

Year 5 Mathematics: Exploring Symmetry and Reflection

Learning objective: To identify, describe, and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.

Read each question carefully. Use a ruler for drawing lines of symmetry. Max the monkey needs your help to complete these geometric puzzles. Show your working out clearly.

Max the monkey is designing a new mosaic for the jungle school. He is using tiles that feature patterns based on nature. To ensure the mosaic is perfectly balanced, he must use his knowledge of symmetry and reflections.

Word bank: Symmetry · Reflection · Line of symmetry · Horizontal · Vertical · Congruent · Axis · Coordinate

1. Define the term 'line of symmetry' in your own words. Why is it important for a shape to be considered symmetrical? (2 marks)

2. Max has a square, a regular pentagon, and a regular hexagon. State the number of lines of symmetry for each shape. (3 marks)

3. If a shape is reflected across a vertical axis, explain why the properties of the shape (such as side length and internal angles) remain identical to the original. (3 marks)

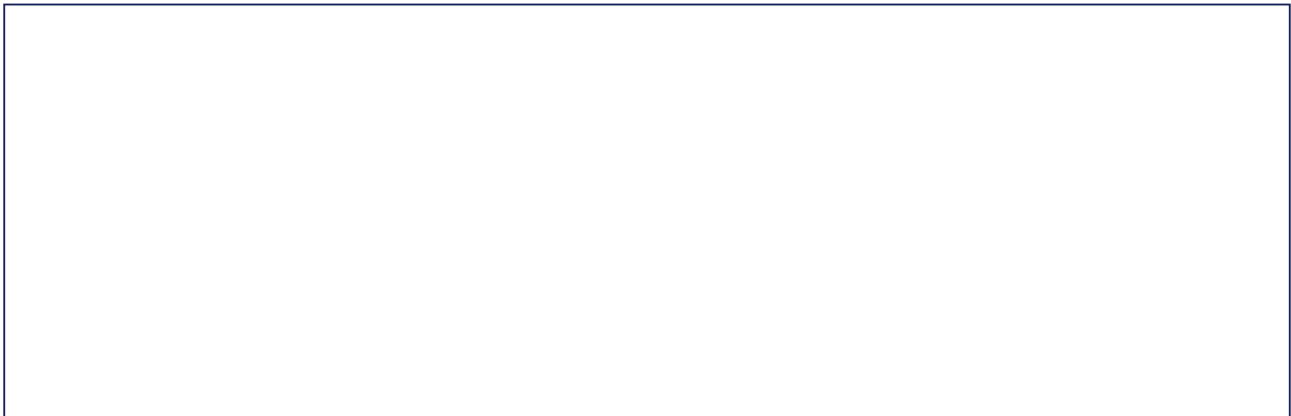
4. A triangle has vertices at (2, 2), (5, 2), and (2, 6). If this triangle is reflected across the vertical line $x = 6$, what will the new coordinates of the vertices be? (4 marks)

5. Compare and contrast a reflection and a rotation. Use a diagram or detailed description to justify why a reflection creates a 'mirror image' while a rotation does not. (4 marks)

6. Max is selling tiles for £1.50 each. He creates a symmetrical pattern using 8 tiles. Calculate the total cost of the tiles. If he adds a border that costs £4.25, what is the total price? Explain how symmetry helped him calculate the number of tiles needed. (4 marks)

7. Extended Response: Design a symmetrical logo for the jungle school. Describe its lines of symmetry (horizontal, vertical, or diagonal) and justify why your design creates a sense of balance. How might the design change if you were asked to create an asymmetrical version, and what effect would that have on the viewer? (5 marks)

Draw: On a piece of squared paper, draw a scalene triangle and demonstrate why it possesses zero lines of symmetry. Then, draw a kite shape and accurately mark all its lines of symmetry.



Extension challenge: Challenge: Investigate the symmetry of the English alphabet. Which capital letters possess horizontal symmetry, which possess vertical, and which possess both? Create a table to categorise them. Justify why some letters, such as 'R', cannot be symmetrical regardless of the axis chosen. Total: /25