FOUNDATION & HIGHER

HIGHER EXTENDS

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

G19: Similarity

Reason and prove with similar shapes

20 marks · 25 minutes · Non-calculator

1) Explain why two triangles with the same angles are similar.

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[Question 1: 2 marks]

2) Show that triangles with sides 3, 4, 5 and 6, 8, 10 are similar.

[Question 2: 2 marks]

3) Kim says a shape enlarged by scale factor 3 has 3 times the area. Explain her mistake.

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[Question 3: 2 marks]

4) Explain why all squares are similar but not all rectangles are.

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[Question 4: 2 marks]

5) Show that similar solids with lengths in the ratio 1 : 4 have volumes in the ratio 1 : 64

[Question 5: 1 marks]

6) In triangle ADE, B is on AD and C is on AE, with BC parallel to DE. Prove that triangles ABC and ADE are similar.

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[Question 6: 3 marks]

7) Two similar shapes have areas 16 cm^2 and 36 cm^2. Show that their lengths are in the ratio 2 : 3

[Question 7: 2 marks]

8) Two similar cones have heights 6 cm and 9 cm. The smaller has volume 40 cm^3. Show that the larger has volume 135 cm^3.

[Question 8: 2 marks]

9) Are all isosceles triangles similar? Explain.

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[Question 9: 2 marks]

10) Explain why congruent shapes are also similar.

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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	Same shape, sides in the same ratio (C2).
2	Shown	All sides $\times 2$ (M1); C1.
3	9 times	Area factor is 3^2 (C1); B1.
4	Explanation	Squares all have the same proportions (C1); rectangles can have different length:width ratios (C1).
5	Shown	$4^3 = 64$ (C1).
6	Proof	Angle A common (M1); corresponding angles equal (M1); AA so similar (C1).
7	Shown	Area ratio 4 : 9 (M1); square roots (C1).
8	Shown	$1.5^3 = 3.375$ (M1); 40×3.375 (C1).
9	No	Apex angles can differ (C2).
10	Explanation	Scale factor 1 (C2).