

WA8MMGTW1

Two-dimensional space and structures

Core + Challenge

Area of Parallelograms and Trapeziums — Marking Key

I can find the area of parallelograms and trapeziums using the perpendicular height, and work backwards to missing lengths.

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: 23 Section C Reasoning: 9 Section D Challenge: 11 **Total: 59**

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	40 cm ²	$8 \times 5 = 40 \text{ cm}^2$
2	84 m ²	$12 \times 7 = 84 \text{ m}^2$
3	26 cm ²	$6.5 \times 4 = 26 \text{ cm}^2$
4	3.6 m ²	$2.4 \times 1.5 = 3.6 \text{ m}^2$
5	32 cm ²	$\frac{1}{2} \times 16 \times 4 = 32 \text{ cm}^2$
6	30 m ²	$\frac{1}{2} \times 12 \times 5 = 30 \text{ m}^2$
7	57 cm ²	$\frac{1}{2} \times 19 \times 6 = 57 \text{ cm}^2$
8	18 mm ²	$\frac{1}{2} \times 12 \times 3 = 18 \text{ mm}^2$
9	5 cm	$60 \div 12 = 5 \text{ cm}$
10	6 m	$54 \div 9 = 6 \text{ m}$
11	7 cm	$2 \times 70 \div 20 = 7 \text{ cm}$
12	18 m	$2 \times 36 \div 4 = 18 \text{ m}$
13	11 cm	$2 \times 32 \div 4 = 16; 16 - 5 = 11 \text{ cm}$
14	120 mm ²	$15 \times 8 = 120 \text{ mm}^2$
15	40 m ²	$\frac{1}{2} \times 8 \times 10 = 40 \text{ m}^2$
16	240 cm ²	$20 \times 12 \text{ (the slant side is not used)} = 240 \text{ cm}^2$

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B

Core answers, working and marks

/ 23 marks

Q	Answer	Working / sample response	Marks
1	A = 66 cm ² ; P = 36 cm	$A = 11 \times 6 = 66$ (use the perpendicular height, not 7) $P = 2 \times (11 + 7) = 36$ 1 mark: area 1 mark: perimeter	2
2	55 m ²	$\frac{1}{2} \times (8 + 14) \times 5 = \frac{1}{2} \times 22 \times 5 = 55$ 1 mark: working 1 mark: 55 m ²	2
3	\$1350	$A = 7.5 \times 4 = 30 \text{ m}^2$ $30 \times 45 = 1350$ 1 mark: area 1 mark: cost	2
4	672 m ²	$\frac{1}{2} \times (18 + 24) \times 32 = \frac{1}{2} \times 42 \times 32 = 672$ 1 mark: correct substitution 1 mark: 672 m ²	2
5	7 cm	$h = A \div b = 84 \div 12 = 7$ 1 mark: divide 1 mark: 7 cm	2
6	14 m	$a + b = 2 \times 99 \div 9 = 22$ $b = 22 - 8 = 14$ Check: $\frac{1}{2} \times 22 \times 9 = 99$ 1 mark: $2A \div h$ 1 mark: 22 1 mark: 14 m	3
7	A = 128 cm ² ; P = 52 cm	$A = \frac{1}{2} \times (10 + 22) \times 8 = 128$ $P = 10 + 22 + 10 + 10 = 52$ 1 mark each	2
8	75 m ²	Rectangle: $12 \times 4 = 48$ Trapezium: $\frac{1}{2} \times (6 + 12) \times 3 = 27$ Total: $48 + 27 = 75$ 1 mark: rectangle 1 mark: trapezium 1 mark: 75 m ²	3
9	108 cm ²	$15 \times 8 - 4 \times 3 = 120 - 12 = 108$ 1 mark: 120 and 12 1 mark: 108 cm ²	2

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Q	Answer	Working / sample response	Marks
10	3 tins	$A = \frac{1}{2} \times (3.2 + 4.8) \times 2.5 = 10 \text{ m}^2$ Two coats: 20 m^2 $20 \div 8 = 2.5$, so buy 3 tins <i>1 mark: 10 m^2</i> <i>1 mark: 20 m^2</i> <i>1 mark: round up to 3</i>	3

C Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	Cut and move a triangle	Cut the right-angled triangle off one end (along the height) and slide it to the other end. The pieces form a rectangle b long and h high, so $A = b \times h$. <i>1 mark: sketch of cut and move</i> <i>1 mark: rectangle b by h</i>	2
2	50 cm^2	He used the slant side. The height must be perpendicular to the base. $A = 10 \times 5 = 50 \text{ cm}^2$ <i>1 mark: error</i> <i>1 mark: 50 cm^2</i>	2
3	Half of a parallelogram with base $a + b$	The second copy is turned upside down, so the two copies make a parallelogram. Its base is $b + a$ and its height is h , so its area is $(a + b)h$. One trapezium is half of it: $A = \frac{1}{2}(a + b)h$. <i>1 mark: parallelogram</i> <i>1 mark: base $a + b$</i> <i>1 mark: halve</i>	3
4	False (unless the parallelogram is a rectangle)	A slanted parallelogram's height is shorter than its slant side, so $b \times h$ is smaller than the rectangle's area. e.g. sides 10 cm and 6 cm : rectangle 60 cm^2 , but with $h = 5 \text{ cm}$ the parallelogram is 50 cm^2 . <i>1 mark: false</i> <i>1 mark: reason or example</i>	2

D Challenge *solutions and marking criteria*

/ 11 marks

Q	Answer	Working / sample response	Marks
1	8 cm and 12 cm	$a + b = 2 \times 60 \div 6 = 20$ $a + (a + 4) = 20$, so $a = 8$ and $b = 12$ <i>1 mark: sum 20</i> <i>1 mark: 8 and 12</i>	2

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Q	Answer	Working / sample response	Marks
2	12 cm	Area = $15 \times 8 = 120 \text{ cm}^2$ Using the other side as the base: $10 \times h = 120$ $h = 12 \text{ cm}$ <i>1 mark: area 120</i> <i>1 mark: same area, new base</i> <i>1 mark: 12 cm</i>	3
3	$\frac{3}{10}$	Trapezium: $\frac{1}{2} \times 20 \times 8 = 80 \text{ cm}^2$; triangle ABM: $\frac{1}{2} \times 6 \times 8 = 24 \text{ cm}^2$ $\frac{24}{80} = \frac{3}{10}$ Wherever M is on DC, the triangle has base AB = 6 and the same perpendicular height 8 (the distance between the parallel sides). <i>1 mark: 80 and 24</i> <i>1 mark: $\frac{3}{10}$</i> <i>1 mark: explanation</i>	3
4	24 m^2 ; 216 m^2 ; $\frac{1}{10}$	The path is a parallelogram: base 2 m, perpendicular height 12 m $\rightarrow 24 \text{ m}^2$ Lawn: $240 - 24 = 216 \text{ m}^2$ $\frac{24}{240} = \frac{1}{10}$ <i>1 mark: 24 m^2</i> <i>1 mark: 216 m^2</i> <i>1 mark: $\frac{1}{10}$</i>	3