

Max's Geometry Garden Challenge

Learning objective: To identify, describe, and represent the position of a shape following a reflection or translation, and to calculate missing angles and lengths in geometric shapes.

Help Max the monkey solve these geometric puzzles. Read the information carefully, use your mathematical reasoning to solve the problems, and show your working out clearly.

Max is designing a symmetrical garden. He has placed a triangular flowerbed at coordinates (2, 3), (2, 6), and (5, 3). He wants to move the bed to a new part of the garden and create a matching one on the other side of a central path. Max uses a translation to move his shape 4 squares to the right and 2 squares up. He then reflects the original shape across a vertical line at $x = 6$ to see how it looks mirrored. Remember, when a shape is translated, its size and orientation stay the same. When it is reflected, the shape flips over the line of symmetry.

Word bank: Translation · Reflection · Vertex · Coordinate · Horizontal · Vertical · Symmetry

1. If Max translates his triangular flowerbed (originally at (2, 3), (2, 6), and (5, 3)) by moving it 4 squares right and 2 squares up, what are the new coordinates of the vertices? (2 marks)

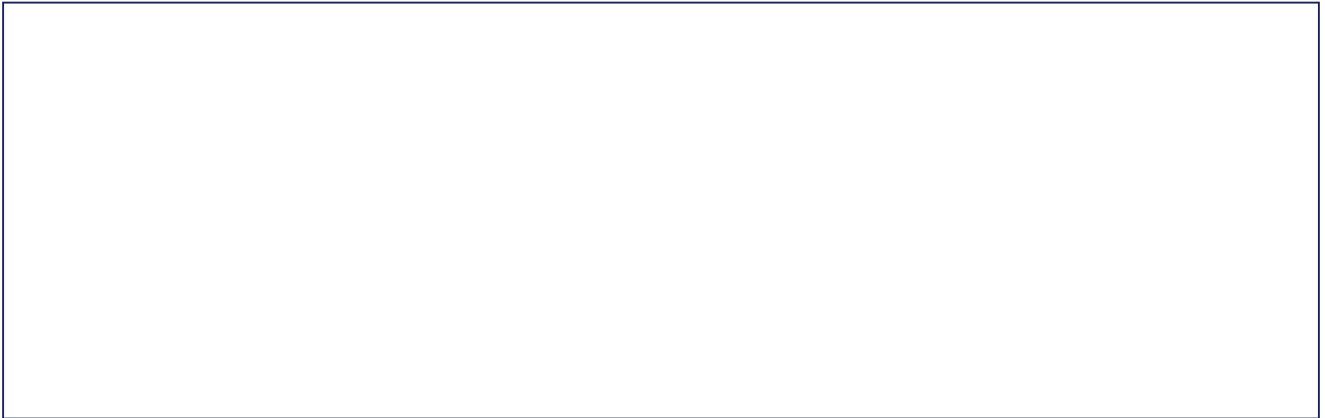
2. A square flowerbed has a perimeter of £24. If each side of the square costs £3 per metre to edge with stones, what is the total cost to edge the entire square? (2 marks)

3. Max has a triangle where two angles are 45 degrees and 65 degrees. What is the size of the third angle? Explain how you know. (2 marks)

4. If a shape is reflected across a vertical line, does the vertical coordinate (y) of the vertices change? Explain your reasoning. (2 marks)

5. Max wants to build a rectangular path that is 8 metres long and 4 metres wide. He needs to cover it in gravel costing £5 per square metre. How much will the gravel cost in total? (2 marks)

Draw: Draw a set of axes from 0 to 10. Plot Max's original triangle at (2, 3), (2, 6), and (5, 3). Then, use a different colour to draw the translated triangle after moving it 4 squares right and 2 squares up.



Extension challenge: Challenge: If Max reflects the original triangle across the line $x = 6$, what would the coordinates of the new vertices be? Compare these to the translated coordinates you found in Question 1.