Max’s Geometry Garden Challenge

Learning objective: To identify, describe, and represent the position of a shape following a reflection or translation, and to identify angles and lines of symmetry.

Read the information below about Max the monkey’s garden project. Use your knowledge of geometry to answer the questions. Show your working out clearly.

Max is designing a beautiful garden. He has placed a stone bench at coordinate (2, 3) on his grid. He wants to move the bench 4 squares to the right and 2 squares up. Max also needs to place a pond in the shape of a regular pentagon. He wants to ensure the pond has a line of symmetry so he can plant matching flowers on either side. Finally, Max has a square-shaped flower bed at (1, 1), (1, 3), (3, 3), and (3, 1). He wants to reflect this flower bed across the vertical line x = 5 to create a second matching bed.

Word bank: reflection · translation · symmetry · vertex · horizontal · vertical · quadrant · coordinate

1. If Max moves the bench from (2, 3) by translating it 4 squares right and 2 squares up, what will be the new coordinates of the bench? (2 marks)

2. A regular pentagon is used for the pond. How many lines of symmetry does a regular pentagon have? (1 mark)

3. The square flower bed has vertices at (1, 1), (1, 3), (3, 3), and (3, 1). If it is reflected across the vertical line x = 5, what are the coordinates of the new square? (3 marks)

4. Max buys a bag of tulip bulbs for £12.50 and a bag of daisy seeds for £4.75. If he pays with a £20 note, how much change should he receive? (2 marks)

5. Explain the difference between a reflection and a translation in your own words. (2 marks)

Draw: Draw a 10x10 grid. Plot the original square flower bed at (1, 1), (1, 3), (3, 3), and (3, 1). Draw the vertical line of symmetry at x = 5 and show the reflected square on the other side.

Extension challenge: Max wants to add a triangular patch of lavender. If the triangle has vertices at (6, 6), (6, 8), and (9, 6), calculate the area of this triangle in square units.