

Area of Compound Shapes

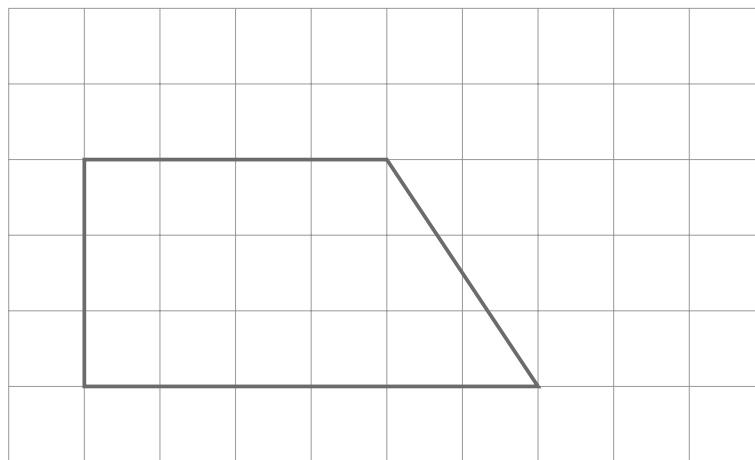
Solutions

For Pearson Edexcel GCSE Mathematics (1MA1) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (2 marks)

The diagram shows a shape drawn on a centimetre grid.



Find the area of the shape.

Split the shape into a rectangle and a triangle.

Rectangle: 4 cm by 3 cm

$$4 \times 3 = 12 \text{ cm}^2$$

Triangle: base 2 cm, height 3 cm

$$\frac{1}{2} \times 2 \times 3 = 3 \text{ cm}^2$$

$$\text{Total area: } 12 + 3 = 15 \text{ cm}^2$$

(You can also count squares: 12 whole squares, plus the half squares in the triangle making 3.)

Answer: 15 cm^2

Tip: If you count squares, don't forget the part squares along the sloping side. Two halves make one whole square.

Marks: 1 mark for 12 or 3 (or for counting squares, including the half squares). 1 mark for 15.

2 (3 marks)

All the corners are right angles.

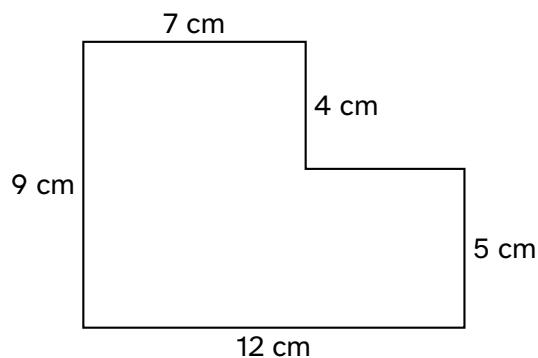


Diagram **NOT** accurately drawn

Work out the area of the shape.

Split the shape into two rectangles with a horizontal line.

Bottom rectangle: 12 cm by 5 cm

$$12 \times 5 = 60 \text{ cm}^2$$

Top rectangle: 7 cm wide and 4 cm tall

$$7 \times 4 = 28 \text{ cm}^2$$

$$\text{Total area: } 60 + 28 = 88 \text{ cm}^2$$

Check: $5 + 4 = 9$, which matches the left side ✓

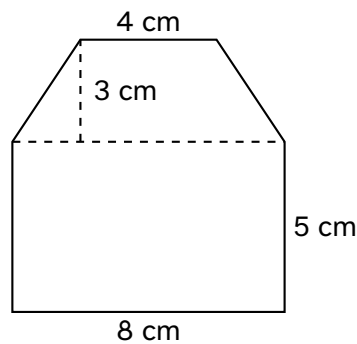
Answer: 88 cm^2

Tip: Don't multiply all the lengths together. Split the shape into rectangles and find each area separately.

Marks: 1 mark for splitting the shape into rectangles. 1 mark for both areas. 1 mark for 88.

3 (3 marks)

The shape is made from a rectangle and a trapezium.



*Diagram **NOT** accurately drawn*

Work out the area of the shape.

Split along the dashed line into a rectangle and a trapezium.

Rectangle: $8 \times 5 = 40 \text{ cm}^2$

Trapezium: parallel sides 8 cm and 4 cm, height 3 cm

$$\frac{1}{2}(8 + 4) \times 3 = \frac{1}{2} \times 12 \times 3 = 18 \text{ cm}^2$$

Total area: $40 + 18 = 58 \text{ cm}^2$

Answer: 58 cm^2

Marks: 1 mark for 40. 1 mark for 18. 1 mark for 58.

4 (3 marks)

A picture 30 cm by 20 cm is in a frame.

The outside of the frame is 40 cm by 30 cm.

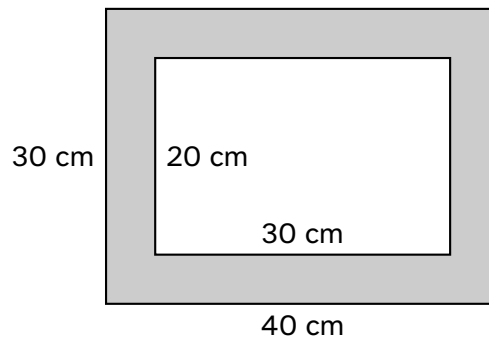


Diagram **NOT** accurately drawn

Work out the area of the frame (the shaded region).

Area of the whole frame (outside edge): $40 \times 30 = 1200 \text{ cm}^2$

Area of the picture: $30 \times 20 = 600 \text{ cm}^2$

The frame is the outside area take away the picture.

$$1200 - 600 = 600 \text{ cm}^2$$

Answer: 600 cm^2

Marks: 1 mark for 1200. 1 mark for the picture's area, 600, and subtracting it. 1 mark for the answer 600.

5 (4 marks)

The diagram shows the floor plan of a room.
All the corners are right angles.

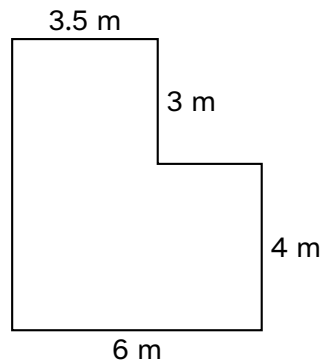


Diagram **NOT** accurately drawn

Carpet costs £18.50 per m^2

Work out the cost of carpet for the whole floor.

Split the floor into two rectangles.

Bottom rectangle: $6 \times 4 = 24 \text{ m}^2$

Top rectangle: $3.5 \times 3 = 10.5 \text{ m}^2$

Total area: $24 + 10.5 = 34.5 \text{ m}^2$

Cost: $34.5 \times 18.50 = \text{£}638.25$

Answer: £638.25

Tip: The carpet price is per m^2 , so you need the **area**. Using the perimeter is a common mistake.

Marks: 1 mark for splitting the floor. 1 mark for 34.5. 1 mark for multiplying by 18.50. 1 mark for £638.25.

6 (3 marks)

The shape is made from a rectangle and an isosceles triangle.

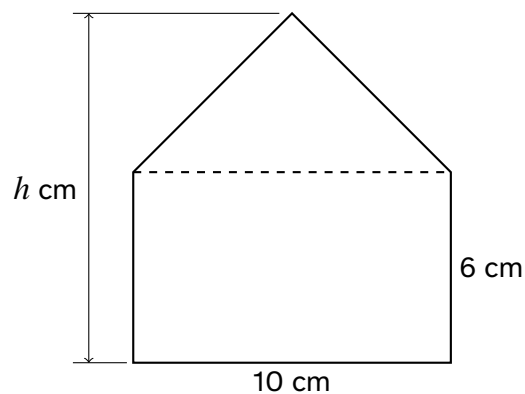


Diagram **NOT** accurately drawn

The total area of the shape is 85 cm^2

Work out the value of h .

Area of the rectangle: $10 \times 6 = 60 \text{ cm}^2$

Area of the triangle: $85 - 60 = 25 \text{ cm}^2$

The triangle's base is 10 cm, so $\frac{1}{2} \times 10 \times \text{height} = 25$

$5 \times \text{height} = 25$, so the triangle's height is 5 cm.

h is the height of the whole shape: $6 + 5 = 11$

Answer: $h = 11$

Tip: h is the height of the **whole** shape, so add the rectangle's height to the triangle's height.

Marks: 1 mark for 60 and 25. 1 mark for the triangle's height 5. 1 mark for $h = 11$.

7 (5 marks)

Three identical small rectangles fit together, with no gaps or overlaps, to make the large rectangle $ABCD$.

The perimeter of $ABCD$ is 60 cm.

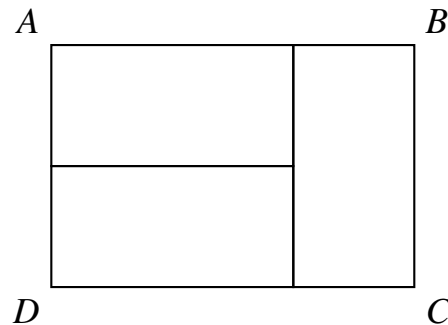


Diagram **NOT** accurately drawn

Work out the area of rectangle $ABCD$.

Let the width of one small rectangle be w cm.

On the left, two widths stack up to the same height as one length on the right.

So the length of each small rectangle is $2w$ cm.

$$AB = 2w + w = 3w \text{ and } AD = 2w$$

$$\text{Perimeter of } ABCD: 3w + 2w + 3w + 2w = 10w$$

$$10w = 60, \text{ so } w = 6$$

$$AB = 3 \times 6 = 18 \text{ cm and } AD = 2 \times 6 = 12 \text{ cm}$$

$$\text{Area of } ABCD: 18 \times 12 = 216 \text{ cm}^2$$

Answer: 216 cm^2

Tip: Use the diagram to connect the lengths: two widths make one length. Then write the sides of $ABCD$ using one letter.

Marks: 1 mark for the length = $2 \times$ the width. 1 mark for the sides $3w$ and $2w$ (or equivalent). 1 mark for $10w = 60$. 1 mark for $w = 6$. 1 mark for 216.