

WA8MMGTW2

Two-dimensional space and structures

Core + Challenge

# Circumference of a Circle

I can use  $C = \pi d = 2\pi r$  to find the circumference of a circle, and work backwards to find the radius or diameter.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 58

## Key idea

**Radius**  $r$ : centre to edge. **Diameter**  $d = 2r$ . **Circumference**  $C$ : the distance around the circle (its perimeter).

For every circle  $C \div d = \pi = 3.14159\dots$ , so  **$C = \pi d = 2\pi r$** . Use  $\pi \approx 3.14$  or the  $\pi$  key, as each question says.

$\pi \approx 3.14$ ,  $d = 10$  cm:  $C = 3.14 \times 10 = 31.4$  cm.  $\pi$  key,  $r = 4$  m:  $C = 2 \times \pi \times 4 = 25.13$  m (2 d.p.).

**Backwards:**  $d = C \div \pi$ ,  $r = C \div (2\pi)$ .  $C = 50$  cm  $\rightarrow d = 50 \div \pi \approx 15.9$  cm (1 d.p.). Round only at the end.

A

**Fluency** *practise the skill*

/ 16 marks

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

1.  $d = 10$  cm \_\_\_\_\_

9.  $d = 7$  cm \_\_\_\_\_

2.  $d = 6$  m \_\_\_\_\_

10.  $r = 3$  cm \_\_\_\_\_

3.  $r = 4$  cm \_\_\_\_\_

11.  $d = 12.5$  m \_\_\_\_\_

4.  $r = 2$  m \_\_\_\_\_

12.  $r = 8$  mm \_\_\_\_\_

5.  $d = 20$  mm \_\_\_\_\_

13.  $r = 1.5$  m \_\_\_\_\_

6.  $r = 0.5$  m \_\_\_\_\_

14.  $C = 40$  cm: find  $d$  \_\_\_\_\_

7.  $d = 100$  cm \_\_\_\_\_

15.  $C = 100$  m: find  $r$  \_\_\_\_\_

8.  $C = 31.4$  cm: find  $d$  \_\_\_\_\_

16.  $d = 45$  cm \_\_\_\_\_

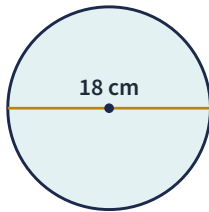
## Circumference of a Circle · WA8MMGTW2

**B****Core** *apply the skill to problems*

/ 22 marks

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

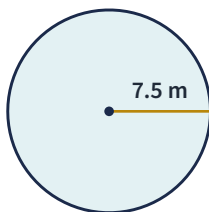
[2 marks]



Answer: \_\_\_\_\_

- 2 Find the circumference of this circle. Use the  $\pi$  key and round to 1 decimal place.

[2 marks]



Answer: \_\_\_\_\_

- 3 A bike wheel has a diameter of 66 cm. (a) How far does the bike travel in one turn of the wheel, to the nearest cm? (b) About how many turns does the wheel make in 1 km? Use the  $\pi$  key and give (b) to the nearest whole number.

[3 marks]

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Answer: \_\_\_\_\_

- 4 A circular garden bed has a radius of 2.4 m. Plastic edging is sold by the whole metre at \$8.50 per metre. Using the  $\pi$  key, find the length of the edge (1 decimal place) and the cost of the edging.

[3 marks]

.....

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Answer: \_\_\_\_\_

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- 5 A tree trunk has a circumference of 2.2 m. Find its diameter. Use the  $\pi$  key and round to 2 decimal places. [2 marks]

.....

Answer: \_\_\_\_\_

- 6 A circular cycling track in a park is 400 m around. Find its radius. Use the  $\pi$  key and round to 1 decimal place. [2 marks]

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Answer: \_\_\_\_\_

- 7 The minute hand of a clock is 12 cm long. How far does its tip travel in 1 hour? In 15 minutes? Use  $\pi \approx 3.14$ . [2 marks]

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Answer: \_\_\_\_\_

- 8 A round table has a diameter of 1.5 m. Each person needs 60 cm of the edge. How many people can sit at it? Use the  $\pi$  key. [2 marks]

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Answer: \_\_\_\_\_

- 9 A \$2 coin has a diameter of 20.5 mm. Find its circumference to the nearest millimetre. Use the  $\pi$  key. [2 marks]

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Answer: \_\_\_\_\_

- 10 Which is longer: the circumference of a circle with diameter 10 cm, or the perimeter of a square with side 8 cm? By how much? Use  $\pi \approx 3.14$ . [2 marks]

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Answer: \_\_\_\_\_

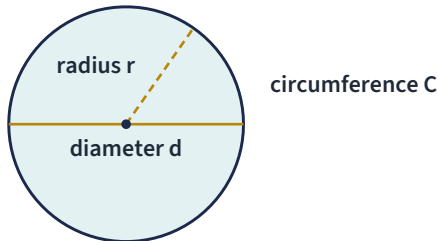
C

**Reasoning** *explain, justify and check*

/ 9 marks

- 1 Explain why  $C = \pi d$  and  $C = 2\pi r$  always give the same answer.

[2 marks]



- 2 Students measured some round objects. Complete the last column (to 2 decimal places). What do you notice? What is this number?

[2 marks]

| Object     | d (cm) | C (cm) | $C \div d$ |
|------------|--------|--------|------------|
| Can        | 7.0    | 22.0   |            |
| Plate      | 24.0   | 75.4   |            |
| Bike wheel | 66.0   | 207.3  |            |

- 3 Ava finds the circumference of a circle with radius 6 cm as  $\pi \times 6 = 18.8$  cm. Explain her mistake and find the correct answer to 1 decimal place ( $\pi$  key).

[2 marks]

- 4 True or false: “If you double the diameter of a circle, its circumference doubles.” Explain, and give an example ( $\pi \approx 3.14$ ).

[3 marks]

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

/ 11 marks

- 1 A rope fits tightly around the Earth's equator (radius about 6371 km). The rope is made 10 m longer and lifted so it is the same height above the ground all the way round. How high is it? [3 marks]  
Use the  $\pi$  key and round to 2 decimal places. Does the Earth's radius matter?

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Answer: \_\_\_\_\_

- 2 A car's computer measures distance by counting wheel turns, set for wheels of diameter 64 cm. The owner fits bigger wheels with diameter 68 cm. When the car says it has gone 100 km, how far has it really gone? [3 marks]

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Answer: \_\_\_\_\_

- 3 The front wheel of a penny-farthing bicycle makes exactly 250 turns in 1 km. Find the diameter of the wheel to the nearest centimetre ( $\pi$  key). [2 marks]

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Answer: \_\_\_\_\_

- 4 A 1 m piece of wire is bent into a circle. Another 1 m piece is bent into a square. How much wider is the circle than the square? Answer in mm to 1 decimal place ( $\pi$  key). [3 marks]

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Answer: \_\_\_\_\_

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

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