$$

[3]