Max’s Geometry Garden: Exploring Shapes and Symmetry

Learning objective: To identify, describe, and classify 2D shapes based on their properties, including parallel and perpendicular lines, and to identify lines of symmetry in 2D shapes.

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

Max the monkey is designing a new garden for his friends. He wants to plant flowerbeds in specific geometric patterns. Max has created a square patch for sunflowers, a rhombus patch for daisies, and a right-angled triangle patch for ferns. He says, 'Every shape has a secret identity defined by its lines and angles!' Max is very careful to ensure his square has four lines of symmetry and that his garden paths meet at perfect perpendicular angles to make walking easy. He is now calculating the cost of decorative stones, which cost £2.50 per metre to edge his shapes.

Word bank: parallel · perpendicular · symmetry · polygon · quadrilateral · acute · obtuse · vertices

1. Max has a rhombus-shaped flowerbed. Explain why a rhombus is classified as a quadrilateral and compare its properties to a square. (2 marks)

2. Draw a shape that has at least one pair of parallel lines and one pair of perpendicular lines. Label the lines clearly. (2 marks)

3. If Max decides to edge his square flowerbed, and each side is 4 metres long, calculate the total cost of the stones at £2.50 per metre. (2 marks)

4. Justify why a regular hexagon has more lines of symmetry than a regular pentagon. You may use a diagram to support your answer. (3 marks)

5. What might happen to the internal angles of a square if you were to push two opposite corners together to turn it into a rhombus? (2 marks)

Draw: Sketch a garden design for Max that includes at least one irregular polygon, one shape with rotational symmetry, and one shape containing an obtuse angle.

Extension challenge: Max wants to create a complex pattern using only triangles. Research and explain the difference between equilateral, isosceles, and scalene triangles. Then, justify whether it is possible to create a tessellating pattern using only scalene triangles.