

Just In Time Quick Check
Standard of Learning (SOL) G.3c

Strand: Reasoning, Lines, and Transformations

Standard of Learning (SOL) G.3c

The student will solve problems involving symmetry and transformations. This will include investigating symmetry and determining whether a figure is symmetric with respect to a line or a point.

Grade Level Skills:

- Determine whether a figure has point symmetry, line symmetry, both, or neither.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
 - [G.3c – Symmetry](#) (Word) / [PDF Version](#)
- VDOE Word Wall Cards: Geometry ([Word](#)) | ([PDF](#))
 - Line Symmetry (Examples)
 - Point Symmetry (Examples)
- Other VDOE Resources
 - [Geometry, Module 3, Topic 7 – Symmetry \[eMediaVA\]](#)
- Desmos Activity
 - [Line Symmetry](#)
 - [Point and Line Symmetry](#)

Supporting and Prerequisite SOL: [8.7a](#), [7.6a](#), [6.8a](#), [6.8b](#)

SOL G.3c - Just in Time Quick Check

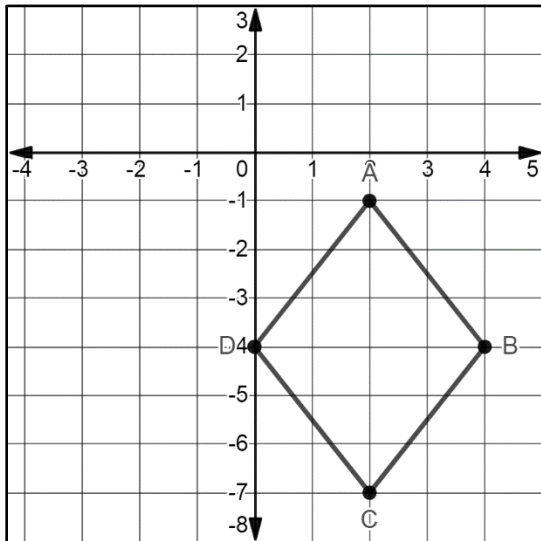
1. Use the following letters to answer the questions below. Explain your reasoning.

U P X N J

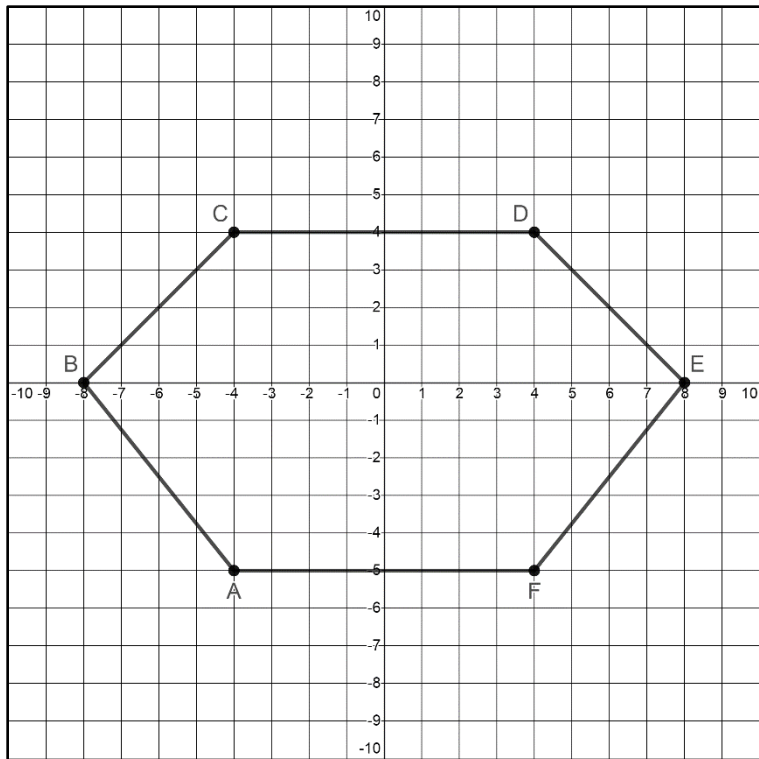
- Which letter(s) have both line symmetry and point symmetry?
 - Which letter(s) have line symmetry, but not point symmetry?
 - Which letter(s) have point symmetry, but not line symmetry?
2. Determine if the parallelogram and rectangle have line symmetry, point symmetry, both line and point symmetry, or neither point nor line symmetry. If line symmetry is present, draw the line(s) of symmetry.



3. Quadrilateral ABCD with points A (2, -1), B (4, -4), C (2, -7), D (0, -4) is shown below. Write the equation of the line(s) of symmetry in Quadrilateral ABCD. Explain your reasoning.



4. Given Polygon ABCDEF with points A (-4,-5), B (-8, 0), C (-4, 4), D (4, 4), E (8, 0), F (4, -5), determine if the polygon has point symmetry, line symmetry, both, or neither. If the figure has line symmetry, identify how many lines. Explain your answer.



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Common Errors/Misconceptions and their Possible Indications

1. Use the following letters to answer the questions below.

U P X N J

- Which letter(s) have both line symmetry and point symmetry? Explain your answer.
- Which letter(s) have lines symmetry, but not point symmetry? Explain your answer.
- Which letter(s) have point symmetry, but not line symmetry? Explain your answer.

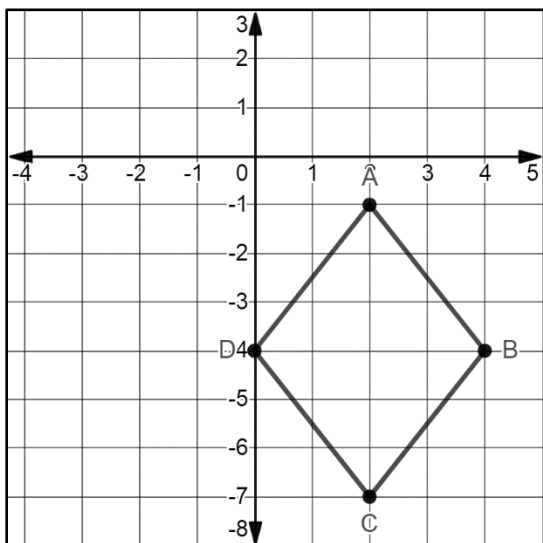
Some students may assume incorrectly that N contains a line of symmetry diagonally. Additionally, some students may not readily see that N has point symmetry. Students could use techniques such as mirrors and paper folding as a strategy to help identify lines of symmetry. Another strategy may include using one half of a figure or image and having students create the other half of the figure or image that would make the figure or image symmetric. Teachers can use digital graphics to rotate electronically or students can physically rotate a copy of an image as a strategy for identifying point symmetry. Teachers should use VDOE Word Wall cards and Mathematical Instructional Plans (MIPs) for references and activities.

2. Determine if the parallelogram and rectangle have line symmetry, point symmetry, both line and point symmetry, or neither point nor line symmetry. If line symmetry is present, draw the line(s) of symmetry.



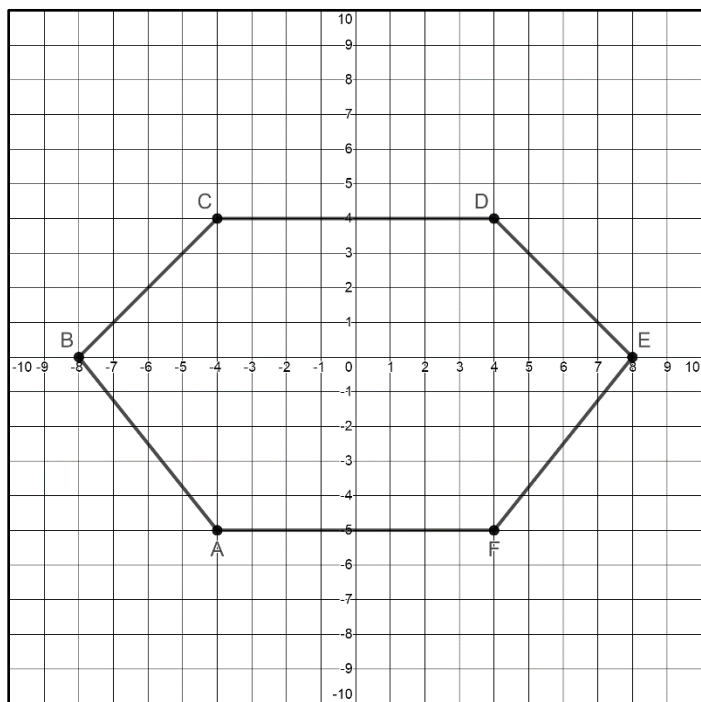
A common error some students may make is to draw lines of symmetry on the diagonals of the quadrilaterals. This may indicate that a student perceives all lines that divide a figure into two congruent figures are lines of symmetry, which is not true. Techniques and strategies for helping students in identifying line symmetry may include using a coordinate grid and pattern blocks to provide students with a conceptual understanding of line symmetry using manipulatives. Have students create symmetrical designs and determine the line of symmetry in their design. Teachers may also wish to insert a black line on the coordinate grid in different locations (on the x-axis, y-axis, $y=x$, etc.) and encourage students to create a symmetrical design using the given line of symmetry. Teachers are encouraged to use a variety of examples related to symmetry to include letters, shapes, numbers, and images found in nature.

3. Quadrilateral ABCD with points A (2, -1), B (4, -4), C (2, -7), D (0, -4) is shown below. Write the equation(s) of the line(s) of symmetry in Quadrilateral ABCD.



A common error a student might make is to identify incorrectly the lines of symmetry as $x = -4$ and $y = 2$ in polygon ABCD. This may indicate that a student struggles with writing the equations of horizontal and vertical lines. Teachers should encourage students to use a dynamic graphing calculator or Desmos to graph the lines of symmetry. Using Desmos, students are able to graph the figure as well as the lines of symmetry.

4. Given Polygon ABCDEF with points A (-4,-5), B (-8, 0), C (-4, 4), D (4, 4), E (8, 0), F (4, -5), determine if the polygon has point symmetry, line symmetry, both, or none. If the figure has line symmetry, identify how many lines. Explain your answer.



A common error a student might make would be to identify that the figure has both line symmetry and point symmetry. Students may use the image as a means of determining symmetry because they assume it is a regular hexagon rather than verifying algebraically. Teachers should encourage students to verify that corresponding sides are congruent using the distance formula before they assume that the figure is a regular hexagon. When side lengths are verified, it will be determined that \overline{CB} and \overline{DE} are not congruent to \overline{AB} and \overline{FE} . Additionally, teachers should encourage students to use a dynamic graphing calculator or Desmos.