



- 1** A rectangle has length 9 cm and width 4 cm.

- Work out the area of the rectangle.
- Work out the perimeter of the rectangle.

(2 marks)

Perimeter is the total distance around the boundary. Area counts the unit squares inside the shape, so its units are squared

$$\text{Area} = \text{length} \times \text{width} = 9 \times 4 = 36 \text{ cm}^2$$

$$\text{Perimeter} = 2 \times (9 + 4) = 2 \times 13 = 26 \text{ cm}$$

2

The diagram shows a parallelogram.

- Work out the area of the parallelogram.
- Work out the perimeter of the parallelogram.
- The parallelogram is cut along a diagonal into two identical triangles. Work out the area of one of the triangles.

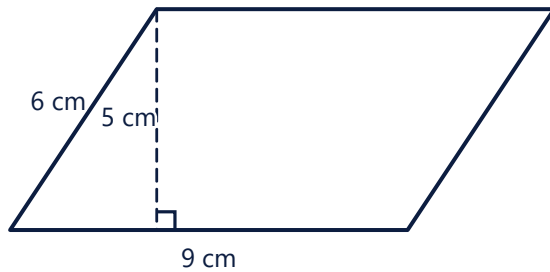


Diagram NOT accurately drawn

(3 marks)

a)

Area = base $\times$ perpendicular height

$$\text{Area} = 9 \times 5$$

$$\text{Area} = 45 \text{ cm}^2$$

$$\boxed{45 \text{ cm}^2}$$

b)

Opposite sides are equal

$$\text{Perimeter} = 9 + 6 + 9 + 6$$

$$\text{Perimeter} = 30 \text{ cm}$$

$$\boxed{30 \text{ cm}}$$

c)

The diagonal cuts it in half

$$\text{Area} = 45 \div 2$$

$$\text{Area} = 22.5 \text{ cm}^2$$

$$\boxed{22.5 \text{ cm}^2}$$

3

- a. A rectangular noticeboard has an area of 84 cm^2 and a length of 12 cm. Work out the width of the noticeboard.
- b. A triangle has an area of 36 cm^2 and a base of 9 cm. Work out the perpendicular height of the triangle.

(3 marks)

a)

$$\begin{array}{rcl} 12 \times w & = & 84 \\ \div 12 & & \div 12 \\ w & = & 7 \end{array}$$

7 cm

b)

$$\begin{array}{rcl} \frac{1}{2} \times 9 \times h & = & 36 \\ 4.5h & = & 36 \\ \div 4.5 & & \div 4.5 \\ h & = & 8 \end{array}$$

8 cm

4

- a. Change 4 m^2 to cm^2 .
- b. Change 2500 mm^2 to cm^2 .
- c. Arjun says, "1 m^2 is the same as 100 cm^2 ." Explain why Arjun is wrong.

(3 marks)

a)

$$1 \text{ m}^2 = 100 \text{ cm} \times 100 \text{ cm}$$

$$1 \text{ m}^2 = 10\,000 \text{ cm}^2$$

$$4 \text{ m}^2 = 4 \times 10\,000$$

$$40\,000 \text{ cm}^2$$

b)

$$1 \text{ cm}^2 = 10 \text{ mm} \times 10 \text{ mm}$$

$$1 \text{ cm}^2 = 100 \text{ mm}^2$$

$$2500 \div 100 = 25$$

$$25 \text{ cm}^2$$

c)

1 m^2 is a square 100 cm by 100 cm

$$100 \times 100 = 10\,000$$

$$1 \text{ m}^2 = 10\,000 \text{ cm}^2, \text{ not } 100 \text{ cm}^2$$

5

The diagram shows a trapezium.

- Work out the area of the trapezium.
- Work out the perimeter of the trapezium.



Diagram NOT accurately drawn

(3 marks)

a)

$$\text{Area} = \frac{(a + b)}{2} \times h$$

$$\text{Area} = \frac{9 + 12}{2} \times 4$$

$$\text{Area} = 10.5 \times 4$$

$$\text{Area} = 42 \text{ cm}^2$$

$$\boxed{42 \text{ cm}^2}$$

b)

Add all four sides

$$\text{Perimeter} = 12 + 5 + 9 + 4$$

$$\text{Perimeter} = 30 \text{ cm}$$

$$\boxed{30 \text{ cm}}$$

6

A trapezium has parallel sides of length 8 cm and 14 cm.

The area of the trapezium is 66 cm^2 .

Work out the perpendicular height of the trapezium.

(2 marks)

$$\text{Area} = \frac{(a + b)}{2} \times h$$

$$\frac{8 + 14}{2} \times h = 66$$

$$11h = 66$$

$\div 11$

$$h = 6 \quad \div 11$$

$$\boxed{6 \text{ cm}}$$

7

The shape is made from a rectangle and a right-angled triangle.

- Work out the perimeter of the shape.
- Work out the area of the shape.

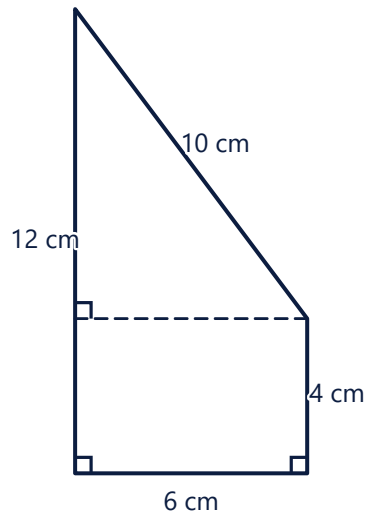


Diagram NOT accurately drawn

(4 marks)

a)

$$\text{Perimeter} = 6 + 4 + 10 + 12$$

$$\text{Perimeter} = 32 \text{ cm}$$

$$\boxed{32 \text{ cm}}$$

b)

Rectangle

$$6 \times 4 = 24 \text{ cm}^2$$

Height of the triangle

$$12 - 4 = 8 \text{ cm}$$

Triangle

$$\frac{1}{2} \times 6 \times 8 = 24 \text{ cm}^2$$

$$\text{Total} = 24 + 24$$

$$\text{Total} = 48 \text{ cm}^2$$

$$\boxed{48 \text{ cm}^2}$$

8

A circle has radius 6 cm.

- Work out the circumference of the circle. Give your answer correct to 1 decimal place.
- Work out the area of the circle. Give your answer correct to 1 decimal place.

(3 marks)

Circumference is the distance around the circle; area is the space inside it. The radius runs from the centre to the edge, and the diameter is twice the radius. Use the calculator's π key and round only the final answers

$$\text{Circumference} = 2\pi r = 2 \times \pi \times 6 = 37.699... = 37.7 \text{ cm (1 dp)}$$

$$\text{Area} = \pi r^2 = \pi \times 36 = 113.097... = 113.1 \text{ cm}^2 \text{ (1 dp)}$$

9

A circle has diameter 18 cm.

- Work out the circumference of the circle. Give your answer in terms of π .
- Work out the area of the circle. Give your answer in terms of π .

(3 marks)

$$\text{Circumference} = \pi d = 18\pi \text{ cm}$$

$$\text{Radius} = 18 \div 2 = 9 \text{ cm, so area} = \pi r^2 = \pi \times 81 = 81\pi \text{ cm}^2$$

10

Shape A is a semicircle with diameter 10 cm.

Shape B is a quarter circle with radius 8 cm.

- Work out the perimeter of shape A. Give your answer correct to 1 decimal place.
- Work out the area of shape B. Give your answer in terms of π .

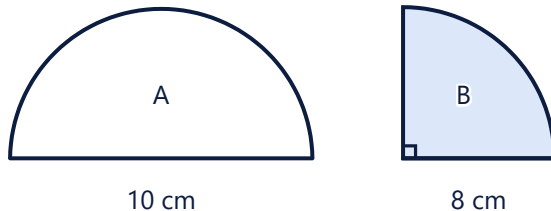


Diagram NOT accurately drawn

(4 marks)

a)

Curved edge = half of πd

$$\text{Curved edge} = \pi \times 10 \div 2$$

$$\text{Curved edge} = 15.707\dots$$

Add the diameter

$$\text{Perimeter} = 15.707\dots + 10$$

$$\text{Perimeter} = 25.707\dots$$

$$\boxed{25.7 \text{ cm}}$$

b)

Whole circle = πr^2

$$\text{Whole circle} = \pi \times 8^2$$

$$\text{Whole circle} = 64\pi$$

$$\text{Quarter} = 64\pi \div 4$$

$$\text{Quarter} = 16\pi$$

$$\boxed{16\pi \text{ cm}^2}$$

11 A sector of a circle has radius 7.5 cm and angle 140° .

- Work out the arc length of the sector.
- Work out the area of the sector.

Give each answer correct to 3 significant figures.

(4 marks)

A full turn is 360° . This sector is $140/360$ of the full circle, so both its arc and its area are that fraction of the full circumference and area respectively

$$\text{a) Arc length} = \left(\frac{140}{360}\right) \times 2\pi \times 7.5 = \left(\frac{7}{18}\right) \times 15\pi = 18.32\dots = 18.3 \text{ cm (3 s.f.)}$$

$$\text{b) Area} = \left(\frac{140}{360}\right) \times \pi \times 7.5^2 = \left(\frac{7}{18}\right) \times 56.25\pi = 68.72\dots = 68.7 \text{ cm}^2 \text{ (3 s.f.)}$$

12 A sector of a circle has radius 6 cm and area $15\pi \text{ cm}^2$.

Work out the angle of the sector.

(2 marks)

$$\text{Area of a sector} = \left(\frac{\text{angle}}{360}\right) \times \pi r^2$$

$$\text{The full circle has area } \pi \times 6^2 = 36\pi \text{ cm}^2$$

$$\frac{\text{angle}}{360} = 15\pi \div 36\pi = \frac{5}{12}$$

$$\text{Angle} = \frac{5}{12} \times 360 = 150^\circ$$

$$\boxed{150^\circ}$$