



Foundation / Higher Tier

Area and Circumference of Circles

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

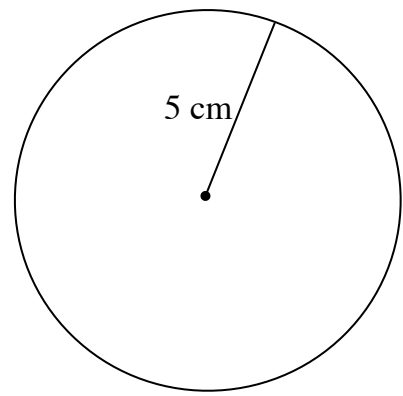
Information

- The marks for **each** question are shown in brackets- *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
 - Keep an eye on the time.
 - Try to answer every question.
 - Check your answers if you have time at the end.
-

1. A circle has a radius of 5 cm.
 Work out the circumference of the circle.
 Leave your answer in terms of π



$$C = 2\pi r$$

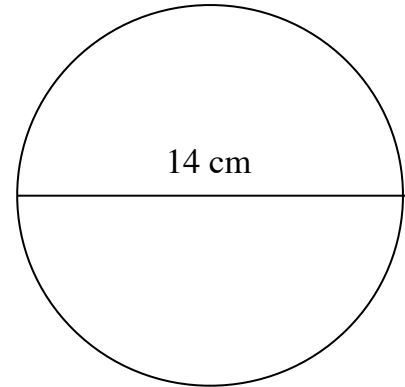
$$= 2\pi(5)$$

$$= 10\pi$$

.....
 10π cm

(Total for Question 1 is 2 marks)

2. A circle has a diameter of 14 cm.
 Work out the area of the circle.
 Leave your answer in terms of π .



$$A = \pi r^2$$

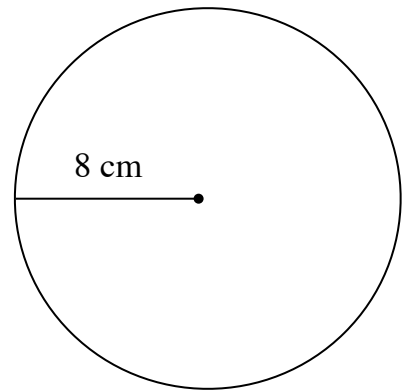
$$= \pi \times 7^2$$

$$= 49\pi$$

.....
 49π cm²

(Total for Question 2 is 2 marks)

3. A circle has a radius of 8 cm.
 Work out the area of the circle.
 Give your answer to 3 significant figures.



$$A = \pi r^2$$

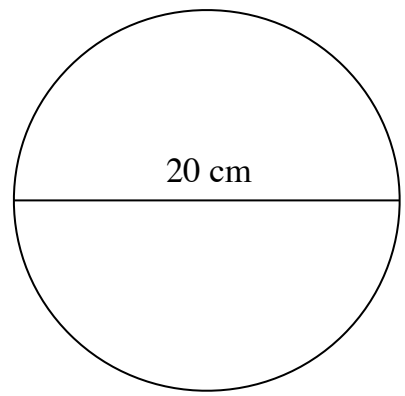
$$= \pi(8)^2$$

$$= 64\pi = 201.0619$$

.....
 201 cm²

(Total for Question 3 is 2 marks)

4. A circle has a diameter of 20 cm.
Work out the circumference of the circle.
Give your answer to 3 significant figures.

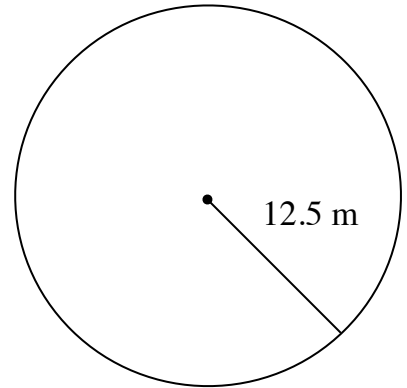


$$\begin{aligned}
 C &= \pi d \\
 &= 20\pi \\
 &= 62.831
 \end{aligned}$$

.....
62.8 cm

(Total for Question 4 is 2 marks)

5. A circle has a radius of 12.5 m.
Work out the circumference of the circle.
Give your answer to 3 significant figures.

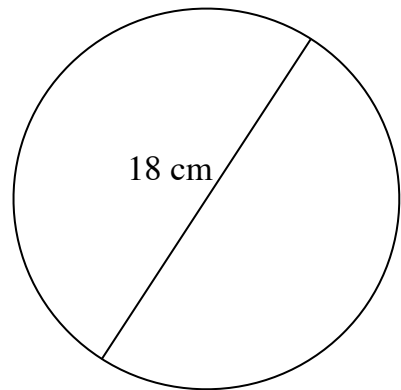


$$\begin{aligned}
 C &= 2\pi r \\
 &= 2\pi(12.5) \\
 &= 25\pi \\
 &= 78.539
 \end{aligned}$$

.....
78.5 cm

(Total for Question 5 is 2 marks)

6. A circle has a diameter of 18 cm.
Work out the area of the circle.
Give your answer to 3 significant figures.



$$\begin{aligned}
 A &= \pi r^2 \\
 &= \pi \times 9^2 \\
 &= 81\pi \\
 &= 254.469
 \end{aligned}$$

.....
254 cm²

(Total for Question 6 is 2 marks)

7. The circumference of a circle is 50.3 cm

Work out the diameter of the circle.

Give your answer to 3 significant figures.

$$C = \pi D$$
$$50.3 = \pi D$$
$$D = \frac{50.3}{\pi} = 16.01098$$

..... 16.0 cm

(Total for Question 7 is 3 marks)

8. The area of a circle is 154 cm²

Work out the radius of the circle.

Give your answer to 3 significant figures.

$$A = \pi r^2$$
$$154 = \pi r^2$$
$$r = \sqrt{\frac{154}{\pi}} = 7.0014$$

..... 7.00 cm

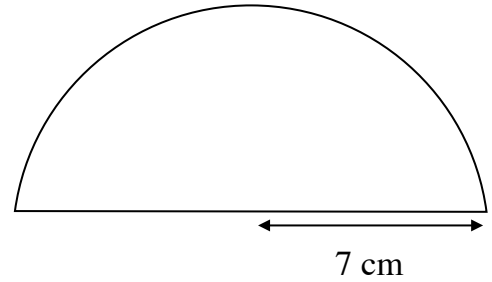
(Total for Question 8 is 3 marks)

9. A semicircle has a radius of 7 cm.

Work out the area of the semicircle.

Give your answer to 3 significant figures.

$$A = \frac{\pi r^2}{2} = \frac{\pi (7)^2}{2} \\ = 76.969$$



77.0 cm²

(Total for Question 9 is 2 marks)

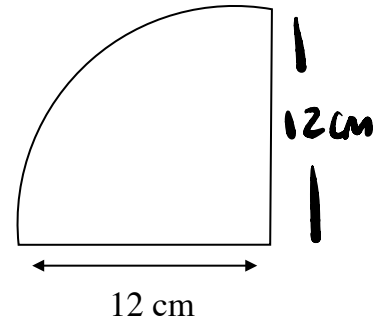
10. A quarter circle has a radius of 12 cm.

Work out the perimeter of the quarter circle.

Give your answer to 3 significant figures.

$$C = \frac{2\pi r}{4} = \frac{2\pi (12)}{4} \\ = 6\pi = 18.849$$

$$P = 12 + 12 + 18.8 = 42.8$$



42.8 cm

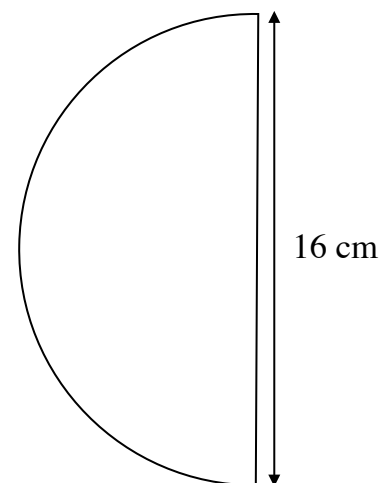
(Total for Question 10 is 2 marks)

11. A semicircle has a diameter of 16 cm.

Work out the perimeter of the semicircle.

Give your answer to 3 significant figures.

$$C = \frac{\pi D}{2} \\ = \frac{16\pi}{2} \\ P = 8\pi + 16 \\ = 41.13$$



41.1 cm

(Total for Question 11 is 3 marks)

12. A circular flower bed has a radius of 4.5 m.

The flower bed is covered with soil.

Soil costs £6 per square metre.

Work out the total cost of covering the flower bed.

Give your answer to the nearest penny.

$$\begin{aligned}A &= \pi r^2 \\ &= \pi (4.5)^2 \\ &= 63.617\end{aligned}$$

$$\begin{aligned}63.617 \times 6 \\ = 381.7035\end{aligned}$$

£ 381.70

.....
(Total for Question 12 is 3 marks)

13. A running track is made from a rectangle and two semicircles.

The rectangle is 60 m long and 20 m wide.

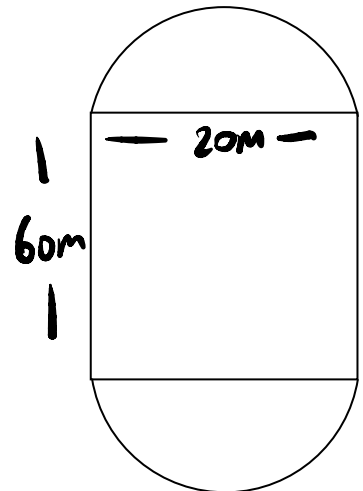
The semicircles are attached to the shorter sides of the rectangle.

Work out the total perimeter of the track.

Give your answer to 3 significant figures.

$$\begin{aligned}C &= \pi D \\ &= \pi \times 20 \\ &= 20\pi\end{aligned}$$

$$\begin{aligned}P &= 20\pi + 60 + 60 \\ &= 182.83\end{aligned}$$



.....
183 m

(Total for Question 13 is 3 marks)

14. A square has side length 14 cm

Inside the square is a circle that touches all four sides of the square.

Work out the shaded area between the square and the circle.

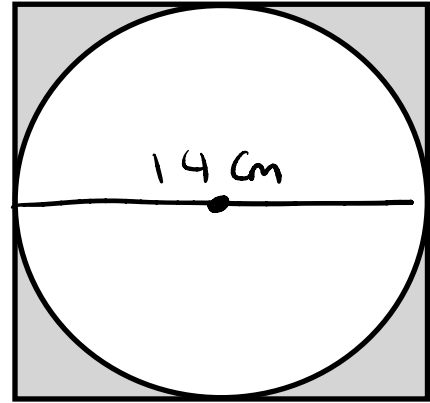
Give your answer to 3 significant figures.

$$\text{Area Square} = 14 \times 14 = 196$$

$$\begin{aligned} \text{Area Circle} &= \pi \times 7^2 \\ &= 49\pi \end{aligned}$$

$$\begin{aligned} \text{Area Shaded} &= 196 - 49\pi \\ &= 42.0619 \end{aligned}$$

14 cm



42.1 cm²

(Total for Question 14 is 3 marks)