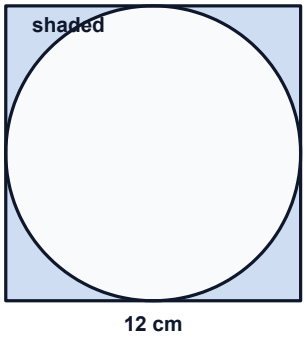
WORKSHEETFORGE ANSWER KEY

Number-Shape Practice

Diagrams, patterns and grids · Calculator allowed · 10 questions · 26 marks · seed 2026

1. **Shaded regions** **3 marks**

A circle is drawn inside a square of side 12 cm so that it touches all four sides. Work out the area of the shaded region. Give your answer in terms of π.

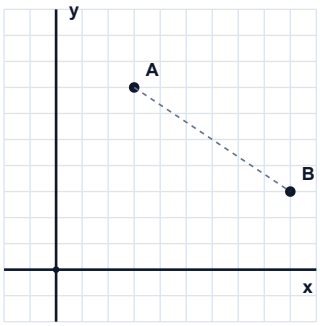


Answer: $144 - 36\pi$ cm^2

M1	Area of the square = $12^2 = 144$ cm^2
M1	Radius of the circle = $12 \div 2 = 6$ cm, so its area is 36π cm^2
A1	$144 - 36\pi$ cm^2

2. **Midpoints** **2 marks**

A is the point (3, 7) and B is the point (9, 3). Work out the coordinates of the midpoint of AB.

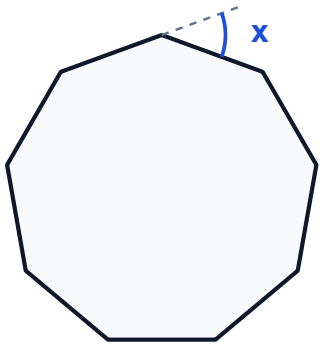


Answer: (6, 5)

M1	Add the x-coordinates and the y-coordinates, then divide each total by 2
A1	(6, 5)

3. **Angles in polygons** **2 marks**

Work out the size of an exterior angle of a regular polygon with 9 sides.



Answer: 40°

M1	Exterior angles sum to 360°: 360 ÷ 9
A1	40°

4. **Matchstick patterns** **3 marks**

A pattern of squares is made from matchsticks. Figure 1 uses 4 matchsticks, Figure 2 uses 7 and Figure 3 uses 10.

(a) How many matchsticks are used in Figure 5?

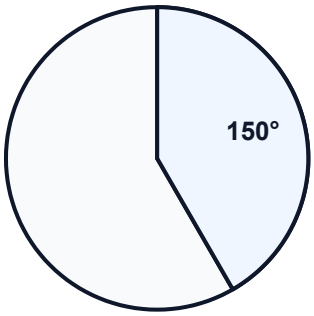
(b) Write an expression, in terms of n, for the number of matchsticks in Figure n.

Answer: (a) 16 (b) 3n + 1

M1	Each new square adds 3 matchsticks, starting from 4
A1	(a) 16
B1	(b) 3n + 1

5. **Pie charts** **2 marks**

The pie chart shows the pets owned by 84 students. The sector for a cat has an angle of 150°. Work out the number of students who own a cat.

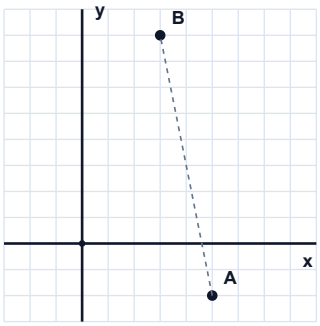


Answer: 35

M1	150/360 of 84
A1	35

6. **Midpoints** **2 marks**

A is the point (5, −2) and B is the point (3, 8). Work out the coordinates of the midpoint of AB.



Answer: (4, 3)

M1	Add the x-coordinates and the y-coordinates, then divide each total by 2
A1	(4, 3)

7. **Area on a grid** **3 marks**

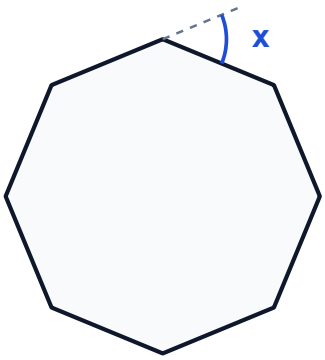
The shape is drawn on a square grid. Each small square is 1 cm by 1 cm. Work out the area of the shape.

Answer: 9 cm²

M1	Cut a triangle off one end and move it to the other end to make a rectangle
M1	Count whole squares and half squares, or calculate from the rectangle
A1	9 cm²

8. **Angles in polygons** **3 marks**

Work out the size of an interior angle of a regular polygon with 8 sides.

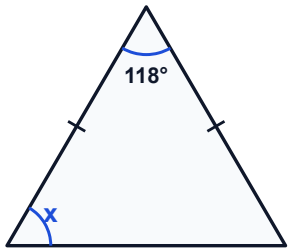


Answer: 135°

M1	Exterior angle = 360 ÷ 8 = 45°
M1	Interior angle = 180° − the exterior angle
A1	135°

9. **Angles in triangles** **3 marks**

The diagram shows an isosceles triangle. The apex angle is 118°. Work out the size of one of the two equal base angles.

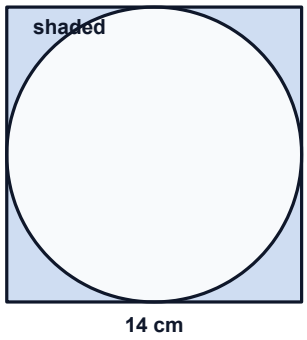


Answer: 31°

M1	Angles in a triangle sum to 180°: 180 − 118 = 62
M1	Divide by 2 for the two equal angles
A1	31°

10. **Shaded regions** **3 marks**

A circle is drawn inside a square of side 14 cm so that it touches all four sides. Work out the area of the shaded region. Give your answer in terms of π.



Answer: $196 - 49\pi$ cm^2

M1	Area of the square = 14^2 = 196 cm^2
M1	Radius of the circle = 14 ÷ 2 = 7 cm, so its area is 49π cm^2
A1	$196 - 49\pi$ cm^2