

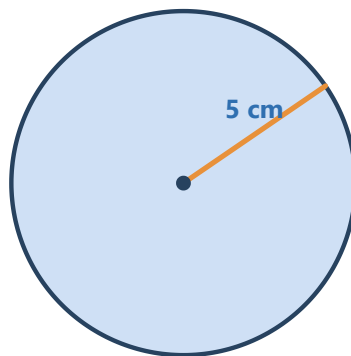
## GCSE Maths: Area of a circle, semicircles and composite shapes (Higher): answers

GCSE Maths - Perimeter, Area and Circles - Higher - Lesson 18.7

**Answers.** Final answers to the worksheet questions. Full step-by-step solutions for every question are free at [websink.site/gcse/maths/ch18-perimeter-area-circles/higher/area-of-a-circle-semicircles-and-composite-shapes/](https://websink.site/gcse/maths/ch18-perimeter-area-circles/higher/area-of-a-circle-semicircles-and-composite-shapes/)

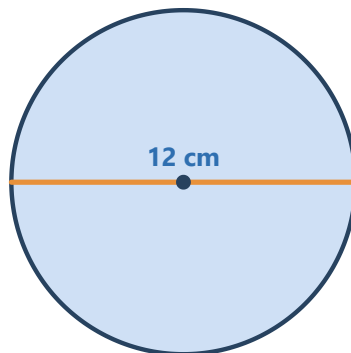
### Exercise 18G Area of a circle, semicircles and composite shapes Calculator allowed

- 1 Work out the area of the circle. Give your answer to 1 decimal place.



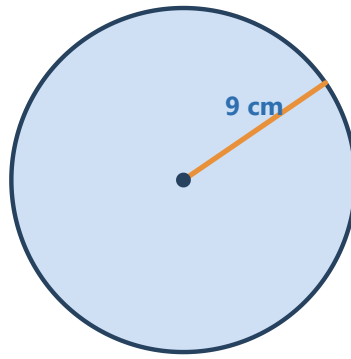
**Answer:** 78.5 cm<sup>2</sup>

- 2 Work out the area of the circle. Give your answer to 1 decimal place.



**Answer:** 113.1 cm<sup>2</sup>

- 3 Work out the area of the circle with radius 9 cm. Give your answer (a) in terms of  $\pi$  and (b) to 1 decimal place.



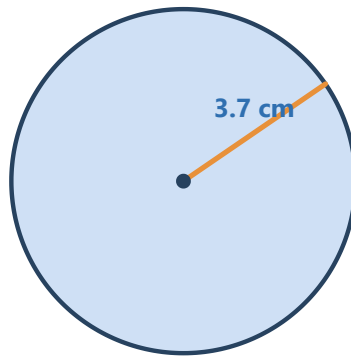
(a) in terms of  $\pi$

**Answer:**  $81\pi \text{ cm}^2$

(b) 1 d.p.

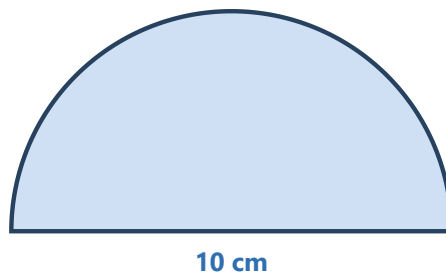
**Answer:**  $254.5 \text{ cm}^2$

4 Work out the area of the circle. Give your answer to 3 significant figures.



**Answer:**  $43.0 \text{ cm}^2$

5 Work out (a) the area and (b) the perimeter of the semicircle. Give your answers to 1 decimal place.



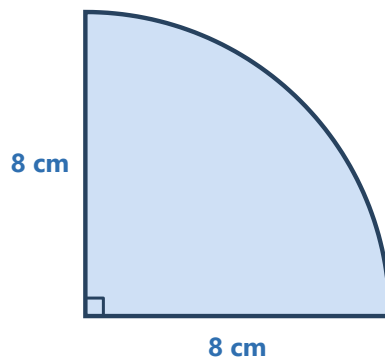
(a) area

**Answer:**  $39.3 \text{ cm}^2$

(b) perimeter

**Answer:**  $25.7 \text{ cm}$

6 The shape is a quarter of a circle. Work out (a) its area and (b) its perimeter. Give both answers in terms of  $\pi$ .



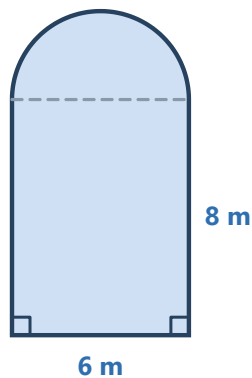
(a) area

**Answer:**  $16\pi \text{ cm}^2$

(b) perimeter

**Answer:**  $(16 + 4\pi) \text{ cm}$

- 7 The diagram shows a window made from a rectangle and a semicircle. Work out (a) the area and (b) the perimeter. Give your answers to 1 decimal place.



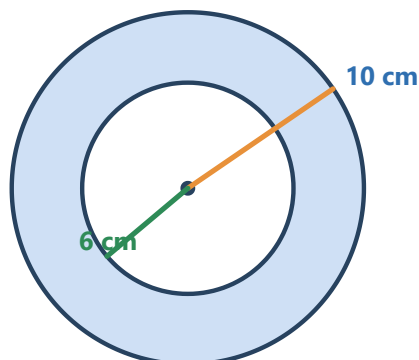
(a) area

**Answer:**  $62.1 \text{ m}^2$

(b) perimeter

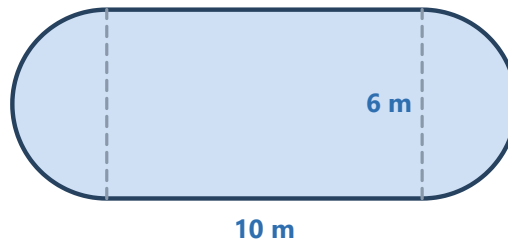
**Answer:**  $31.4 \text{ m}$

- 8 The diagram shows a ring. Work out the shaded area. Give your answer in terms of  $\pi$ .



**Answer:**  $64\pi \text{ cm}^2$

- 9 A running track is a rectangle with a semicircle at each end, as shown. Work out (a) the distance round the track and (b) the area inside the track. Give your answers in terms of  $\pi$ .



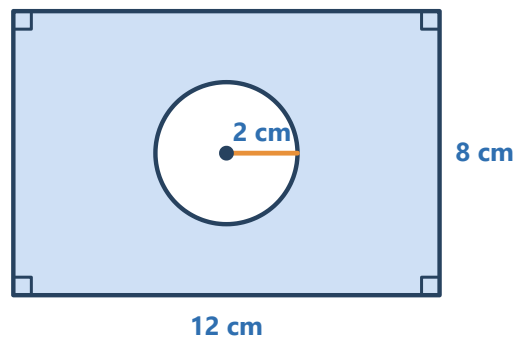
- (a) perimeter

**Answer:**  $(20 + 6\pi) \text{ m}$

- (b) area

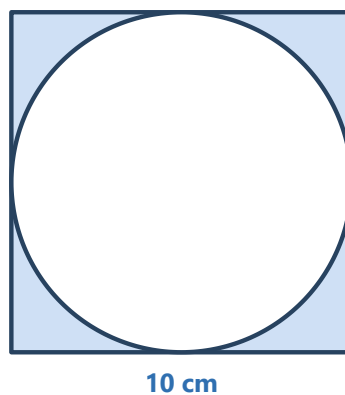
**Answer:**  $(60 + 9\pi) \text{ m}^2$

- 10 A metal plate is a rectangle 12 cm by 8 cm with a circular hole of radius 2 cm cut out. Work out the area of the plate. Give your answer to 1 decimal place.



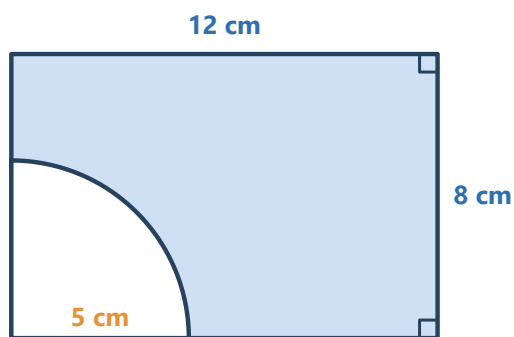
**Answer:**  $83.4 \text{ cm}^2$

- 11 A circle just touches all four sides of a square of side 10 cm. Work out the shaded area. Give your answer to 1 decimal place.



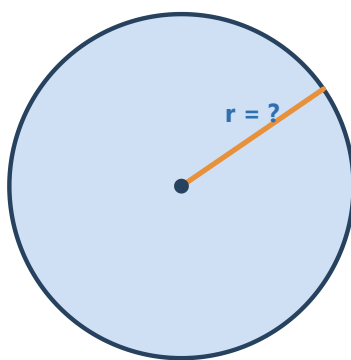
**Answer:**  $21.5 \text{ cm}^2$

- 12** A quarter circle of radius 5 cm is cut from a 12 cm by 8 cm rectangle. Work out the shaded area to 3 significant figures.



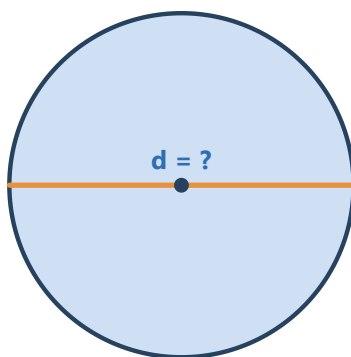
**Answer:** 76.4 cm<sup>2</sup>

- 13** The area of a circle is  $64\pi$  cm<sup>2</sup>. Work out the radius.



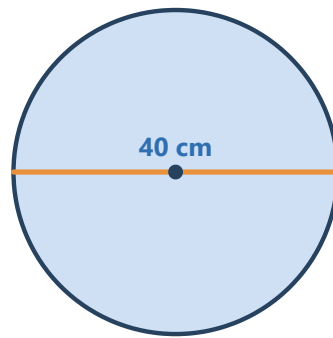
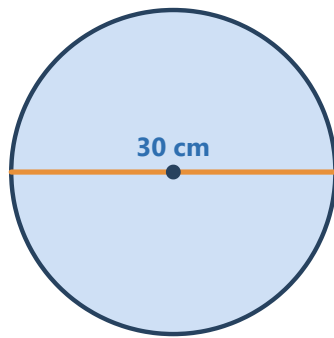
**Answer:** 8 cm

- 14** The area of a circle is 100 cm<sup>2</sup>. Work out the diameter. Give your answer to 1 decimal place.



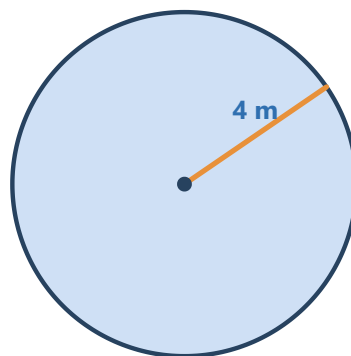
**Answer:** 11.3 cm

- 15** A pizza shop sells a medium pizza (diameter 30 cm) for £8 and a large pizza (diameter 40 cm) for £12. Which is better value for money? Show your working.



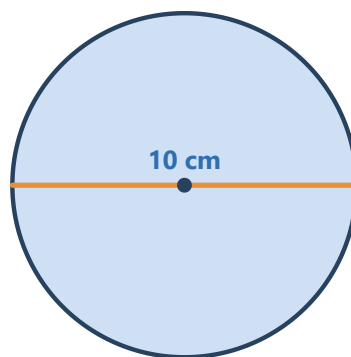
**Answer:** Large: 0.95p per cm<sup>2</sup> against 1.13p for medium; the large is better value

- 16** A circular lawn has radius 4 m. Turf costs £3.50 per square metre and must be bought in whole square metres. Work out the cost of the turf.



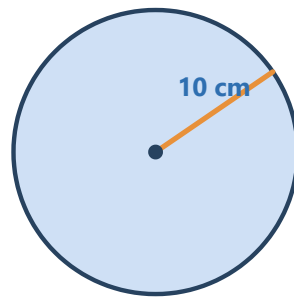
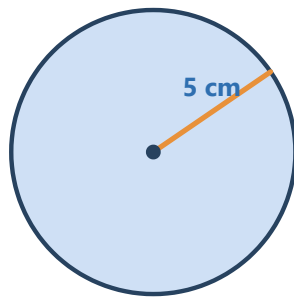
**Answer:** £178.50

- 17** Kai says: "The area of a circle with diameter 10 cm is  $\pi \times 10^2 = 314 \text{ cm}^2$ ." Explain his mistake and work out the correct area to 1 decimal place.



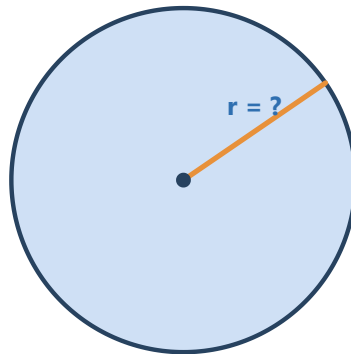
**Answer:** He used the diameter; area = 78.5 cm<sup>2</sup>

- 18** Show that the area of a circle with radius 10 cm is 4 times the area of a circle with radius 5 cm.



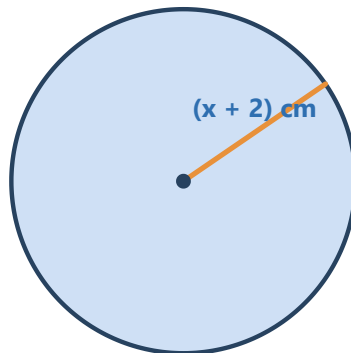
**Answer:**  $100\pi = 4 \times 25\pi$

- 19** A circle has the same value for its area (in  $\text{cm}^2$ ) as for its circumference (in cm). Work out its radius.



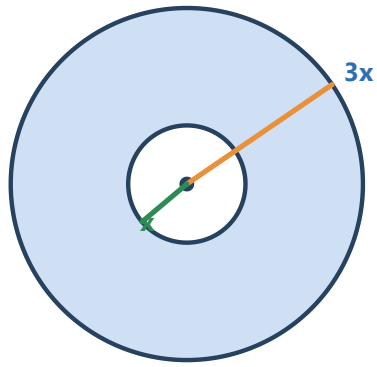
**Answer:** 2 cm

- 20** The radius of a circle is  $(x + 2)$  cm. Its area is  $49\pi \text{ cm}^2$ . Work out the value of  $x$ .



**Answer:**  $x = 5$

- 21** A ring has outer radius  $3x$  cm and inner radius  $x$  cm. (a) Show that the area of the ring is  $8\pi x^2 \text{ cm}^2$ . (b) The area is  $72\pi \text{ cm}^2$ . Work out  $x$ .



(a) (a) show that

**Answer:**  $8\pi x^2 \text{ cm}^2$

(b) (b) find  $x$

**Answer:**  $x = 3$