

WA7MMGTH2

Three-dimensional space

Core + Challenge

Volume of Composite Prisms — Marking Key

I can find the volume of composite prisms by splitting them into rectangular prisms or using cross-section area $\times$ length.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 22 Section C Reasoning: 9 Section D Challenge: 11 **Total: 58**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A

Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	120 cm ³	20 $\times$ 6
2	140 cm ³	35 $\times$ 4
3	100 cm ³	12.5 $\times$ 8
4	28 cm ³	12 + 16
5	48 cm ³	40 + 8
6	750 cm ³	1000 – 250
7	90 cm ³	18 $\times$ 5
8	120 m ³	48 $\times$ 2.5
9	8 cm	200 $\div$ 25
10	12 cm ²	144 $\div$ 12
11	24 cm ³	3 $\times$ 8
12	24 cm ³	12 + 8 + 4
13	108 cm ³	120 – 12
14	30 cm ³	7.5 $\times$ 4
15	243 cm ³	216 + 27
16	180 cm ³	120 + 60

B

Core *answers, working and marks*

/ 22 marks

Q	Answer	Working / sample response	Marks
1	72 cm ³	Cross-section: $6 \times 2 + 2 \times 3 = 18$ $18 \times 4 = 72$ <i>1 mark: 18</i> <i>1 mark: 72 cm³</i>	2
2	270 000 cm ³ = 0.27 m ³	Cross-section: $30 \times 15 \times (1 + 2 + 3) = 2700 \text{ cm}^2$ $\times 100 \text{ cm} = 270\,000 \text{ cm}^3$ $\div 1\,000\,000 = 0.27 \text{ m}^3$ <i>1 mark: 2700</i> <i>1 mark: 270 000</i> <i>1 mark: 0.27</i>	3
3	240 cm ³	Cross-section: $8 \times 2 + 2 \times 4 = 24$ $24 \times 10 = 240$ <i>1 mark each</i>	2
4	384 cm ³	$480 - 4 \times 4 \times 6 = 480 - 96 = 384$ <i>1 mark: 96</i> <i>1 mark: 384</i>	2
5	1440 m ³	$1200 + 240 = 1440$ <i>1 mark each</i>	2
6	200 000 L	$50 + 150 = 200 \text{ m}^3$ $200 \times 1000 = 200\,000 \text{ L}$ <i>1 mark: 50 and 150</i> <i>1 mark: 200 m³</i> <i>1 mark: litres</i>	3
7	15 cm	$675 \div 45 = 15$ <i>1 mark each</i>	2
8	132 cm ³	$60 - 16 = 44 \text{ cm}^2$ $44 \times 3 = 132$ <i>1 mark: 44</i> <i>1 mark: 132</i>	2
9	0.216 m ³	$1.2 \times 0.6 \times 0.2 = 0.144$ $1.2 \times 0.3 \times 0.2 = 0.072$; total 0.216 <i>1 mark: parts</i> <i>1 mark: total</i>	2
10	230 cm ³	$35 - 12 = 23 \text{ cm}^2$ $23 \times 10 = 230$ <i>1 mark: 23</i> <i>1 mark: 230</i>	2

C

Reasoning sample answers and marking criteria

/ 9 marks

Q	Answer	Working / sample response	Marks
1	Both 72 cm ³	Split: $6 \times 2 \times 4 + 2 \times 3 \times 4 = 48 + 24 = 72$ Cross-section: $18 \times 4 = 72$ 1 mark: split 1 mark: cross-section 1 mark: agree	3
2	Every slice must be identical	The formula stacks identical slices; if the shape changes, the slices are not all the same area. 2 marks	2
3	Counted the corner twice	The 2×2 corner is in both rectangles; the top part is only 2×3 . 1 mark: overlap 1 mark: correct 18	2
4	It doubles	The cross-section is unchanged and the length doubles, so $V = \text{area} \times \text{length}$ doubles. 1 mark each	2

D

Challenge solutions and marking criteria

/ 11 marks

Q	Answer	Working / sample response	Marks
1	512 cm ³ ; $\frac{1}{9}$	$576 - 64 = 512$ $\frac{64}{576} = \frac{1}{9}$ 1 mark: 576 1 mark: 512 1 mark: $\frac{1}{9}$	3
2	1000 L	$0.4 \times 2.5 = 1 \text{ m}^3 = 1000 \text{ L}$ 1 mark each	2
3	0.405 m ³	Cross-section: $25 \times 18 \times (1 + 2 + 3 + 4) = 4500 \text{ cm}^2$ $4500 \times 90 = 405\,000 \text{ cm}^3 = 0.405 \text{ m}^3$ 1 mark: 4500 1 mark: 405 000 1 mark: 0.405	3
4	72 cm ³ ; $2 \times 2 \times 2 = 8$	$8 + 64 = 72$ Each of the three dimensions doubles: $2 \times 2 \times 2 = 8$ 1 mark: 72 2 marks: explanation	3