

Max's Geometric Garden Adventure

Learning objective: To identify, describe, and represent the position of a shape following a reflection or translation, and to calculate the area and perimeter of rectilinear shapes.

Help Max the monkey organise his geometric garden. Read the passage carefully and use your knowledge of coordinates, reflections, and measurements to solve the challenges below.

Max is designing a symmetrical garden. He has placed a square flowerbed at coordinates (2, 3), (2, 5), (4, 3), and (4, 5). Max wants to translate this flowerbed 4 units to the right to make space for a fountain. Once placed, he plans to reflect a triangular vegetable patch across the vertical axis. Max reminds you that the perimeter of a shape is the total distance around the edge, while the area is the space inside, measured in square units.

Word bank: reflection · translation · vertex · quadrant · perimeter · rectilinear · coordinate · axis

1. If Max translates his square flowerbed 4 units to the right, what will the new coordinates of the four vertices be? (2 marks)

2. Calculate the perimeter and the area of the original square flowerbed. Show your working out. (2 marks)

3. Explain why reflecting a shape across an axis does not change its area, even though its position in the quadrant changes. (2 marks)

4. Max adds a rectangular path with a length of 8m and a width of 3m. If he wants to pave it with tiles costing £5 per square metre, what is the total cost? (2 marks)

5. Compare and contrast a translation and a reflection. What remains constant in both transformations? (2 marks)

Draw: Draw a set of axes on grid paper. Plot Max's original square at (2, 3), (2, 5), (4, 3), and (4, 5). Then, draw the translated square 4 units to the right and label the new coordinates.



Extension challenge: Justify your answer: If Max doubles the length of all sides of his square flowerbed, does the area also double? Explain your reasoning using calculations to support your theory. What might happen if he used an irregular polygon instead of a square?