

Max's Magnificent Map of the Meadow

Learning objective: To identify, describe and represent the position of a shape following a reflection or translation, and to plot coordinates in all four quadrants.

Help Max the monkey map out his meadow. Use your knowledge of the Cartesian grid to plot points, identify shapes, and calculate the coordinates of translated polygons. Remember: always go along the corridor (x-axis) before you go up or down the stairs (y-axis).

Max the monkey is organising a treasure hunt for his friends in the wildflower meadow. He has sketched out the meadow on a coordinate grid. The centre of the meadow, where the old oak tree stands, is at the origin (0,0). Max has placed a patch of juicy strawberries at coordinates (3, 4). A hidden basket of golden acorns is located at (-2, 5). To make the game more challenging, Max wants to move the strawberry patch 4 squares to the left and 3 squares down. He also wants to reflect the acorn basket across the y-axis to create a symmetric pattern for the meadow's layout.

Word bank: coordinate · x-axis · y-axis · quadrant · origin · translation · reflection · polygon · vertex

1. Max decides to move the strawberry patch from (3, 4) by translating it 4 squares left and 3 squares down. What are the new coordinates of the strawberries? Show your working. (2 marks)

2. If the acorn basket is at (-2, 5), what will its new coordinates be after it is reflected across the y-axis? Explain the rule you used to find this position. (2 marks)

3. Max plots a square with vertices at (1, 1), (1, 3), (3, 3), and (3, 1). If he translates this square 5 units down, what are the coordinates of the new vertices? (2 marks)

4. Justify your answer: If a point is located at (0, 0), does reflecting it across the x-axis change its position? Why or why not? (2 marks)

5. Compare and contrast: How does a translation differ from a reflection when moving a shape on a coordinate grid? (2 marks)

Draw: Draw a 10x10 coordinate grid with the origin (0,0) in the middle. Plot a triangle with vertices at (-4, 2), (-1, 2), and (-2, 4). Then, draw the reflection of this triangle across the y-axis and label the new coordinates.



Extension challenge: Max wants to build a fence in the shape of a rhombus. He has plotted two vertices at (-3, 0) and (3, 0). If the area of the rhombus must be 12 square units, suggest possible coordinates for the remaining two vertices. Explain your reasoning and what might happen to the shape if you were to translate it into the third quadrant.