

WA8MMGTW1

Two-dimensional space and structures

Core + Challenge

Area of Rhombuses and Kites — Marking Key

I can find the area of rhombuses and kites from their diagonals, find their perimeters and work out a missing diagonal.

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	24 cm ²	$\frac{1}{2} \times 8 \times 6 = 24 \text{ cm}^2$
2	35 cm ²	$\frac{1}{2} \times 10 \times 7 = 35 \text{ cm}^2$
3	30 m ²	$\frac{1}{2} \times 12 \times 5 = 30 \text{ m}^2$
4	18 cm ²	$\frac{1}{2} \times 9 \times 4 = 18 \text{ cm}^2$
5	4 m ²	$\frac{1}{2} \times 3.2 \times 2.5 = 4 \text{ m}^2$
6	82.5 mm ²	$\frac{1}{2} \times 15 \times 11 = 82.5 \text{ mm}^2$
7	50 cm ²	$\frac{1}{2} \times 10 \times 10$ (a square is a rhombus) = 50 cm ²
8	30 cm	$4 \times 7.5 = 30 \text{ cm}$
9	28 cm	$2 \times (5 + 9) = 28 \text{ cm}$
10	13 cm	$52 \div 4 = 13 \text{ cm}$
11	8 cm	$2 \times 40 \div 10 = 8 \text{ cm}$
12	9 m	$2 \times 63 \div 14 = 9 \text{ m}$
13	11 cm	$34 \div 2 = 17$; $17 - 6 = 11 \text{ cm}$
14	240 cm ²	$\frac{1}{2} \times 16 \times 30 = 240 \text{ cm}^2$
15	20 cm ²	diagonals 10 and 4: $\frac{1}{2} \times 10 \times 4 = 20 \text{ cm}^2$
16	1.8 m ²	$\frac{1}{2} \times 2.4 \times 1.5 = 1.8 \text{ m}^2$

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B

Core answers, working and marks

/ 22 marks

Q	Answer	Working / sample response	Marks
1	70 cm ²	$\frac{1}{2} \times 14 \times 10 = 70$ 1 mark: working 1 mark: 70 cm ²	2
2	72 m ²	Diagonals: 12 m and 3 + 9 = 12 m $\frac{1}{2} \times 12 \times 12 = 72$ 1 mark: 12 and 12 1 mark: 72 m ²	2
3	P = 18 cm; A = 19.44 cm ²	P = 4 × 4.5 = 18 A = $\frac{1}{2} \times 7.2 \times 5.4 = 19.44$ 1 mark each	2
4	2700 cm ² ; 150 cm	$\frac{1}{2} \times 90 \times 60 = 2700$ 90 + 60 = 150 1 mark each	2
5	\$10.40	P = 2 × (25 + 40) = 130 cm 130 ÷ 10 × 0.80 = 10.40 1 mark: 130 cm 1 mark: \$10.40	2
6	15 cm	y = 2 × 150 ÷ 20 = 15 Check: $\frac{1}{2} \times 20 \times 15 = 150$ 1 mark: 2A ÷ x 1 mark: 15 cm	2
7	15 cm; 216 cm ²	side = 60 ÷ 4 = 15 A = $\frac{1}{2} \times 24 \times 18 = 216$ 1 mark each	2
8	120 cm ²	Rectangle: 20 × 12 = 240 Rhombus: $\frac{1}{2} \times 20 \times 12 = 120$; shaded = 240 – 120 = 120 1 mark: rhombus 120 1 mark: shaded 120 cm ²	2
9	7 bags	A = $\frac{1}{2} \times 6 \times 4.5 = 13.5$ m ² 13.5 ÷ 2 = 6.75 Round up: 7 bags 1 mark: 13.5 1 mark: 6.75 1 mark: 7 bags	3

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Q	Answer	Working / sample response	Marks
10	20 cm ² and 60 cm ² ; total 80 cm ²	Top: $\frac{1}{2} \times 10 \times 4 = 20$ Bottom: $\frac{1}{2} \times 10 \times 12 = 60$ $20 + 60 = 80 = \frac{1}{2} \times 16 \times 10$ <i>1 mark each</i>	3

C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	It is half of an x by y rectangle	The rectangle around the rhombus is x by y, so its area is xy. The diagonals split the rectangle into 4 small rectangles; the rhombus side cuts each one in half. So the rhombus is half of the big rectangle: $A = \frac{1}{2}xy$. <i>1 mark: rectangle xy</i> <i>1 mark: each part halved</i> <i>1 mark: conclusion</i>	3
2	Side × side only works for a square	A rhombus is a slanted parallelogram: $A = \text{base} \times \text{perpendicular height}$, and the height is less than 6 cm unless the angles are 90°. So its area is less than 36 cm². <i>1 mark: height is not the side</i> <i>1 mark: area is less</i>	2
3	False: it is 4 times as big	$\frac{1}{2} \times 2x \times 2y = 4 \times \frac{1}{2}xy$ e.g. diagonals 6 and 4: 12 cm²; 12 and 8: 48 cm² <i>1 mark: false</i> <i>1 mark: × 4 with reason</i>	2
4	No	A square with side 10 cm has area 100 cm². A rhombus with diagonals 16 cm and 12 cm also has sides of 10 cm (half-diagonals 8 and 6), but its area is $\frac{1}{2} \times 16 \times 12 = 96 \text{ cm}^2$. <i>1 mark: no</i> <i>1 mark: valid example</i>	2

D

Challenge *solutions and marking criteria*

/ 11 marks

Q	Answer	Working / sample response	Marks
1	24 cm	Area = $\frac{1}{2} \times 30 \times 40 = 600 \text{ cm}^2$ A rhombus is a parallelogram, so $A = \text{side} \times \text{height}$: $25 \times h = 600$ $h = 24 \text{ cm}$ <i>1 mark: 600</i> <i>1 mark: $A = b \times h$</i> <i>1 mark: 24 cm</i>	3

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Q	Answer	Working / sample response	Marks
2	40 square units; 30 and 24	Diagonals: 10 (vertical) and 8 (horizontal): $\frac{1}{2} \times 10 \times 8 = 40$ $360 \div 40 = 9 = 3 \times 3$, so each length is multiplied by 3 New diagonals 30 and 24 (check $\frac{1}{2} \times 30 \times 24 = 360$) <i>1 mark: 40</i> <i>1 mark: scale factor 3</i> <i>1 mark: 30 and 24</i>	3
3	750 cm ² each	Rhombus: $\frac{1}{2} \times 50 \times 30 = 750$; offcuts: $1500 - 750 = 750$ Each offcut is a right-angled triangle with legs 25 cm and 15 cm. Put the four right angles together at a point: the 25 cm legs make a 50 cm diagonal, the 15 cm legs a 30 cm diagonal → the same rhombus. <i>1 mark: 750 and 750</i> <i>1 mark: triangles 25 by 15</i> <i>1 mark: rearrangement</i>	3
4	16 cm and 18 cm	$xy = 2 \times 144 = 288$ and $x + y = 34$ Try pairs adding to 34: $16 \times 18 = 288$ <i>1 mark: $xy = 288$</i> <i>1 mark: 16 and 18</i>	2