FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

G16: Area and volume

Reason with area and volume formulae for 2D shapes and prisms

20 marks · 25 minutes · Non-calculator

1) Explain why the area of a triangle is $\frac{1}{2} \times$ base $\times$ height.

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[Question 1: 2 marks]

2) Show how splitting a trapezium into two triangles gives the formula $\frac{1}{2}(a + b)h$.

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[Question 2: 3 marks]

3) Kim uses the slanted side of a parallelogram as its height. Explain her mistake.

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[Question 3: 2 marks]

4) Show that a cylinder with radius 2 cm and height 5 cm has volume 20π cm^3.

[Question 4: 2 marks]

5) Explain why the volume of a prism is area of cross-section $\times$ length.

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[Question 5: 2 marks]

6) The length of a prism is doubled. Explain what happens to its volume.

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[Question 6: 2 marks]

7) Show that a triangle with base 8 cm and height 5 cm has the same area as a 4 cm by 5 cm rectangle.

[Question 7: 2 marks]

8) A cuboid has volume 60 cm^3. Two of its edges are 3 cm and 4 cm. Show that the third is 5 cm.

[Question 8: 1 marks]

9) Which holds more: a cube with side 4 cm or a 2 cm by 4 cm by 9 cm cuboid? Show your working.

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[Question 9: 2 marks]

10) Explain why area units are squared and volume units are cubed.

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[Question 10: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Explanation	A triangle is half of a rectangle or parallelogram (C2).
2	Shown	$\frac{1}{2}ah$ and $\frac{1}{2}bh$ (M1, M1); sum (C1).
3	Explanation	Height must be perpendicular to the base (C2).
4	Shown	$\pi \times 4 \times 5$ (M1); C1.
5	Explanation	Layers of the cross-section stacked along the length (C2).
6	Doubles	Area unchanged, length doubled (C2).
7	Shown	Both $20\,\text{cm}^2$ (M1); C1.
8	Shown	$60 \div 12$ (C1).
9	Cuboid	64 and 72 (M1); C1.
10	Explanation	Area: two lengths multiplied (C1); volume: three (C1).