

Max's Geometric Garden Design Challenge

Learning objective: To identify, describe, and classify 2D shapes based on their properties, including parallel and perpendicular lines, and calculate perimeter and area of composite rectilinear shapes.

Max the monkey is designing a new garden for the BookFlik friends. He has sketched out various flowerbeds using different 2D shapes. Examine the properties of each flowerbed below and use your mathematical knowledge to solve Max's design problems. For each shape, you must justify your answer using geometric vocabulary.

Word bank: parallel · perpendicular · quadrilateral · polygon · rectilinear · vertex · composite · acute · obtuse · reflex

1. Max has designed a flowerbed in the shape of a parallelogram with a base of 8m and a height of 5m. He wants to add a smaller square flowerbed inside with a side length of 2m. Explain why the square is a special type of parallelogram. Justify your answer using its properties. (2 marks)

2. A rectangular flowerbed has a perimeter of 24m. If the length is 8m, calculate the width. Show your working out. (2 marks)

3. Max creates a composite L-shaped lawn. The vertical sides are 4m and 6m, and the horizontal sides are 3m and 5m. Calculate the total area of the lawn. Explain the method you used to decompose the shape. (3 marks)

4. Compare and contrast a rhombus and a rectangle. What are the similarities and differences regarding their side lengths and interior angles? (3 marks)

5. What might happen to the area of a rectangle if you double the length but keep the width the same? Justify your answer with an example. (2 marks)

6. If a flowerbed is a regular pentagon, can it have any parallel sides? Explain your reasoning using your knowledge of internal angles. (2 marks)

Draw: Draw a composite rectilinear shape that could represent a garden path. Label the lengths of all sides, ensuring that the total perimeter is exactly 20m.



Extension challenge: Design a 'Geometric Playground' on grid paper. Your design must include at least one rectangle, one triangle, and one composite shape. Calculate the total area of your playground in square metres and write a paragraph explaining how you used parallel and perpendicular lines to ensure your design is structurally sound.