FOUNDATION & HIGHER

HIGHER EXTENDS

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

G19: Similarity

Solve problems using similar shapes

20 marks · 25 minutes · Non-calculator

1) A cone of volume 270 cm^3 and height 12 cm has a smaller similar cone of height 8 cm cut off from its top. Find the volume of the remaining frustum.

..... cm^3

[Question 1: 4 marks]

2) A 12 cm by 8 cm photo is enlarged to an area of 216 cm^2. Find the dimensions of the enlargement.

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[Question 2: 3 marks]

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3) Two similar jugs hold 1 litre and 3.375 litres. The smaller jug is 12 cm tall. How tall is the larger jug?

..... cm

[Question 3: 3 marks]

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4) In triangle ABC, D is on AB and E is on AC with DE parallel to BC. $AD = 4\,\text{cm}$, $DB = 6\,\text{cm}$ and $DE = 5\,\text{cm}$. Find BC.

..... cm

[Question 4: 2 marks]

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5) Two similar triangles have areas $18\,\text{cm}^2$ and $50\,\text{cm}^2$. A side of the smaller triangle is $6\,\text{cm}$. Find the corresponding side of the larger.

..... cm

[Question 5: 3 marks]

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6) A model car is made to a scale of 1 : 25. The real car has a surface area of 15 m^2. Find the model's surface area in cm^2.

..... cm^2

[Question 6: 3 marks]

7) Two similar solids have surface areas in the ratio 4 : 9. The smaller has a volume of 40 cm^3. Find the volume of the larger.

..... cm^3

[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	190	Scale factor $\frac{2}{3}$ (P1); small volume $270 \times \frac{8}{27} = 80$ (P1, P1); A1.
2	18 cm by 12 cm	Area factor 2.25 (P1); scale factor 1.5 (P1); A1.
3	18	Volume factor 3.375 so length factor 1.5 (P1, P1); A1.
4	12.5	Scale factor 2.5 (P1); A1.
5	10	Area factor $\frac{25}{9}$ (P1); length factor $\frac{5}{3}$ (P1); A1.
6	240	$15\,m^2 = 150\,000\,cm^2$ (P1); $\div 625$ (P1); A1.
7	135	Length factor 1.5 (P1); A1.