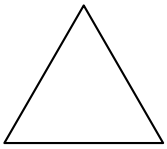
Foundation GCSE: Symmetry

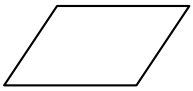
Name: _____ Class: _____

Instructions: Answer all 10 questions. Diagrams are not necessarily drawn to scale. Working out should be shown where appropriate.

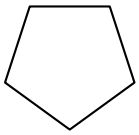
1. How many lines of symmetry does the equilateral triangle shown below have?



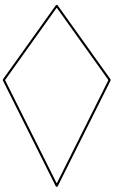
2. What is the order of rotational symmetry of the parallelogram shown below?



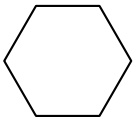
3. A regular pentagon is shown with its center marked. What is the order of its rotational symmetry?



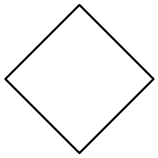
4. How many lines of symmetry does the kite shown below have?



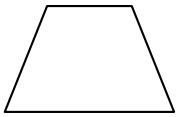
5. A regular hexagon is rotated about its center. What is the smallest angle of rotation that maps the shape onto itself?



6. State the number of lines of symmetry and the order of rotational symmetry for the rhombus shown below.

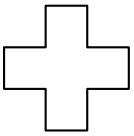


7. How many lines of symmetry does the isosceles trapezium shown below have?

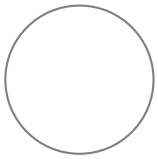


8. A regular polygon has a rotational symmetry order of 12. Find the size of its exterior angle.

9. A symmetric cross shape is shown below. How many lines of symmetry does it possess?



10. **Beyond course!** What is the order of rotational symmetry and how many lines of symmetry does a circle have?



Answers & Worked Solutions

1. 3: An equilateral triangle has three lines of symmetry connecting each vertex to the midpoint of the opposite side.

2. 2: A general parallelogram maps onto itself twice per full 360° rotation (at 180° and 360°).

3. 5: Any regular n-gon has a rotational symmetry order equal to n.

4. 1: A standard kite has one line of symmetry running along its main vertical diagonal.

5. 60°: Calculated by $360°/6 = 60°$.

6. 2 lines of symmetry, order 2 rotational symmetry: Lines run along the two diagonals, and it maps onto itself twice in a full turn.

7. 1: An isosceles trapezium has a single vertical line of symmetry passing through the center of its parallel top and bottom bases.

8. 30°: The exterior angle of a regular polygon is given by $360°/n$, so $360°/12 = 30°$.

9. 4: The symmetric cross has two diagonal lines and two median axes of symmetry.

10. ∞, ∞: A circle possesses an **infinite** order of rotational symmetry and an **infinite** number of lines of symmetry since any straight line through its center is a line of symmetry.