

WA7MMGTW5

Two-dimensional space and structures

Core + Challenge

Angles on Parallel Lines

I can identify corresponding, alternate and co-interior angles, find unknown angles on parallel lines and test whether lines are parallel.

Name: _____ Date: _____ Score: _____ / 58

Key idea

A **transversal** crosses two **parallel** lines (marked with arrows), making 8 angles of only **two sizes**.

Corresponding angles (F-shape) are **equal**. **Alternate** angles (Z-shape) are **equal**.

Co-interior angles (C-shape, same side, between the parallels) add to **180°**.

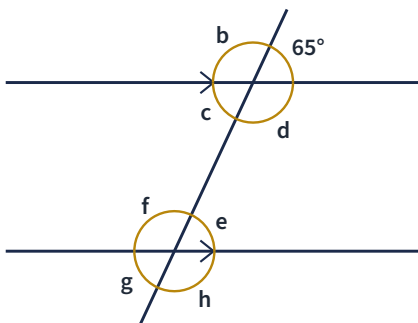
Always give a **reason**, e.g. ' $x = 65^\circ$, corresponding angles, parallel lines'. If these rules fail, the lines are **not** parallel.

A

Fluency *practise the skill*

/ 16 marks

Use the diagram (the lines with arrows are parallel). 1 mark each.



- | | |
|--------------------|-------------------------------------|
| 1. Size of b _____ | 9. d and f are ____ angles _____ |
| 2. Size of c _____ | 10. c and e are ____ angles _____ |
| 3. Size of d _____ | 11. d and e are ____ angles _____ |
| 4. Size of e _____ | 12. c and f are ____ angles _____ |
| 5. Size of f _____ | 13. Co-interior angles add to _____ |

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6. Size of g _____

14. Corresponding angle to 72° _____

7. Size of h _____

15. Co-interior angle to 72° _____

8. a and e are ____ angles _____

16. Alternate angles are _____

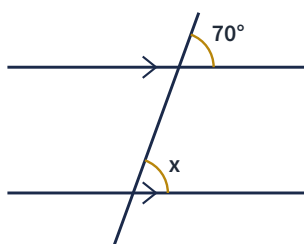
B

Core *apply the skill to problems*

/ 22 marks

1 Find x and give a reason.

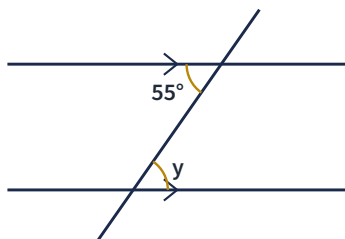
[2 marks]



Answer: _____

2 Find y and give a reason.

[2 marks]

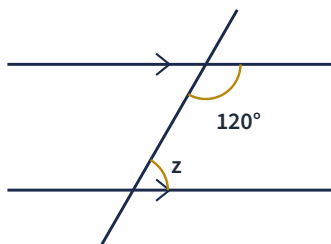


Answer: _____

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- 3 Find z and give a reason.

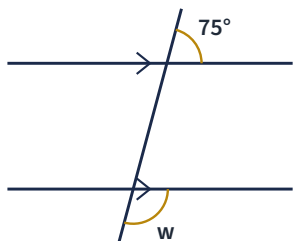
[2 marks]



Answer: _____

- 4 Find w . Show your steps and reasons.

[2 marks]



Answer: _____

- 5 In a diagram, two co-interior angles measure 68° and 110° . Are the two lines parallel? Explain.

[2 marks]

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Answer: _____

- 6 Two corresponding angles on parallel lines are $3x$ and 105° . Find x .

[2 marks]

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Answer: _____

- 7 Two co-interior angles on parallel lines are $(2x + 10)^\circ$ and 110° . Find x .

[3 marks]

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Answer: _____

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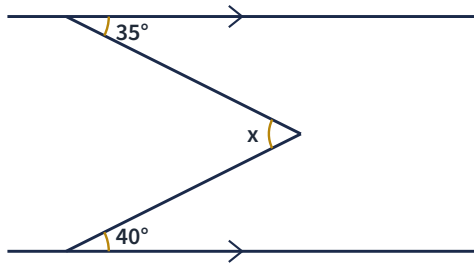
- 8 The rungs of a ladder are parallel. A rail meets the top rung at 72° . What angle does the rail make with the bottom rung, in the same position? Why? [2 marks]

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Answer: _____

- 9 The two horizontal lines are parallel. Find x . (Hint: draw a third parallel line through the corner.) [3 marks]



Answer: _____

- 10 Two parallel streets are crossed by a diagonal road. The acute angle between the road and one street is 58° . Find the obtuse angle. [2 marks]

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Answer: _____

C Reasoning *explain, justify and check*

/ 9 marks

- 1 Use corresponding angles and angles on a straight line to explain why co-interior angles add to 180° . [3 marks]

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- 2 Explain how you could use a protractor to test whether two lines are parallel. [2 marks]

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- 3 Kim says, 'Alternate angles are always equal.' When is she wrong? [2 marks]

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- 4 Explain why all eight angles in the fluency diagram have only two different sizes. [2 marks]

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D Challenge *multi-step and problem-solving*

/ 11 marks

- 1 Two alternate angles on parallel lines are $3x$ and $(x + 40)^\circ$. Find x and the size of the angles. [2 marks]

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Answer: _____

- 2 Draw a triangle and a line through one vertex parallel to the opposite side. Use alternate angles to prove the angles in a triangle add to 180° . [3 marks]

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- 3 Two co-interior angles are in the ratio $2 : 3$. Find them. [3 marks]

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Answer: _____

- 4 In a diagram like Core Q9, the angle at P is 110° and the top angle is 45° . Find the bottom angle. [3 marks]

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Answer: _____

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

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