

Circles: Circumference & Area

KEY IDEAS

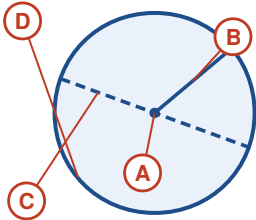
Radius (r): centre to edge. **Diameter (d):** all the way across through the centre, so $d = 2r$.

Circumference (distance around): $C = \pi d$ or $C = 2\pi r$. **Area** (space inside): $A = \pi r^2$. Always use the **radius** for area.

Use $\pi \approx 3.14$ and round answers to **one decimal place**. Circumference uses units like cm or m; area uses square units like cm^2 or m^2 .

A Parts of a circle

2 marks (½ each)



1. Part A is the _____
2. Part B is the _____
3. Part C is the _____
4. Part D is the _____

B Radius and diameter

4 marks

5. $r = 7 \text{ cm}$, so $d =$ _____

6. $d = 18 \text{ m}$, so $r =$ _____

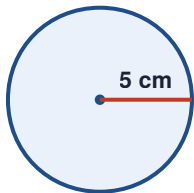
7. $d = 5.6 \text{ cm}$, so $r =$ _____

8. $r = 12.5 \text{ mm}$, so $d =$ _____

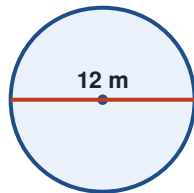
C Find the circumference

4 marks

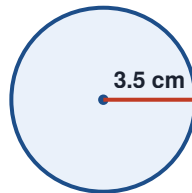
9.



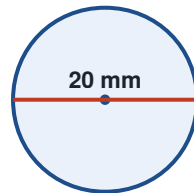
10.



11.



12.

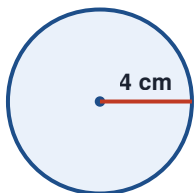


D Find the area

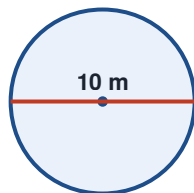
4 marks

Careful: when you're given the diameter, find the radius first.

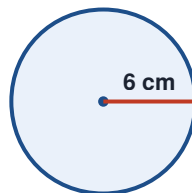
13.



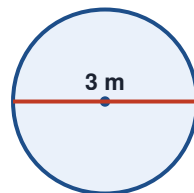
14.



15.



16.



E Work backwards

4 marks (2 each)

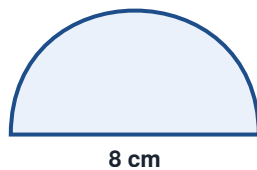
17. A circle has a circumference of 47.1 cm. Find its diameter and its radius.

18. A circle has an area of 314 m^2 . Find its radius.

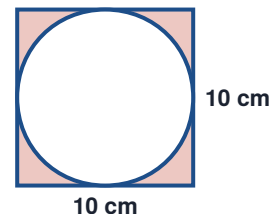
F Composite shapes

4 marks

19. Semicircle with diameter 8 cm. Find its **area** and its **perimeter**.



20. A circle is cut from a $10 \text{ cm} \times 10 \text{ cm}$ square. Find the area of the shaded corners.



G Real-world problems

6 marks

Show your work and give units. 2 marks each.

21. A bike wheel has a diameter of 70 cm. How far does the bike travel in one full turn of the wheel? How many metres does it travel in 100 turns?

22. Is one 12-inch pizza (12 in across) more or less pizza than two 8-inch pizzas? Compare their areas.

23. A lawn sprinkler sprays water 4 m in every direction. What area of lawn does it water?

H Spot the mistake

2 marks

24. For a circle with radius 6 cm, a student writes $C = 3.14 \times 6 = 18.84 \text{ cm}$. Explain the error and correct it.

25. For a circle with diameter 10 m, a student writes $A = 3.14 \times 10^2 = 314 \text{ m}^2$. Explain the error and correct it.

Circles: Circumference & Area

ANSWER KEY

KEY IDEAS

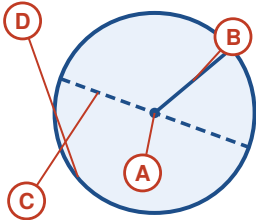
Radius (r): centre to edge. **Diameter (d):** all the way across through the centre, so $d = 2r$.

Circumference (distance around): $C = \pi d$ or $C = 2\pi r$. **Area** (space inside): $A = \pi r^2$. Always use the **radius** for area.

Use $\pi \approx 3.14$ and round answers to **one decimal place**. Circumference uses units like cm or m; area uses square units like cm^2 or m^2 .

A Parts of a circle

2 marks (½ each)



1. Part A is the **centre**
2. Part B is the **radius**
3. Part C is the **diameter**
4. Part D is the **circumference**

B Radius and diameter

4 marks

5. $r = 7 \text{ cm}$, so $d = \mathbf{14 \text{ cm}}$

6. $d = 18 \text{ m}$, so $r = \mathbf{9 \text{ m}}$

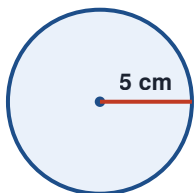
7. $d = 5.6 \text{ cm}$, so $r = \mathbf{2.8 \text{ cm}}$

8. $r = 12.5 \text{ mm}$, so $d = \mathbf{25 \text{ mm}}$

C Find the circumference

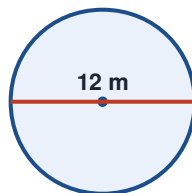
4 marks

9.



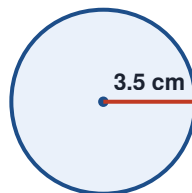
$$C = 2\pi r = 2 \times 3.14 \times 5 = 31.4 \text{ cm}$$

10.



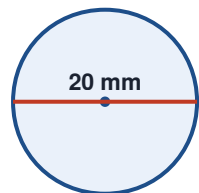
$$C = \pi d = 3.14 \times 12 = 37.68 \approx 37.7 \text{ m}$$

11.



$$C = 2\pi r = 2 \times 3.14 \times 3.5 = 21.98 \approx 22.0 \text{ cm}$$

12.



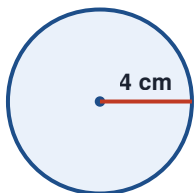
$$C = \pi d = 3.14 \times 20 = 62.8 \text{ mm}$$

D Find the area

4 marks

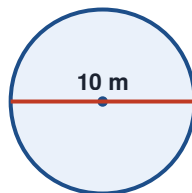
Careful: when you're given the diameter, find the radius first.

13.



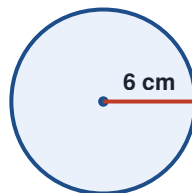
$$A = \pi r^2 = 3.14 \times 4^2 = 50.24 \approx 50.2 \text{ cm}^2$$

14.



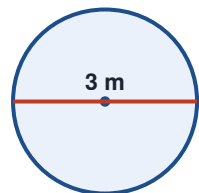
$$r = 10 \div 2 = 5. A = \pi r^2 = 3.14 \times 5^2 = 78.5 \text{ m}^2$$

15.



$$A = \pi r^2 = 3.14 \times 6^2 = 113.04 \approx 113.0 \text{ cm}^2$$

16.



$$r = 3 \div 2 = 1.5. A = \pi r^2 = 3.14 \times 1.5^2 = 7.065 \approx 7.1 \text{ m}^2$$

E Work backwards

4 marks (2 each)

17. A circle has a circumference of 47.1 cm. Find its diameter and its radius.

$$d = C \div \pi = 47.1 \div 3.14 = \mathbf{15 \text{ cm}}, \text{ so } r = \mathbf{7.5 \text{ cm}}$$

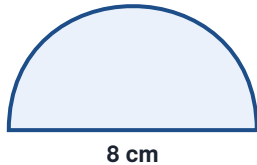
18. A circle has an area of 314 m². Find its radius.

$$r^2 = A \div \pi = 314 \div 3.14 = 100, \text{ so } r = \sqrt{100} = \mathbf{10 \text{ m}}$$

F Composite shapes

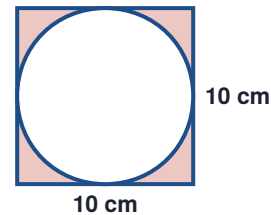
4 marks

19. Semicircle with diameter 8 cm. Find its **area** and its **perimeter**.



$$\text{Area} = \frac{1}{2} \times 3.14 \times 4^2 = \mathbf{25.1 \text{ cm}^2}. \text{ Perimeter} = \frac{1}{2} \times 3.14 \times 8 + 8 = \mathbf{12.56 + 8 = 20.6 \text{ cm}}$$

20. A circle is cut from a 10 cm × 10 cm square. Find the area of the shaded corners.



$$\text{Square} = 100. \text{ Circle: } r = 5, A = 3.14 \times 25 = 78.5. \text{ Corners} = 100 - 78.5 = \mathbf{21.5 \text{ cm}^2}$$

G Real-world problems

6 marks

Show your work and give units. 2 marks each.

21. A bike wheel has a diameter of 70 cm. How far does the bike travel in one full turn of the wheel? How many metres does it travel in 100 turns?

$$C = 3.14 \times 70 = \mathbf{219.8 \text{ cm}} \text{ per turn. } 100 \text{ turns} = 21\,980 \text{ cm} = \mathbf{219.8 \text{ m}}$$

22. Is one 12-inch pizza (12 in across) more or less pizza than two 8-inch pizzas? Compare their areas.

$$12\text{-inch: } 3.14 \times 6^2 = 113.04 \text{ in}^2. \text{ Two } 8\text{-inch: } 2 \times 3.14 \times 4^2 = 100.48 \text{ in}^2. \text{ One } \mathbf{12\text{-inch} \text{ pizza is more.}}$$

23. A lawn sprinkler sprays water 4 m in every direction. What area of lawn does it water?

$$A = 3.14 \times 4^2 = \mathbf{50.2 \text{ m}^2} \text{ (50.24)}$$

H Spot the mistake

2 marks

24. For a circle with radius 6 cm, a student writes $C = 3.14 \times 6 = 18.84 \text{ cm}$. Explain the error and correct it.

$$C = \pi d, \text{ and the diameter is } 12, \text{ not } 6 \text{ (or use } 2\pi r). C = 3.14 \times 12 = 37.68, \text{ so } \mathbf{C = 37.7 \text{ cm.}}$$

25. For a circle with diameter 10 m, a student writes $A = 3.14 \times 10^2 = 314 \text{ m}^2$. Explain the error and correct it.

$$\text{The area formula uses the } \mathbf{radius}, \text{ which is } 5. A = 3.14 \times 5^2 = \mathbf{78.5 \text{ m}^2}.$$