Find the Fold

Sort figures by line symmetry

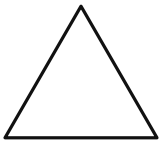
GDA.GM.D.22 "Explore rotations, reflections, and translations using graph paper, tracing paper, and geometry software. a. Given a geometric figure and a rotation, reflection, or translation, draw the image of the transformed figure using graph paper..."

NAME _____ DATE _____

LINE SYMMETRY

You can fold the figure along at least one straight line so its two halves match exactly.

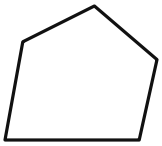
This figure has a line of symmetry through a vertex and the midpoint of the opposite side.



NO LINE SYMMETRY

There is no straight line you can fold along to make the two halves match exactly.

No fold makes both halves of this figure match.



1 SORT

8 items

For Part 1, circle LINE or NONE for each figure; for Part 2, choose one figure from each group and explain how you know.

1.

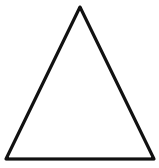


Figure 1

LINE NONE

2.

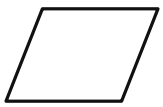


Figure 2

LINE NONE

3.

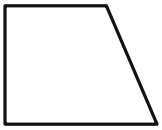


Figure 3

LINE **NONE**

4.



Figure 4

LINE **NONE**

5.

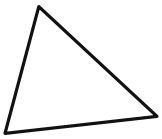


Figure 5

LINE **NONE**

6.

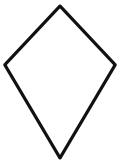


Figure 6

LINE **NONE**

7.

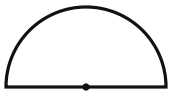


Figure 7

LINE **NONE**

8.

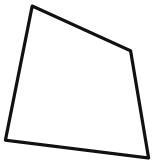


Figure 8

LINE **NONE**

2 PROVE IT

Explain your thinking

Choose one figure from each group and explain how you know.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Draw one new figure with line symmetry and one new figure with no line symmetry. Label each LINE or NONE.

LINE

NONE

CHALLENGE

Draw a figure with no line symmetry that still matches itself after a half-turn. Explain how you know both claims.

ANSWER KEY # Find the Fold

HIGH SCHOOL · GDA.GM.D.22

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Figure 1 (isosceles)	**LINE**	A line through the top vertex and the midpoint of the base makes matching halves.
2	Figure 2 (parallelogram)	**NONE**	The oblique parallelogram has no line of reflection symmetry.
3	Figure 3 (right_trapezoid)	**NONE**	No fold line makes the unequal bases and other sides match.
4	Figure 4 (rectangle)	**LINE**	A line through the midpoints of either pair of opposite sides makes matching halves.
5	Figure 5 (polygon)	**NONE**	All three sides have different lengths, so this triangle has no line of symmetry.
6	Figure 6 (kite)	**LINE**	A line through the vertices where the equal side pairs meet makes matching halves.
7	Figure 7 (semicircle)	**LINE**	A line through the midpoint of the straight edge, perpendicular to that edge, makes matching halves.
8	Figure 8 (polygon)	**NONE**	This irregular quadrilateral has no fold line that makes its halves match.

PART 2 · PROVE IT

Task: Choose one figure from each group and explain how you know.
Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **LINE**: Draw a regular pentagon.
- **NONE**: Draw a triangle with sides of 4 cm, 5 cm, and 6 cm.

Challenge: Draw a Z with equal-length horizontal segments at the top and bottom and a diagonal connecting their opposite ends. A half-turn maps it onto itself, but no fold line makes its halves match.

For Part 2, accept explanations that identify a fold line for a LINE figure or explain why no fold works for a NONE figure. A half-turn is a 180° rotation.