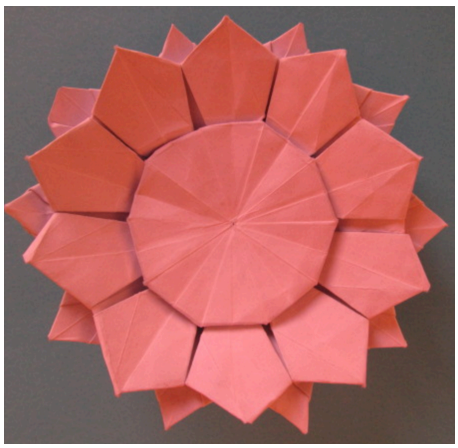
Key

Lesson 6 Symmetries of Regular Polygons

A Solidify Understanding Task

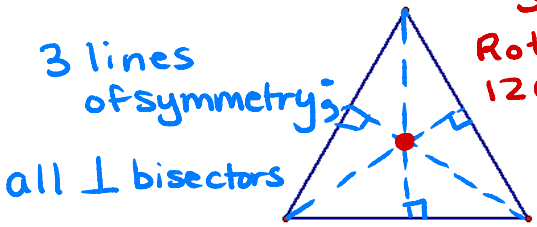


A line that reflects a figure onto itself is called a **line of symmetry**. A figure that can be carried onto itself by a rotation is said to have **rotational symmetry**. A **diagonal of a polygon** is any line segment that connects non-consecutive vertices of the polygon.

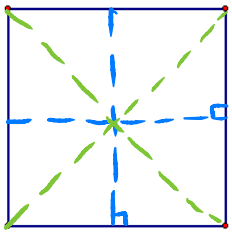
← all sides and angles are ≅

For each of the following regular polygons, describe the rotations and reflections that carry it onto itself: (be as specific as possible in your descriptions, such as specifying the angle of rotation)

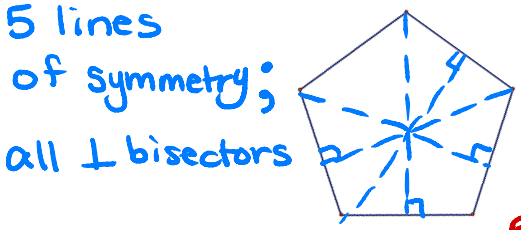
1. An equilateral triangle



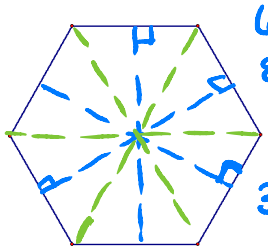
2. A square



3. A regular pentagon

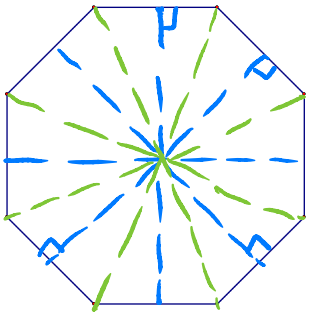


4. A regular hexagon



5. A regular octagon

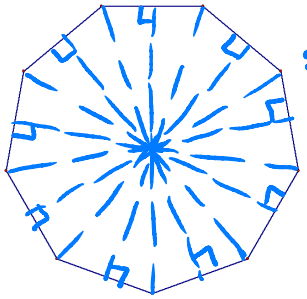
8 lines of Symmetry;
4 diagonals
4 ⊥ bisectors



$\frac{360°}{8} = 45°$ Rotational Symmetry

45°, 90°, 135°, 180°
225°, 270°, 315°, 360°

6. A regular nonagon



9 lines of symmetry;
9 ⊥ bisectors

What patterns do you notice in terms of the number and characteristics of the lines of symmetry in a regular polygon?

- n sides = n lines of symmetry
- odd sides: lines of symmetry are all ⊥ bisectors
- even sides: $\frac{1}{2}$ are diagonals & $\frac{1}{2}$ are ⊥ bisectors

What patterns do you notice in terms of the angles of rotation when describing the rotational symmetry in a regular polygon? n = # of sides

multiples of $\frac{360°}{n}$