

WA8MMGTW2

Two-dimensional space and structures

Core + Challenge

Area of a Circle

I can use $A = \pi r^2$ to find the area of a circle from its radius or diameter, find the radius from the area, and find the area of rings.

Name: _____ Date: _____ Score: _____ / 58

Key idea

$A = \pi r^2$: square the radius first, then multiply by π . Area is in square units (cm^2 , m^2).

Why: cut a circle into thin sectors and rearrange them: nearly a parallelogram, base πr , height r , so $A = \pi r \times r$.

Given the diameter, halve it first: $d = 10 \text{ cm} \rightarrow r = 5 \text{ cm} \rightarrow A = 3.14 \times 25 = 78.5 \text{ cm}^2$ ($\pi \approx 3.14$).

Backwards: $r = \sqrt{(A \div \pi)}$. **Ring (annulus):** $A = \pi R^2 - \pi r^2$ (big circle minus the hole). Round at the end.

A

Fluency *practise the skill*

/ 16 marks

Find A unless told otherwise. Q1–8: $\pi \approx 3.14$ (exact answers). Q9–16: π key, round to 1 decimal place.

1. $r = 10 \text{ cm}$ _____

9. $r = 7 \text{ cm}$ _____

2. $r = 2 \text{ m}$ _____

10. $r = 4.5 \text{ m}$ _____

3. $r = 5 \text{ cm}$ _____

11. $d = 12 \text{ cm}$ _____

4. $d = 40 \text{ mm}$ _____

12. $d = 25 \text{ m}$ _____

5. $r = 3 \text{ cm}$ _____

13. $r = 1.2 \text{ m}$ _____

6. $d = 8 \text{ m}$ _____

14. $A = 50 \text{ cm}^2$: find r _____

7. $r = 0.5 \text{ m}$ _____

15. $A = 150 \text{ m}^2$: find r _____

8. $r = 100 \text{ mm}$ _____

16. $A = 1000 \text{ mm}^2$: find d _____

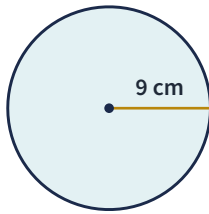
B

Core *apply the skill to problems*

/ 22 marks

- 1 Find the area of this circle. Use $\pi \approx 3.14$.

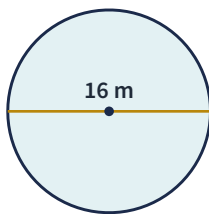
[2 marks]



Answer: _____

- 2 Find the area of this circle. Use the π key and round to 1 decimal place.

[2 marks]



Answer: _____

- 3 A 30 cm pizza costs \$18 and a 20 cm pizza costs \$9 (the sizes are diameters). Using the π key, find the cost per cm^2 of each (in cents, 2 decimal places). Which is better value?

[3 marks]

.....

.....

Answer: _____

- 4 A garden sprinkler waters a circle of radius 4.5 m. Find the area watered to the nearest m^2 (π key).

[2 marks]

.....

Answer: _____

- 5 A circular rug has an area of 2.5 m^2 . Find its radius to 2 decimal places (π key).

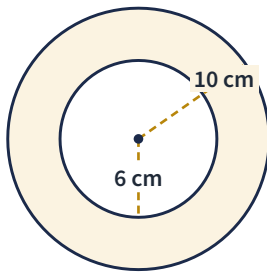
[2 marks]

.....

Answer: _____

Area of a Circle · WA8MMGTW2

- 6 A metal washer is a ring. Find its area (shaded). Use $\pi \approx 3.14$. [3 marks]



Answer: _____

- 7 An above-ground pool has a diameter of 5.5 m. Find the area of the pool cover to 1 decimal place (π key). [2 marks]

.....

Answer: _____

- 8 The centre circle of an AFL ground has a diameter of 10 m. (a) Find its area to 1 decimal place (π key). (b) The centre square is 50 m by 50 m. About how many times bigger is its area (to the nearest whole number)? [2 marks]

.....
.....

Answer: _____

- 9 A round cake tin has a diameter of 22 cm. A square tin has sides of 20 cm. Which base has the larger area, and by how much? Use the π key and round to 1 decimal place. [2 marks]

.....
.....

Answer: _____

- 10 A mobile phone tower covers a circle of radius 12 km. Find the area covered to the nearest km^2 (π key). [2 marks]

.....

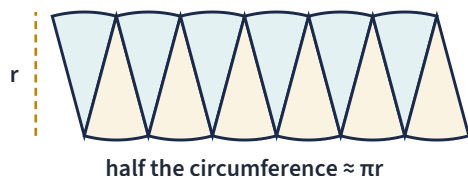
Answer: _____

C

Reasoning *explain, justify and check*

/ 9 marks

- 1 A circle is cut into 12 equal sectors, which are rearranged as shown. Explain how this shows that the area of a circle is πr^2 . [3 marks]



- 2 Sam says: “The diameter is 10 cm, so the area is $\pi \times 10^2 = 314.2 \text{ cm}^2$.” Explain his mistake and find the correct area to 1 decimal place (π key). [2 marks]

- 3 True or false: “If you double the radius of a circle, you double its area.” Explain. [2 marks]

- 4 A circle has radius 2 cm. Its circumference is $4\pi \text{ cm}$ and its area is $4\pi \text{ cm}^2$. Does that mean the area and the circumference are equal? Explain. [2 marks]

Area of a Circle · WA8MMGTW2

D**Challenge** *multi-step and problem-solving*

/ 11 marks

- 1 A circle fits exactly inside a square of side 10 cm. What percentage of the square does the circle cover (1 decimal place, π key)? Would the answer change for a 20 cm square? Explain. [3 marks]

.....

.....

.....

Answer: _____

- 2 For which radius does a circle's area (in cm^2) equal its circumference (in cm) as a number? [2 marks]

.....

.....

Answer: _____

- 3 A circular garden has a radius of 6 m. A path of the same width all the way round is added so that the path has the same area as the garden. How wide is the path, to 2 decimal places? [3 marks]

.....

.....

.....

Answer: _____

- 4 Which gives more pizza: one 40 cm pizza, or two 28 cm pizzas (diameters)? Answer without using a value for π , then find the difference to 1 decimal place (π key). [3 marks]

.....

.....

.....

Answer: _____

How did I go?Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

Stuck on a section? Our Year 8 tutors can show you exactly what to practise next. **Book a free trial class at**
edulift.com.au