3.3 Similarity: Length, Area and Volume Scale Factors: 30-minute Pack

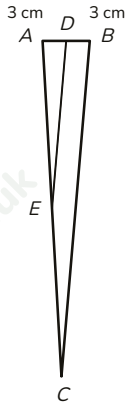
Total Marks

EDEXCEL 4MA1 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer in full sentences for any question that asks to 'Show that' or to 'Explain'. Spend about 30 minutes on the paper.

1 In triangle ABC, the point D lies on AB and the point E lies on AC, with DE parallel to BC. AD = 3 cm and DB = 3 cm. The area of triangle ADE is 32 cm².
Find the area of the trapezium DBCE.



(Total for Question 1 is 4 marks)

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2 Two similar bottles have volumes 16 cm³ and 250 cm³.
Work out the ratio of their surface areas. Give your answer in the form 1 : n or in its simplest whole-number form.

(Total for Question 2 is 3 marks)

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3 Two similar model boats have heights 5 cm and 3 cm. The surface area of the larger one is 12 cm^2.
Find the surface area of the smaller one.

(Total for Question 3 is 3 marks)

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4 Two similar model boats have volumes 3 cm^3 and 1536 cm^3. The first has a height of 9 cm.
Find the height of the second.

(Total for Question 4 is 4 marks)

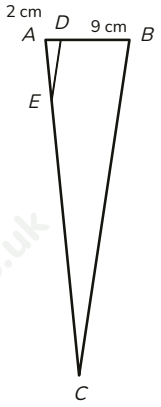
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5 Two triangles are similar. The first has a side of length 10 cm that corresponds to a side of length 9 cm on the second. Another side of the first triangle is 8 cm long.
Find the length of the corresponding side of the second triangle.

(Total for Question 5 is 3 marks)

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6 In triangle ABC, the point D lies on AB and the point E lies on AC, with DE parallel to BC. AD = 2 cm and DB = 9 cm. The area of triangle ADE is 8 cm².
Find the area of the trapezium DBCE.



(Total for Question 6 is 4 marks)

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Mark scheme · 3.3 Similarity: Length, Area and Volume Scale Factors: 30-minute Pack

Question 1

triangles ADE and ABC are similar	**B1**
area scale factor = $(6/3)^2 = 4$	**M1**
area of triangle ABC = 32 x 4 = 128	**M1**
trapezium = 128 - 32 = 96 cm²	**A1**

Answer: 96 cm^2

Question 2

volume ratio = 8:125	**M1**
length ratio = 2:5 (cube root of each)	**M1**
area ratio = 4:25 (squares of the length ratio)	**A1**

Answer: 4 : 25

Question 3

length scale factor = 3/5 = 3/5	**M1**
surface area scale factor = $(3/5)^2 = 9/25$	**M1**
surface area = 4.32 cm²	**A1**

Answer: 4.32 cm^2

Question 4

volume ratio = 1536/3 = 512	**M1**
length scale factor = cube root of 512 = 8	**M1**
9 x 8	**M1**
72 cm	**A1**

Answer: 72 cm

Question 5

scale factor = 9/10 = 9/10	**M1**
8 x 9/10	**M1**
7.2 cm	**A1**

Answer: 7.2 cm

Question 6

triangles ADE and ABC are similar	**B1**
area scale factor = $(11/2)^2 = 121/4$	**M1**
area of triangle ABC = 8 x 121/4 = 242	**M1**
trapezium = 242 - 8 = 234 cm²	**A1**

Answer: 234 cm^2

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