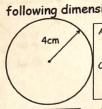
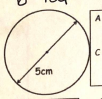
Year 9 Core – Area and Circumference of circles

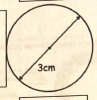
Calculate the area and circumference of the circles with the following dimensions: all to 1dp



$A = \pi r^2$
$= \pi \times 4^2$
$= 50.3\ cm^2$
$C = \pi d$
$= \pi \times 8$
$= 25.1\ cm$

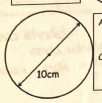


$A = \pi r^2$
$= \pi \times 2.5^2$
$= 19.6\ cm^2$
$C = \pi d$
$= \pi \times 5$
$= 15.7\ cm$

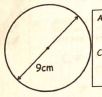


$A = \pi r^2$
$= \pi \times 1.5^2$
$= 7.1\ cm^2$
$C = \pi d$
$= \pi \times 3$
$= 9.4\ cm$

$A = \pi r^2$
$= \pi \times 6^2$
$= 113.1\ cm^2$
$C = \pi d$
$= \pi \times 12$
$= 37.7\ cm$



$A = \pi r^2$
$= \pi \times 5^2$
$= 78.5\ cm^2$
$C = \pi d$
$= \pi \times 10$
$= 31.4\ cm$

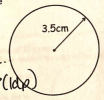


$A = \pi r^2$
$= \pi \times \frac{4.5}{2}^2$
$= 63.6\ cm^2$
$C = \pi d$
$= \pi \times 9$
$= 28.3\ cm$

1. Calculate the area

$Area = \pi r^2$
$= \pi \times 7^2$
$= 153.93804$
$= 153.9\ cm^2$ (1dp)

2. Find the circumference



$C = \pi D$
$= \pi \times 7$
$= 21.99114...$
$= 22.0\ cm$ (1dp)

3. Find the circumference

$C = \pi D$
$= \pi \times 6$
$= 18.849555...$
$= 18.8\ cm$ (1dp)

4. What is the area of this circle?

$Area = \pi r^2$
$= \pi \times 2^2$
$= 4\pi$
$= 12.56637$
$= 12.6\ cm^2$ (1dp)

5. A circle has a diameter of 9 m.
Work out the area of the circle.
Give your answer correct to 1 decimal place.

$r = 9 \div 2$
$= 4.5$

$Area = \pi r^2$
$= \pi \times 4.5^2$
$= 63.6\ m^2$ (1dp)

6. A circle has a radius of 8 cm.
Work out the area of the circle.
Give your answer in terms of π

$Area = \pi r^2$
$= \pi \times 8^2$
$= 64\pi\ cm^2$

don't forget units.

7. The diagram shows a shaded ring formed by cutting a smaller circle out of a larger circle.

The radius of the smaller circle is 6 cm.
The diameter of the larger circle is 15 cm.
Find the area of the shaded ring.

area shaded = area whole − area smaller

area whole $= \pi r^2$
$= \pi \times 7.5^2$
$= 56.25\pi$

area smaller $= \pi r^2$
$= \pi \times 6^2$
$= 36\pi$

Shaded area $= 56.25\pi - 36\pi = 63.6\ cm^2$ (1dp)

8 a. A circle has a diameter of 12 mm.
Work out the circumference of the circle.
Give your answer in terms of π

$C = \pi D$
$= \pi \times 12$
$= 12\pi\ mm$

b. A circle has a radius of 6.5 cm.
Work out the circumference of the circle.
Give your answer correct to 2 decimal places.

$C = \pi D$
$= \pi \times 13$
$= 13\pi$
$= 40.84\ cm$ (2dp)

9. The diagram shows three quarters of a circle with a radius of 12 metres.

Find the perimeter of the shape.

Circumference
$= \pi D$
$= 24\pi$

Perimeter $= \left(\frac{3}{4}\text{ of } 24\pi\right) + 12 + 12$
$= 18\pi + 24$
$= 80.5\ m$ (1dp)

10. A circular field has a diameter of 32 metres.
A farmer wants to build a fence around the edge of the field.

Each metre of fence will cost £15.95

Work out the total cost of the fence.

$C = \pi D$
$= \pi \times 32$
$= 32\pi\ m$

$32\pi \times £15.95$
$= £1663.47$

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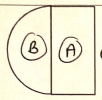

Calculate the area of compound shapes by splitting them up into more recognisable shapes.

This question has been started for you.

Area of **rectangle** = b x h
Area of **semi-circle** = $\frac{\pi r^2}{2}$
Total area = **rectangle + semi-circle**

Area A $= b \times h$
$= 6 \times 4$
$= 24\ cm^2$

Area B $= \frac{1}{2} \times \pi r^2$
$= \frac{\pi \times 3^2}{2}$
$= 4.5\pi\ cm^2$

Total area $= 24 + 4.5\pi$
$= 38.1\ cm^2$ (1dp)

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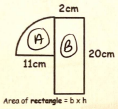

Area of **rectangle** = b x h
Area of **quarter-circle** = $\frac{\pi r^2}{4}$
Total area = **rectangle + quarter circle**

Area $\frac{1}{4}$ circle $= \frac{\pi r^2}{4}$
$= \frac{\pi \times 11^2}{4}$
$= 30.25\pi\ cm^2$

Area (B) $= b \times h$
$= 2 \times 20$
$= 40\ cm^2$

Total area $= 30.25\pi + 40$
$= 135.0\ cm^2$ (1dp)