

WA7MMGTW1

Two-dimensional space

Core + Challenge

Area of Triangles

I can find the area of any triangle using the base and perpendicular height, and work backwards to find a missing length.

Name: _____ Date: _____ Score: _____ / 58

Key idea

Every triangle is **half** of a rectangle (or parallelogram) with the same base and height: $A = \frac{1}{2} \times b \times h$

The **height** is **perpendicular** (at 90°) to the base. It is not the sloping side. For an obtuse triangle it may fall **outside** the triangle.

Right-angled triangle: the two shorter sides (legs) are the base and height. $\frac{1}{2} \times 6 \times 8 = 24 \text{ cm}^2$

Work backwards: $h = 2 \times A \div b$. Area 24 cm^2 , base $8 \text{ cm} \rightarrow h = 48 \div 8 = 6 \text{ cm}$.

A

Fluency *practise the skill*

/ 16 marks

Find each area (Q1–12, Q15–16) or missing length (Q13–14). 1 mark each.

1. $b = 10 \text{ cm}$, $h = 6 \text{ cm}$ _____

9. $b = 2.5 \text{ m}$, $h = 4 \text{ m}$ _____

2. $b = 8 \text{ cm}$, $h = 5 \text{ cm}$ _____

10. $b = 13 \text{ cm}$, $h = 10 \text{ cm}$ _____

3. $b = 12 \text{ cm}$, $h = 7 \text{ cm}$ _____

11. Right-angled: legs 6 cm , 8 cm _____

4. $b = 9 \text{ cm}$, $h = 4 \text{ cm}$ _____

12. Right-angled: legs 5 m , 12 m _____

5. $b = 15 \text{ cm}$, $h = 8 \text{ cm}$ _____

13. Area 24 cm^2 , $b = 8 \text{ cm}$: h _____

6. $b = 7 \text{ cm}$, $h = 3 \text{ cm}$ _____

14. Area 35 cm^2 , $h = 7 \text{ cm}$: b _____

7. $b = 20 \text{ cm}$, $h = 11 \text{ cm}$ _____

15. $b = 15 \text{ mm}$, $h = 16 \text{ mm}$ _____

8. $b = 6.4 \text{ cm}$, $h = 5 \text{ cm}$ _____

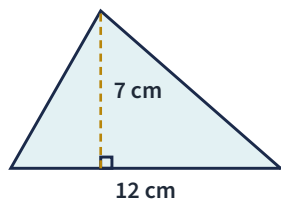
16. $b = 1.2 \text{ m}$, $h = 0.5 \text{ m}$ _____

B**Core** *apply the skill to problems*

/ 22 marks

- 1 Find the area of this triangle.

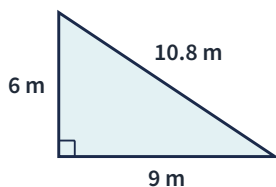
[2 marks]



Answer: _____

- 2 Find the area of this right-angled triangle.

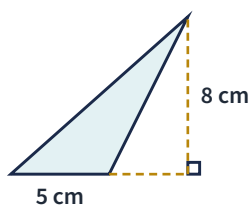
[2 marks]



Answer: _____

- 3 Find the area of this obtuse-angled triangle. The height is measured outside the triangle.

[2 marks]



Answer: _____

- 4 A triangular sail has a base of 3 m and a perpendicular height of 4.2 m. Find its area.

[2 marks]

Answer: _____

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- 5 A triangular garden bed has an area of 18 m^2 and a base of 6 m. Find its perpendicular height. [2 marks]

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Answer: _____

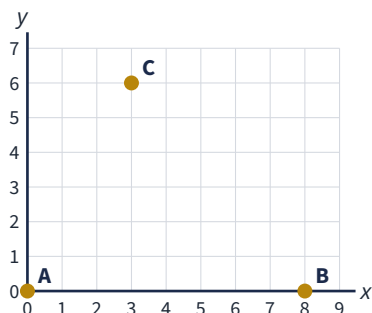
- 6 A triangular pennant has a base of 40 cm and a height of 25 cm. How much fabric is needed for 12 pennants? Give your answer in cm^2 and m^2 . [3 marks]

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Answer: _____

- 7 Plot A(0, 0), B(8, 0) and C(3, 6) and join them. Find the area of triangle ABC. [2 marks]



Answer: _____

- 8 The triangular gable end of a roof has a base of 9 m and a height of 2.8 m. One litre of paint covers 5 m^2 . How many 1-litre tins are needed? [3 marks]

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Answer: _____

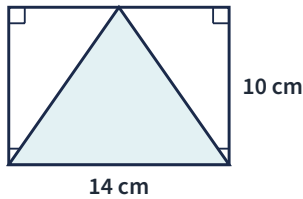
- 9 A square of side 10 cm is cut along one diagonal. What is the area of each triangle? [2 marks]

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Answer: _____

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- 10 The shaded triangle is drawn inside a $14\text{ cm} \times 10\text{ cm}$ rectangle, with its top vertex on the top edge. Find the shaded area and the unshaded area. [2 marks]



Answer: _____

C Reasoning *explain, justify and check*

/ 9 marks

- 1 Use a diagram to explain why the area of a triangle is half of base $\times$ height. [2 marks]
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- 2 For Core Q2, Sam calculated $\frac{1}{2} \times 9 \times 10.8$. Explain his mistake. [2 marks]
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- 3 Two triangles have the same base and their top vertices lie on the same line parallel to the base. Explain why they have the same area. [2 marks]
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- 4 A triangle's base is doubled and its height is halved. What happens to the area? Show an example. [3 marks]
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D**Challenge** *multi-step and problem-solving*

/ 11 marks

- 1 A triangle has an area of 36 cm^2 . Its height is twice its base. Find the base and the height. [3 marks]

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Answer: _____

- 2 A right-angled triangle has sides 6 cm, 8 cm and 10 cm. Find the perpendicular height from the right angle to the 10 cm side. [3 marks]

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Answer: _____

- 3 Find the area of the triangle with vertices (1, 1), (7, 3) and (3, 6). (Hint: draw a rectangle around it.) [3 marks]

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Answer: _____

- 4 A triangular block of land has a base of 40 m and a perpendicular height of 25 m. Land sells for \$350 per m^2 . Find the price of the block. [2 marks]

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Answer: _____

How did I go?

Fluency ___ / 16 Core ___ / 22 Reasoning ___ / 9 Challenge ___ / 11 **Total ___ / 58**

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