

WA8MMGTW1

Two-dimensional space and structures

Core + Challenge

Area of Rhombuses and Kites

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

Name: _____ Date: _____ Score: _____ / 58

Key idea

Rhombus: 4 equal sides; diagonals bisect at 90° . **Kite:** 2 pairs of equal adjacent sides; diagonals meet at 90° .

Area: $A = \frac{1}{2}xy$ (x and y are the diagonals). $x = 10 \text{ cm}, y = 6 \text{ cm} \rightarrow A = \frac{1}{2} \times 10 \times 6 = 30 \text{ cm}^2$.

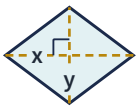
Why: a rhombus or kite fills exactly half of the x by y rectangle drawn around it.

Perimeter: rhombus $4 \times \text{side}$; kite $2 \times (\text{short} + \text{long})$. **Missing diagonal:** $y = 2A \div x$. $A = 24, x = 8 \rightarrow y = 6$.

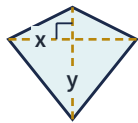
A Fluency *practise the skill*

/ 16 marks

x and y are the diagonals. Find the area unless told otherwise. 1 mark each.



Rhombus



Kite

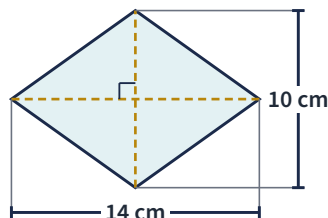
1. Rhombus, diagonals 8 cm, 6 cm _____
2. Kite, diagonals 10 cm, 7 cm _____
3. Rhombus, diagonals 12 m, 5 m _____
4. Kite, diagonals 9 cm, 4 cm _____
5. Rhombus, diagonals 3.2 m, 2.5 m _____
6. Kite, diagonals 15 mm, 11 mm _____
7. Square, diagonals 10 cm _____
8. Perimeter: rhombus, side 7.5 cm _____
9. Perimeter: kite, sides 5 cm, 9 cm _____
10. Rhombus: perimeter 52 cm: side _____
11. Rhombus: $A = 40 \text{ cm}^2, x = 10 \text{ cm}$: y _____
12. Kite: $A = 63 \text{ m}^2, x = 14 \text{ m}$: y _____
13. Kite: $P = 34$, short side 6 (cm): long _____
14. Rhombus, diagonals 16 cm, 30 cm _____
15. Rhombus: half-diagonals 5, 2 (cm) _____
16. Kite, diagonals 2.4 m, 1.5 m _____

B

Core *apply the skill to problems*

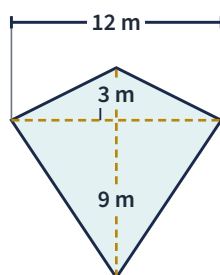
/ 22 marks

- 1 Find the area of this rhombus. Its diagonals are 14 cm and 10 cm. [2 marks]



Answer: _____

- 2 Find the area of this kite. The horizontal diagonal is 12 m long. [2 marks]



Answer: _____

- 3 A rhombus-shaped badge has sides of 4.5 cm and diagonals of 7.2 cm and 5.4 cm. Find its perimeter and its area. [2 marks]

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Answer: _____

- 4 A kite for the Perth kite festival has diagonals of 90 cm and 60 cm. Its frame is two sticks along the diagonals. Find the area of fabric and the total length of stick. [2 marks]

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Answer: _____

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- 5 A kite has two sides of 25 cm and two sides of 40 cm. Ribbon is sewn around its edge. Ribbon costs \$0.80 for each 10 cm. Find the cost of the ribbon. [2 marks]

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Answer: _____

- 6 A rhombus-shaped tile has an area of 150 cm^2 . One diagonal is 20 cm. Find the other diagonal. [2 marks]

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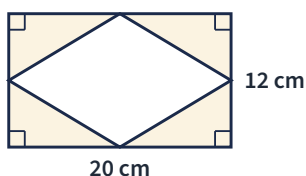
Answer: _____

- 7 A rhombus has a perimeter of 60 cm and diagonals of 24 cm and 18 cm. Find its side length and its area. [2 marks]

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Answer: _____

- 8 A rhombus is drawn by joining the midpoints of the sides of this rectangle. Find the shaded area. [2 marks]



Answer: _____

- 9 A kite-shaped garden bed in Kings Park has diagonals of 6 m and 4.5 m. One bag of mulch covers 2 m^2 . How many bags are needed? [3 marks]

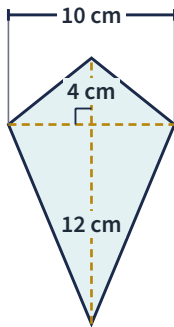
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Answer: _____

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- 10 The 10 cm diagonal splits this kite into two triangles. Find the area of each triangle, then check that they add to $\frac{1}{2}xy$. [3 marks]

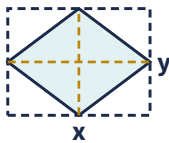


Answer: _____

C Reasoning *explain, justify and check*

/ 9 marks

- 1 Explain why the area of a rhombus is $\frac{1}{2}xy$. Use the rectangle drawn around it. [3 marks]



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- 2 Mia says the area of a rhombus with sides of 6 cm is $6 \times 6 = 36 \text{ cm}^2$. Explain why she is wrong (unless the rhombus is a square). [2 marks]

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- 3 True or false: "If you double both diagonals of a kite, its area doubles." Explain. [2 marks]

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- 4 Two rhombuses both have sides of 10 cm. Must they have the same area? Explain with an example. [2 marks]

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D**Challenge** *multi-step and problem-solving*

/ 11 marks

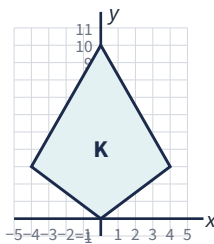
- 1 A rhombus has diagonals of 30 cm and 40 cm, and its sides are 25 cm. Find the perpendicular distance between two opposite sides (its height). [3 marks]

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Answer: _____

- 2 Kite K has vertices (0, 0), (4, 3), (0, 10) and (−4, 3). Find its area. K is enlarged (same shape) so that its area becomes 360 square units. Find the lengths of the new diagonals. [3 marks]



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Answer: _____

- 3 Priya cuts the largest rhombus (diagonals parallel to the edges) from a 50 cm by 30 cm card. Find the areas of the rhombus and of the four offcuts. Show how the offcuts make a copy of the rhombus. [3 marks]

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Answer: _____

- 4 The two diagonals of a rhombus add to 34 cm and its area is 144 cm^2 . Find the diagonals. [2 marks]

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Answer: _____

How did I go?Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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