

Symmetry Line Studio

Draw and test mirror lines on regular polygons

GRADE 6 • 6.MG.4.b

6.MG.4.b "Draw lines of symmetry to divide regular polygons into two congruent parts."

NAME _____

DATE _____

BUILD UNDERSTANDING

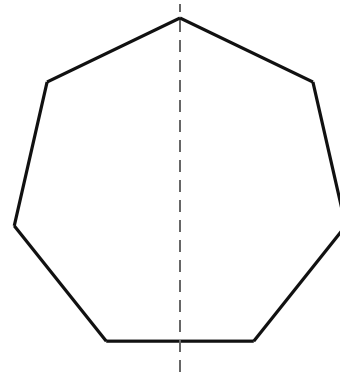
A mirror line divides a shape into two congruent halves that match when folded. Use a ruler, and imagine folding or trace onto scrap paper to check. Regular n -sided polygons have n mirror lines. Counts alone do not complete a drawing task.

WORKED EXAMPLE

The dashed line shows one mirror fold in this regular heptagon. Why does it work?

1. Follow the dashed line through the center.
2. The top vertex stays on the fold; the other vertices pair across it.

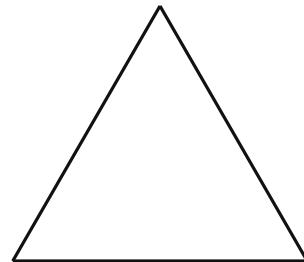
Answer: The line joins the top vertex to the opposite side midpoint; folding matches the two halves.



Regular polygon: 7 sides

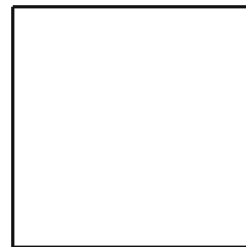
PRACTICE 4 problems

- 1** Draw all mirror lines on the regular triangle. Count them and describe where one meets the sides.



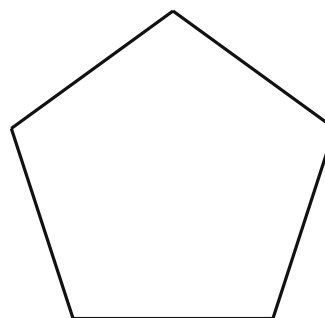
Regular polygon: 3 sides

- 2** Draw all mirror lines on the square. Describe both types of line.



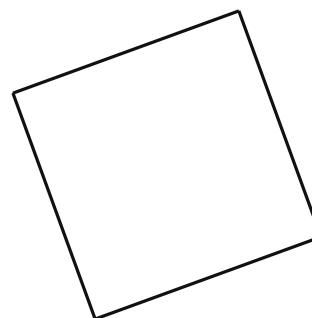
Regular polygon: 4 sides

- 3** Draw all mirror lines on the regular pentagon. Explain why a line through two vertices is not a mirror line here.



Regular polygon: 5 sides

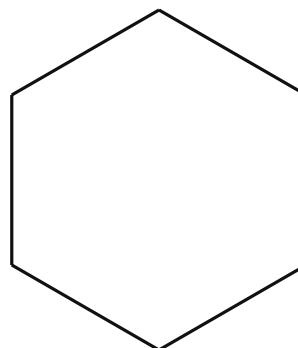
- 4** Draw all mirror lines on this turned square. Does turning change the count? Explain.



Regular polygon: 4 sides

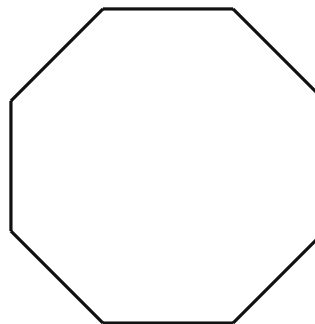
APPLY IT Show your work

- 1** A club cuts a regular hexagon badge. Draw every fold that divides it into matching halves. Describe the two types of fold.



Regular polygon: 6 sides

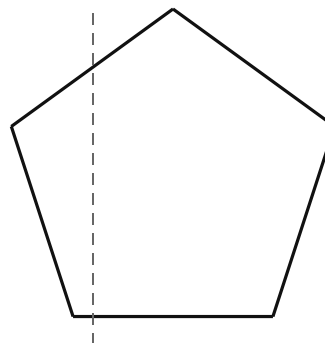
- 2** Draw all mirror folds for this regular octagon seal. How many meet vertices, and how many meet side midpoints?



Regular polygon: 8 sides

CHALLENGE One step up

A student claims the dashed line is a mirror line. Test the claim by imagining a fold. Draw one correct mirror line and explain why it works.

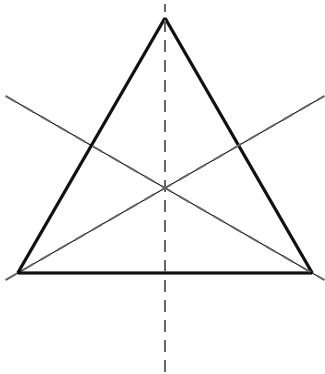


Regular polygon: 5 sides

Check each drawn line against the visual keys. Lines may extend beyond the boundary. Accept any valid mirror line for the challenge; its key shows one example. Regular polygons are drawn with equal sides and equal angles.

PRACTICE 1

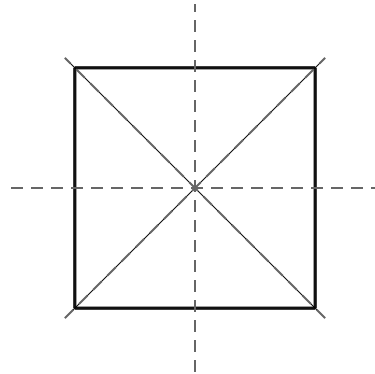
3 lines. Each joins a vertex to the midpoint of the opposite side.



Regular polygon: 3 sides

PRACTICE 2

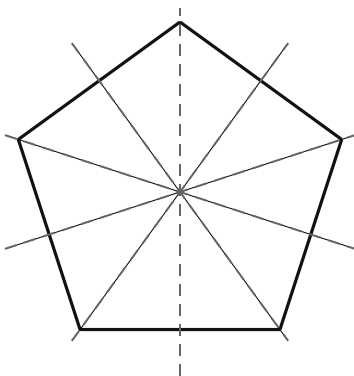
4 lines: two diagonals and two lines through midpoints of opposite sides.



Regular polygon: 4 sides

PRACTICE 3

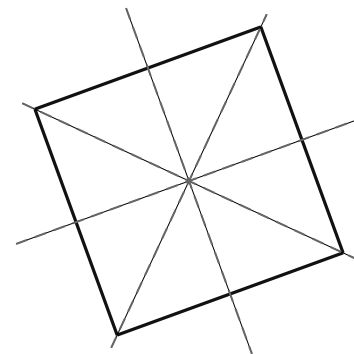
5 lines. Each goes through one vertex and the midpoint of the opposite side; a vertex-to-vertex diagonal does not fold the pentagon onto itself.



Regular polygon: 5 sides

PRACTICE 4

4 lines. Turning preserves the two diagonals and two midpoint-to-midpoint mirror lines.

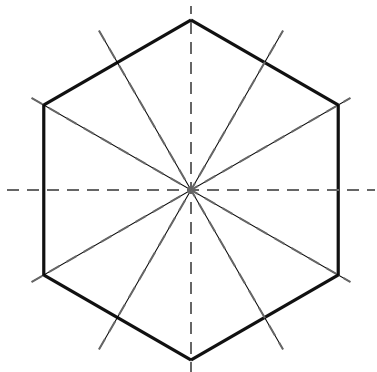


Regular polygon: 4 sides

APPLY IT 1

6 folds: 3 vertex-to-vertex and 3 midpoint-to-midpoint.

Each opposite vertex pair gives one fold; each opposite side pair gives another. Both halves match.

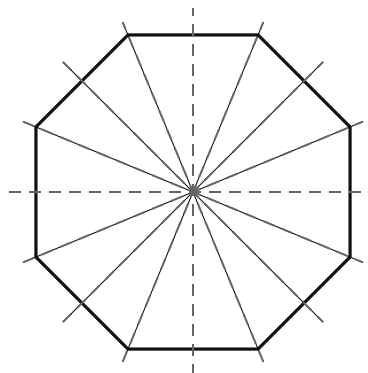


Regular polygon: 6 sides

APPLY IT 2

8 folds: 4 through vertex pairs and 4 through side-midpoint pairs.

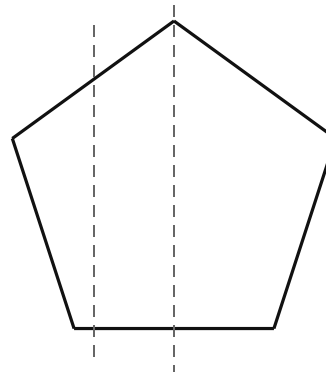
Pair opposite vertices, then opposite sides. These give eight distinct folds with matching halves.



Regular polygon: 8 sides

CHALLENGE

The off-center dashed line is not a mirror line: the halves would not match. One correct line passes through the top vertex, center and midpoint of the bottom side.



Regular polygon: 5 sides