

Symmetry & Transformations

Geometry · Grade 8

Score: _____ / 10

◆ Medium · 10 Questions

Solve each problem. Show your work in the space provided. Write your answer on the line.

1. An arrow ($\rightarrow$) pointing right: does it have line symmetry, rotational symmetry, or neither?

Answer: _____

2. Does a regular octagon have rotational symmetry?
If so, what is the smallest angle of rotation?

Answer: _____

3. What is the order of rotational symmetry of a square?

Answer: _____

4. A shape has rotational symmetry of order 3.
What angles does it map onto itself?

Answer: _____

5. Complete the pattern: a shape has n -fold rotational symmetry.
What is the smallest angle of rotation?

Answer: _____

6. A shape has rotational symmetry of order 6.
List ALL angles (less than 360°) where it maps onto itself.

Answer: _____

7. What is the order of rotational symmetry of an equilateral triangle?

Answer: _____

8. Which letter has rotational symmetry of order 2: H, T, or A?

Answer: _____

9. A regular pentagon has rotational symmetry. What is the smallest angle of rotation?

Answer: _____

10. How many lines of symmetry does a regular pentagon have?

Answer: _____

Answer Key

Symmetry & Transformations — Medium

1. **Neither. It has no line of symmetry and no rotational symmetry (rotating 180° gives $\leftarrow$, not $\rightarrow$).**

An arrow only looks the same if you rotate it 0° (or 360°). It has no reflective or rotational symmetry.

2. **Yes. Smallest angle = $360^\circ \div 8 = 45^\circ$.**

A regular octagon maps onto itself every 45° . Order of rotational symmetry = 8.

3. **4 (it maps onto itself at 90° , 180° , 270° , and 360°).**

A square looks the same after rotating 90° , 180° , 270° , and 360° . That's 4 positions.

4. **120° , 240° , and 360° (or 0°).**

Order 3 means 3 equally spaced positions: $360 \div 3 = 120^\circ$. Rotations: 120° , 240° , 360° .

5. **$360^\circ \div n$**

Divide 360° evenly by n to find the smallest rotation that maps the shape onto itself.

6. **60° , 120° , 180° , 240° , 300°**

$360 \div 6 = 60^\circ$. Multiples of 60° less than 360° : 60, 120, 180, 240, 300.

7. **3**

It maps onto itself at 120° , 240° , and 360° . Order = 3.

8. **H**

H looks the same after a 180° rotation. T and A do not.

9. **72°**

$360^\circ \div 5 = 72^\circ$.

10. **5**

A regular pentagon has 5 lines of symmetry (one through each vertex).