4.13F Volume of a Prism: Foundation Tier Practice

Total Marks

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 50 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A cuboid has length 8 cm, width 3 cm and height 2 cm. Work out its volume.

(Total for Question 1 is 1 mark)

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2 A prism has a triangular cross-section with base 5 cm and height 4 cm. The prism length is 10 cm. Work out the volume of the prism. Give your answer in cm^3.

(Total for Question 2 is 1 mark)

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3 A cuboid has volume 360 cm^3. Its length is 10 cm and its width is 6 cm. Work out the height of the cuboid.

(Total for Question 3 is 2 marks)

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4 A triangular prism has a triangular cross-section with base 6 cm and height 3 cm. The prism is 12 cm long. Work out the volume of the prism in cm^3.

(Total for Question 4 is 2 marks)

5 A cuboid box is 25 cm long, 8 cm wide and 4 cm high. Calculate the volume of the box in litres. (1 litre = 1000 cm^3)

(Total for Question 5 is 3 marks)

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6 Priya pours water into a triangular prism-shaped tray. The triangular cross-section has base 10 cm and height 4 cm. The tray is 20 cm long. How many full 250 cm^3 cups of water can Priya fill from the tray? Show working.

(Total for Question 6 is 3 marks)

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7 A metal beam is a prism with a rectangular cross-section measuring 3 cm by 5 cm. The beam is 2.4 m long. Work out the volume of the beam in cubic centimetres. Give your answer correct to 3 significant figures.

(Total for Question 7 is 4 marks)

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8 Callum is designing a sailboat hull model. The hull is a triangular prism with cross-section base 18 cm and height 6 cm. The hull length is 45 cm. Calculate the hull volume in litres. Give your answer to 2 decimal places. (1 litre = 1000 cm^3)

(Total for Question 8 is 4 marks)

9 A prism has a trapezoidal cross-section. The parallel sides of the trapezium are 6 cm and 10 cm, the height of the trapezium is 4 cm, and the prism length is 15 cm. Work out the volume of the prism in cm^3. (Area of trapezium = 1/2 x (sum of parallel sides) x height)

(Total for Question 9 is 3 marks)

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10 A rectangular aquarium is 60 cm long, 30 cm wide and 40 cm high. Water is filled to a depth of 25 cm. Calculate the volume of water in litres. Give your answer to the nearest litre. (1 litre = 1000 cm^3)

(Total for Question 10 is 5 marks)

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11 A teacher makes a model prism by cutting a triangular cross-section from card. The triangle has sides 9 cm, 12 cm and 15 cm and the prism length is 10 cm. The triangle is right-angled. Work out the volume of the prism in cm^3.

(Total for Question 11 is 4 marks)

12 Oliwia has a storage unit in the shape of a prism. The cross-section is a rectangle 1.2 m by 0.8 m. The depth of the unit is 2.5 m. Calculate the volume of the storage unit in cubic metres and in litres. Give answers correct to 2 decimal places where appropriate. (1 cubic metre = 1000 litres)

(a) Calculate the volume in cubic metres. Give your answer to 2 decimal places. **(4)**

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(b) Convert your answer to litres. Give your answer to the nearest litre. **(4)**

(Total for Question 12 is 8 marks)

Mark scheme · 4.13F Volume of a Prism: Foundation Tier Practice

Question 1

- **B1** 48 cm^3 cao
- **Answer: 48 cm^3**

Question 2

- **B1** 100 cm^3 cao
- **Answer: 100 cm^3**

Question 3

- **M1** correct method to divide volume by area of base, e.g. 360 / (10 x 6) or 360 / 60
- **A1** 6 cm cao
- **Answer: 6 cm**

Question 4

- **M1** area of triangle = 1/2 x base x height = 1/2 x 6 x 3 = 9 cm^2
- **A1** 108 cm^3 cao (9 x 12)
- **Answer: 108 cm^3**

Question 5

- **M1** find volume in cm^3: 25 x 8 x 4 = 800 cm^3
- **A1** convert to litres: 800 / 1000 = 0.8
- **A1** 0.8 litres cao
- **Answer: 0.8 litres**

Question 6

- **M1** find volume of tray: area triangle = 1/2 x 10 x 4 = 20 cm^2, volume = 20 x 20 = 400 cm^3
- **M1** divide by 250 to find number of full cups: 400 / 250 = 1.6
- **A1** 1 full cup cao
- **Answer: 1 full cup**

Question 7

- **M1** convert length to cm: 2.4 m = 240 cm and calculate cross-section area 3 x 5 = 15 cm^2
- **M1** volume = 15 x 240 = 3600 cm^3
- **A1** 3600 cm^3 cao
- **A1** 3600 to 3 s.f. = 3.60 x 10^3 or 3600 (accept 3600 as given) oe
- **Answer: 3600 cm^3**

Question 8

- **M1** area triangle = 1/2 x 18 x 6 = 54 cm^2
- **M1** volume = 54 x 45 = 2430 cm^3
- **M1** convert to litres: 2430 / 1000 = 2.43
- **A1** 2.43 litres cao to 2 dp
- **Answer: 2.43 litres**

Question 9

- **M1** area trapezium = 1/2 x (6 + 10) x 4 = 32 cm^2
- **M1** volume = 32 x 15 = 480 cm^3
- **A1** 480 cm^3 cao
- **Answer: 480 cm^3**

Question 10

- **M1** find volume in cm^3: 60 x 30 x 25 = 45000 cm^3
- **M1** convert to litres: 45000 / 1000 = 45 litres
- **A1** 45 litres cao
- **M1** rounding check (nearest litre) - answer already whole number
- **A1** 45 litres cao
- **Answer: 45 litres**

Question 11

- **M1** identify right-angled triangle: sides 9,12,15 with right angle between 9 and 12 so area = 1/2 x 9 x 12 = 54 cm^2
- **M1** volume = 54 x 10 = 540 cm^3
- **A1** 540 cm^3 cao
- **A1** final answer stated with units
- **Answer: 540 cm^3**

Question 12

- (a) **M1** area of cross-section = 1.2 x 0.8 = 0.96 m^2
- (a) **M1** volume = 0.96 x 2.5 = 2.4 m^3
- (a) **A1** 2.40 m^3 cao to 2 dp
- (a) **A1** units given m^3
- **(a) Answer: 2.40 m^3**
- (b) **M1** use 1 m^3 = 1000 litres: 2.4 x 1000 = 2400 litres
- (b) **A1** 2400 litres cao
- (b) **M1** rounding to nearest litre (answer already whole number)
- (b) **A1** 2400 litres cao
- **(b) Answer: 2400 litres**