

Max's Mathematical Pattern Puzzles

Learning objective: To develop logical thinking by identifying sequences, rotations, and transformations in non-verbal reasoning patterns.

Max the monkey has been busy creating these puzzles! Carefully observe the relationships between the shapes, symbols, and rotations. Use your logical reasoning skills to determine the next step in each sequence or identify the odd one out.

Word bank: Rotation · Reflection · Sequence · Symmetry · Clockwise · Anticlockwise · Pattern · Translate

1. Max has a sequence of shapes. Shape A is a triangle pointing up. Shape B is a triangle pointing to the right. Shape C is a triangle pointing down. Describe the rule Max is using for this sequence and draw what Shape D would look like. (2 marks)

2. Look at these three symbols: a circle with a dot, a square with a dot, and a pentagon with a dot. If the number of sides increases by one each time, what would the fourth shape in the sequence be? Justify your answer. (2 marks)

3. In a grid, a shaded square moves from the top-left corner to the top-middle, then to the top-right. Explain why the square is following a horizontal translation pattern and predict where it will move next. (2 marks)

4. Compare and contrast a 90-degree clockwise turn with a 180-degree turn. If a shape starts pointing North, where would it be after a 90-degree clockwise turn followed by a 90-degree anticlockwise turn? (2 marks)

5. Max has four patterns. Three show rotational symmetry, but one does not. Describe how you would identify the 'odd one out' by checking for symmetry. (2 marks)

6. What might happen to a pattern if you were to reflect it across a vertical axis? Use an example of a simple shape to explain your reasoning. (2 marks)

Draw: Draw a complex sequence of three shapes that rotate 90 degrees clockwise each time. Include a small arrow to show the direction of the turn.



Extension challenge: Design your own 4-step non-verbal reasoning challenge for a friend. Ensure your sequence follows a clear mathematical rule (such as increasing sides, rotating degrees, or changing shading). Challenge your friend to justify why their answer is correct using the vocabulary from the word bank.