HIGHER

6.8 Similar Shapes (Area and Volume): 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Two mathematically similar solids have a linear scale factor of 2 from the smaller solid to the larger solid. The volume of the smaller solid is 20 cm³. Work out the volume of the larger solid.

(Total for Question 1 is 2 marks)

2 Two mathematically similar solids have a linear scale factor of 4 from the smaller solid to the larger solid. The volume of the smaller solid is 3 cm³. Work out the volume of the larger solid.

(Total for Question 2 is 2 marks)

© Revision Library | revisionlibrary.co.uk

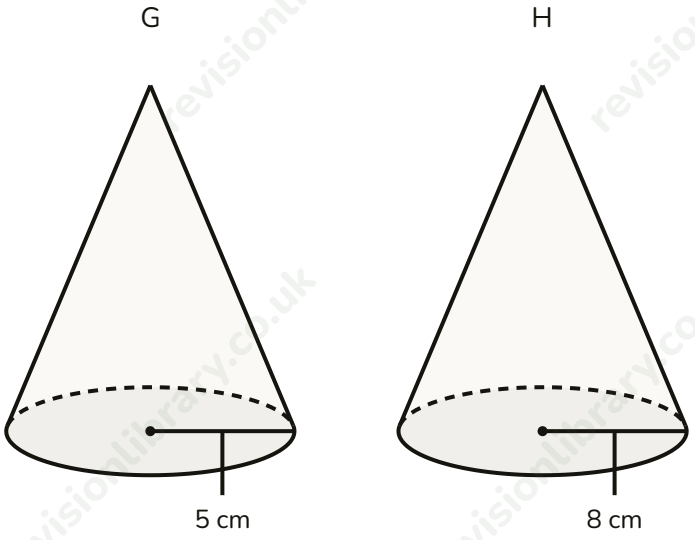
3 Two mathematically similar solids have volumes of 8 cm^3 and 64 cm^3. Find the linear scale factor from the smaller solid to the larger solid.

(Total for Question 3 is 2 marks)

---

4 Cone G and cone H are mathematically similar. The base radius of cone G is 5 cm and the base radius of cone H is 8 cm. The total surface area of cone G is 90pi cm^2 and the volume of cone G is 100pi cm^3.

Diagram NOT accurately drawn



(a) Work out the surface area of cone H. **(3)**

(b) Work out the volume of cone H. **(2)**

(Total for Question 4 is 5 marks)

© Revision Library | revisionlibrary.co.uk

5 A model car is built using a scale of 1:24 compared with the real car (every linear dimension of the real car is 24 times the corresponding dimension of the model). The model car has a volume of 90 cm^3 and a surface area of 220 cm^2.

(a) Work out the volume of the real car. Give your answer in cm^3, in standard form correct to 3 significant figures. **(3)**

.....

(b) Work out the surface area of the real car in m^2, correct to 3 significant figures. **(3)**

.....

(Total for Question 5 is 6 marks)

---

6 Two solid bronze statues are mathematically similar. The height of the smaller statue is 30 cm and its mass is 12 kg. The height of the larger statue is 45 cm. The statues are made from the same bronze, so mass is proportional to volume. Work out the mass of the larger statue.

(Total for Question 6 is 4 marks)

© Revision Library | revisionlibrary.co.uk

7 Shape P and shape Q are mathematically similar. The linear scale factor from shape P to shape Q is 4. The area of shape P is 15 cm^2.

(a) Work out the area scale factor from shape P to shape Q. **(1)**

.....

(b) Work out the area of shape Q. **(2)**

.....

(Total for Question 7 is 3 marks)

---

8 Two mathematically similar triangles have corresponding sides in the ratio 3:7. Find the ratio of their areas.

(Total for Question 8 is 2 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 6.8 Similar Shapes (Area and Volume): 30-minute Pack

Question 1

volume scale factor = 2^3 (=8) **M1**

160 cao, units cm^3 **A1**

Answer: 160 cm^3

Question 2

volume scale factor = 4^3 (=64) **M1**

192 cao, units cm^3 **A1**

Answer: 192 cm^3

Question 3

volume ratio = 64/8 (=8) oe **M1**

2 cao **A1**

Answer: 2

Question 4

(a) linear scale factor = 8/5 (=1.6) **M1**

(a) area scale factor = 1.6^2 (=2.56); 90pi x 2.56 **M1**

(a) 230.4pi cm^2 oe, awrt 724 cm^2 **A1**

(a) Answer: 230.4pi cm^2

(b) volume scale factor = 1.6^3 (=4.096); 100pi x 4.096 **M1**

(b) 409.6pi cm^3 oe, awrt 1290 cm^3 **A1**

(b) Answer: 409.6pi cm^3

Question 5

(a) volume scale factor = 24^3 (=13824) **M1**

(a) 90 x 13824 **M1**

(a) 1.24 x 10^6 cm^3 awrt (1244160 cm^3) **A1**

(a) Answer: 1.24 x 10^6 cm^3 (1244160 cm^3)

(b) area scale factor = 24^2 (=576) **M1**

(b) 220 x 576 (=126720 cm^2), converted by dividing by 10000 to give m^2 **M1**

(b) 12.7 m^2 awrt (12.672 m^2) **A1**

(b) Answer: 12.7 m^2 (12.672 m^2)

Question 6

linear scale factor = 45/30 (=1.5) **M1**

volume (mass) scale factor = 1.5^3 (=3.375) **M1**

12 x 3.375 **M1**

40.5 (kg) cao **A1**

Answer: 40.5 kg

Question 7

(a) 16 **B1**

(a) Answer: 16

(b) 15 x their (a) (=15 x 16) **M1**

(b) 240 cao, units cm^2 **A1**

(b) Answer: 240 cm^2

Question 8

3^2 : 7^2 set up **M1**

9:49 cao oe **A1**

Answer: 9:49

© Revision Library | revisionlibrary.co.uk