

Max's Geometry Challenge: Shapes and Symmetry

Learning objective: To identify, describe, and classify 2D and 3D shapes, understand symmetry, and compare angles.

Read each question carefully. Use your ruler for accurate drawing. Show your working out for any calculations involving money or measurements.

Max the monkey has been organising his jungle workshop. He has collected various 2D and 3D objects to build a new treehouse bridge. He needs your mathematical expertise to ensure his designs are stable and symmetrical.

Word bank: acute · obtuse · isosceles · scalene · line of symmetry · vertex · horizontal · perpendicular

1. Max has a collection of triangles. Explain the difference between an equilateral triangle and a scalene triangle. Use mathematical vocabulary to justify your answer. (2 marks)

2. Identify the number of vertices and edges on a square-based pyramid. (2 marks)

3. Draw a shape that has exactly two lines of symmetry. Label the lines of symmetry clearly. (2 marks)

4. Max buys a wooden plank for £4.50 and a metal bracket for £2.75. If he pays with a £10 note, how much change should he receive? Express your answer in pounds and pence. (2 marks)

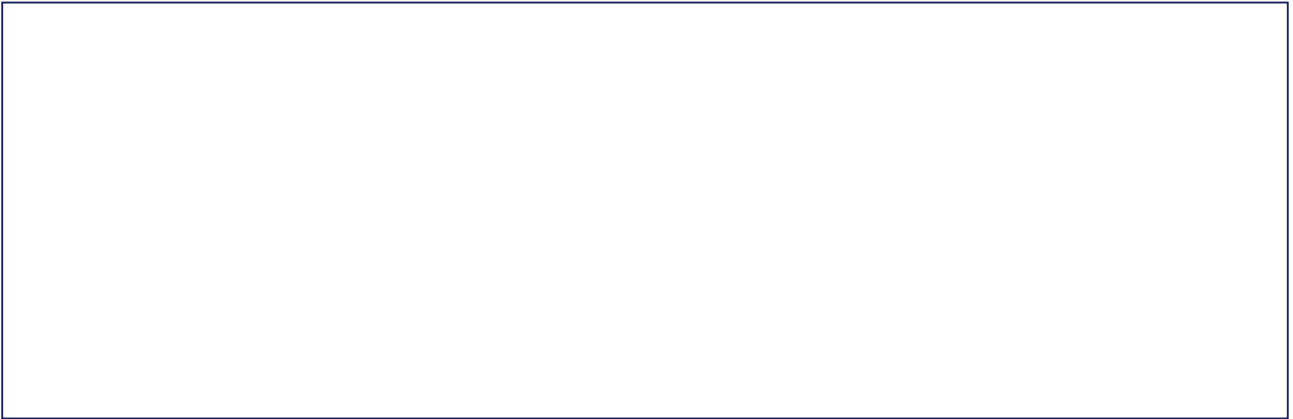
5. Compare and contrast an acute angle and an obtuse angle. Why is a right angle the 'benchmark' for these two? Provide an example of where you might find a right angle in the classroom. (3 marks)

6. Max creates a pattern using three regular hexagons. If each hexagon has a perimeter of 18cm, what is the length of one side of a single hexagon? Show your calculation. (3 marks)

7. Look at a rectangle. If you draw one diagonal line across it, what two types of triangles are created? Justify why these shapes are classified as they are based on their internal angles. (3 marks)

8. Extended Writing: Max wants to build a perfectly symmetrical treehouse entrance. Describe the properties he must consider to ensure the shape is symmetrical. Include the terms 'horizontal', 'vertical', and 'reflection'. If the design were not symmetrical, what might happen to the balance of the structure? (5 marks)

Draw: Sketch a composite 2D shape made of a square and a triangle. Label the right angle, if one exists, and draw all lines of symmetry.



Extension challenge: Total: /25. Challenge: Imagine you are an architect. Design a floor plan for a new animal sanctuary using at least four different polygons. Annotate your drawing to explain why your choice of shapes makes the building strong and stable.