

Shape Detective Lab

Use sides, angles, parallel lines, and symmetry to sort polygons.

GRADE 4 • 4.GSR.8.2

4.GSR.8.2 "Classify, compare, and contrast polygons based on lines of symmetry, the presence or absence of parallel or perpendicular line segments, or the presence or absence of angles of a specified size and based on side lengths."

NAME _____

DATE _____

CHECK THE CLUES

Classify a polygon by checking its side lengths, angle sizes, parallel sides, perpendicular sides, and lines of symmetry. A regular polygon has equal sides and equal angles, and it has the same number of lines of symmetry as sides.

WORKED EXAMPLE

A regular octagon has 8 equal sides.
How many lines of symmetry does it have?

1. A regular polygon has the same number of lines of symmetry as sides.
2. This octagon has 8 sides.
3. So it has 8 lines of symmetry.

Answer: 8 lines of symmetry

PRACTICE 6 problems

- 1** A quadrilateral has 4 equal side lengths and 4 right angles. Classify it.

ANSWER _____

- 2** A quadrilateral has exactly 1 pair of parallel sides. Classify it.

ANSWER _____

- 3** A triangle has 3 equal side lengths. Classify it.

ANSWER _____

- 4** A quadrilateral has opposite sides that are parallel and equal. It has no right angles, and its 4 side lengths are not all equal. Classify it.

ANSWER _____

- 5** A non-square rectangle has 2 lines of symmetry. An equilateral triangle has 3 lines of symmetry. Which shape has more lines of symmetry?

ANSWER _____

- 6** A quadrilateral has 4 equal side lengths, no right angles, and 2 lines of symmetry. Classify it.

ANSWER _____

APPLY IT Show your work

- 1** The art club is sorting window stickers. Sticker A is a quadrilateral with 4 equal sides and 4 right angles. Sticker B is a quadrilateral with 4 equal sides but no right angles. Name each sticker. Which sticker has perpendicular side segments?

WORK SPACE

ANSWER _____

- 2** For a game board, Luis compares two tiles. Tile C is a non-square rectangle. Tile D is a regular pentagon. Which tile has more lines of symmetry, and how many more lines does it have?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Rina says, "A square cannot be a rhombus because it has right angles." Do you agree? Write 2 sentences explaining your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A quadrilateral has 4 equal side lengths and 4 right angles. Classify it.	square
2	A quadrilateral has exactly 1 pair of parallel sides. Classify it.	trapezoid
3	A triangle has 3 equal side lengths. Classify it.	equilateral triangle
4	A quadrilateral has opposite sides that are parallel and equal. It has no right angles, and its 4 side lengths are not all equal. Classify it.	parallelogram
5	A non-square rectangle has 2 lines of symmetry. An equilateral triangle has 3 lines of symmetry. Which shape has more lines of symmetry?	equilateral triangle
6	A quadrilateral has 4 equal side lengths, no right angles, and 2 lines of symmetry. Classify it.	rhombus

PART 2 • APPLY IT

1. **Sticker A is a square. Sticker B is a rhombus. Sticker A has perpendicular side segments.** Four equal sides and four right angles make Sticker A a square. Sticker B has four equal sides but no right angles, so it is a rhombus, and only Sticker A has perpendicular sides.
2. **Tile D has more lines of symmetry. It has 3 more lines than Tile C.** A non-square rectangle has 2 lines of symmetry. A regular pentagon has 5 lines of symmetry, so Tile D has 3 more.

CHALLENGE

I do not agree. A square is a rhombus because it has 4 equal sides, and its right angles do not change that.

Accept correct inclusive classifications, including that a square is also a rectangle and a rhombus. For the trapezoid item, use the stated definition of exactly 1 pair of parallel sides.