

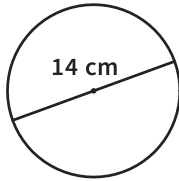
Fix it 1 Radius or diameter?

Circles · ANSWERS

The radius is half the diameter. The diameter is double the radius.

EXAMPLE

Find the radius.

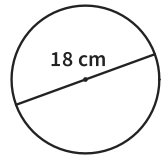


1. The diameter goes right across, through the centre.
2. The radius is half of it: $14 \div 2$.
3. $r = 7$ cm

YOUR TURN

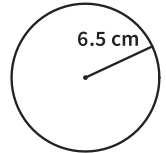
- 1 Find the radius.

$$r = \underline{\hspace{2cm} 9 \text{ cm} \hspace{2cm}}$$



- 2 Find the diameter.

$$d = \underline{\hspace{2cm} 13 \text{ cm} \hspace{2cm}}$$



- 3 A round table top is 1.3 m across. What is its radius?

$$r = \underline{\hspace{2cm} 0.65 \text{ m} \hspace{2cm}}$$

Check: Double your radius: do you get the diameter back?

The Maths Habit

Fix it 2 Circumference

Circles · ANSWERS

$C = \pi \times d$. Given the radius? Double it first, or use $C = 2 \times \pi \times r$.

EXAMPLE

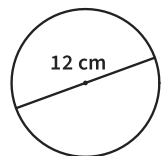
Find the circumference of a circle with diameter 8 cm, to 1 decimal place.

1. The diameter is given: $C = \pi \times d$.
2. $C = \pi \times 8$
3. $C = 25.1$ cm

YOUR TURN

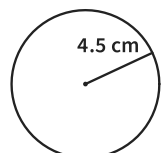
- 1 Find the circumference to 1 decimal place.

$$C = \underline{\hspace{2cm} 37.7 \text{ cm} \hspace{2cm}}$$



- 2 Find the circumference to 1 decimal place.

$$C = \underline{\hspace{2cm} 28.3 \text{ cm} \hspace{2cm}}$$



- 3 A round pond has a radius of 3.2 m. How far is it round its edge, to 1 decimal place?

$$\underline{\hspace{2cm} 20.1 \text{ m} \hspace{2cm}}$$

Check: The circumference is just over 3 times the diameter.

The Maths Habit

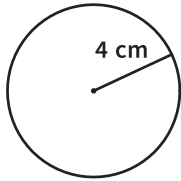
Fix it 3 Area

Circles · ANSWERS

$A = \pi \times r^2$. Square the radius first: r^2 means $r \times r$, never $2 \times r$.

EXAMPLE

Find the area to 1 decimal place.

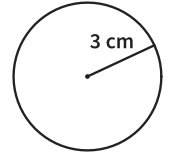


1. $r^2 = 4 \times 4 = 16$
2. $A = \pi \times 16$
3. $A = 50.3 \text{ cm}^2$

YOUR TURN

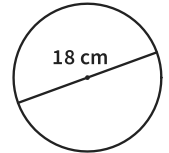
- 1 Find the area to 1 decimal place.

$$A = \underline{28.3 \text{ cm}^2}$$



- 2 Find the area to 1 decimal place.

$$A = \underline{254.5 \text{ cm}^2}$$



- 3 A round rug has a radius of 1.5 m. Find its area to 1 decimal place.

$$A = \underline{7.1 \text{ m}^2}$$

Check: The area is a little over $3 \times r \times r$, and it is in square units.

The Maths Habit

Fix it 4 In terms of π

Circles · ANSWERS

In terms of π : work out the number, then write π after it. To 1 decimal place: multiply by π , then round.

EXAMPLE

Find the area of a circle with radius 5 cm. Give your answer in terms of π .

1. $r^2 = 5 \times 5 = 25$
2. $A = 25 \times \pi$
3. $A = 25\pi \text{ cm}^2$. π stays as it is.

YOUR TURN

- 1 Find the circumference of a circle with diameter 9 cm, in terms of π .

$$C = \underline{9\pi \text{ cm}}$$

- 2 Find the area of a circle with radius 8 cm, in terms of π .

$$A = \underline{64\pi \text{ cm}^2}$$

- 3 A circumference is $14\pi \text{ cm}$. Write it to 1 decimal place.

$$C = \underline{44.0 \text{ cm}}$$

Check: In terms of π , π is still there and nothing is rounded. To 1 decimal place, π has gone.

The Maths Habit

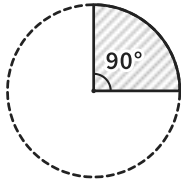
Fix it 5 Fraction of the circle

Circles · ANSWERS

A sector is a fraction of the whole circle: $\text{angle} \div 360$. Simplify it.

EXAMPLE

What fraction of the circle is shaded?

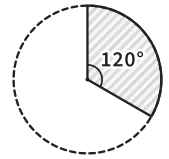


1. A whole turn is 360° .
2. Fraction = $\frac{90}{360}$
3. Divide both by 90: $\frac{1}{4}$

YOUR TURN

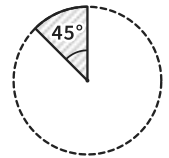
- 1 What fraction of the circle is shaded?

$$\frac{1}{3}$$



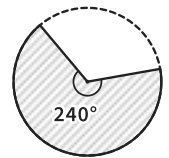
- 2 What fraction of the circle is shaded?

$$\frac{1}{8}$$



- 3 What fraction of the circle is shaded?

$$\frac{2}{3}$$



Check: Multiply your fraction by 360: you get the angle back.

The Maths Habit

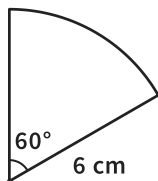
Fix it 6 Arc length

Circles · ANSWERS

Arc length = $\frac{\text{angle}}{360} \times \pi \times d$. It is that fraction of the circumference.

EXAMPLE

Find the arc length to 1 decimal place.

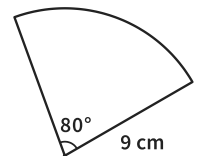


1. The diameter is 12 cm.
2. Arc = $\frac{60}{360} \times \pi \times 12$
3. Arc = 6.3 cm

YOUR TURN

- 1 Find the arc length to 1 decimal place.

$$12.6 \text{ cm}$$

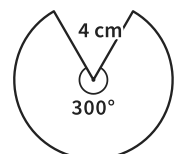


- 2 A circle has a diameter of 10 cm. Find the length of a 135° arc of it, to 1 decimal place.

$$11.8 \text{ cm}$$

- 3 Find the arc length to 1 decimal place.

$$20.9 \text{ cm}$$



Check: The arc is shorter than the circumference. A 180° arc is exactly half of it.

The Maths Habit

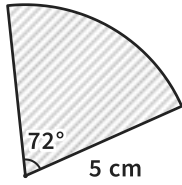
Fix it 7 Sector area

Circles · ANSWERS

Sector area = $\frac{\text{angle}}{360} \times \pi \times r^2$. It is that fraction of the circle's area.

EXAMPLE

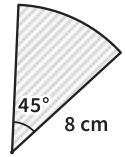
Find the area of the sector to 1 decimal place.



1. $r^2 = 5 \times 5 = 25$
2. Area = $\frac{72}{360} \times \pi \times 25$
3. Area = 15.7 cm^2

YOUR TURN

- 1 Find the area of the sector to 1 decimal place.

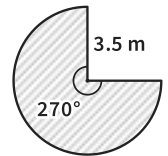


25.1 cm²

- 2 A circle has a diameter of 12 cm. Find the area of a 150° sector of it, to 1 decimal place.

47.1 cm²

- 3 Find the area of the sector to 1 decimal place.



28.9 m²

Check: Sector area uses r^2 and is in square units. Arc length uses d .

The Maths Habit

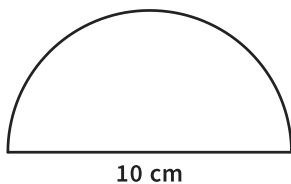
Fix it 8 Perimeter of a sector

Circles · ANSWERS

Perimeter: add every edge. A sector has its arc and two radii; a semicircle has its arc and the diameter.

EXAMPLE

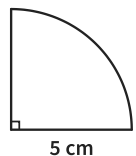
Find the perimeter of the semicircle to 1 decimal place.



1. Curved edge: half of $\pi \times 10$
2. Straight edge: the 10 cm diameter
3. $\pi \times 10 \div 2 + 10 = 25.7 \text{ cm}$

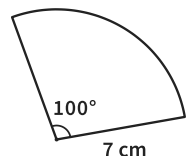
YOUR TURN

- 1 A quarter circle. Find its perimeter to 1 decimal place.



17.9 cm

- 2 Find the perimeter of the sector to 1 decimal place.



26.2 cm

- 3 A window is a semicircle. Its straight edge is 80 cm long. Find the perimeter of the window to 1 decimal place.

205.7 cm

Check: Count the edges in the diagram. Is each one in your sum?

The Maths Habit