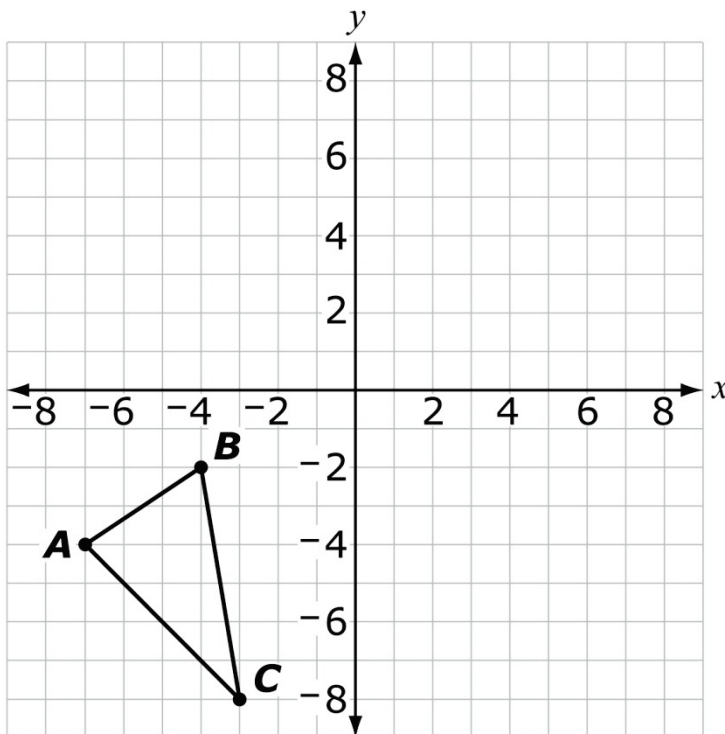


## MAT.08.ER.3.0000G.F.559 Claim 3

Sample Item ID:	MAT.08.ER.3.0000G.F.559
Grade:	08
Primary Claim:	<b>Claim 3: Communicating Reasoning</b> Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
Secondary Claim(s):	Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.  Claim 2: Problem Solving Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.
Primary Content Domain:	Geometry
Secondary Content Domain(s):	
Assessment Target(s):	3 F: Base arguments on concrete referents such as objects, drawings, diagrams, and actions.  1 G: Understand congruence and similarity using physical models, transparencies, or geometry software.  2 D: Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).
Standard(s):	8.G.3
Mathematical Practice(s):	1, 3, 5, 7
DOK:	3
Item Type:	ER
Score Points:	4
Difficulty:	H
Key:	See Sample Top-Score Response.
Stimulus/Source:	
Claim-Specific Attributes (e.g., accessibility issues):	
Notes:	Students should be able to plot points on the coordinate plane to help them answer the question. Requires AI scoring. The response boxes will accept up to 2 numeric characters including negative (-) and positive (+) symbols.

Triangle  $ABC$  is shown on this coordinate grid.



**Part A**

$\triangle ABC$  is rotated 180 degrees clockwise about the origin to form  $\triangle DEF$ . What are the coordinates of the vertices of  $\triangle DEF$ ?

$D$ (, )

$E$ (, )

$F$ (, )

**Part B**

What conjecture can be made about the relationship between the coordinates of the vertices of an original shape and the coordinates of the vertices of the image of the shape when it is rotated 180 degrees clockwise about the origin?

You must demonstrate that the conjecture is always true or that there is at least one example in which the conjecture is not true.

*Sample Top-Score Response:*

**Part A**

$D(7, 4)$ ,  $E(4, 2)$ ,  $F(3, 8)$

**Part B**

The conjecture is that the coordinates of the vertices of the image will have the opposite sign of the coordinates of the vertices of the original shape. When a point is rotated 180 degrees clockwise about the origin, if a line is drawn through the original point and the origin, the image of the point will also be on the line, and it will be the same distance from the origin that the original point was, but on the opposite side of the origin. When two points on the same line are the same distance from the origin and on opposite sides of the origin, the coordinates of the points have opposite signs, because the slope from each coordinate to the origin is the same, but to move from the origin to each point to get its coordinates, you must move in opposite directions. So if you move right from the origin to get to one point, you will move left to get to the other, and if you move up from the origin to get to one point, you will move down to get to the other. So the coordinates of the vertices of the image will have the opposite sign of the coordinates of the vertices of the original shape.

*Scoring Rubric:*

Responses to this item will receive 0-4 points, based on the following:

**4 points:** The student shows thorough understanding of how to rotate figures on the plane and make and justify conjectures regarding rotated figures. The student gives the correct coordinates of the triangles in *Part A* and provides a correct conjecture and justification in *Part B*.

**3 points:** The student shows good but incomplete understanding of how to rotate figures on the plane and make and justify conjectures regarding rotated figures. The student gives the correct coordinates of the triangles in *Part A* and provides a correct conjecture in *Part B*, but the justification of the conjecture is incomplete (e.g., only specific examples are given) although it demonstrates progress. **OR** *Part B* is complete and correct but the student makes a minor error when listing the coordinates of the triangles in *Part A*.

**2 points:** The student shows partial understanding of how to rotate figures on the plane

and make and justify conjectures regarding rotated figures. The student gives the correct coordinates of the triangles in *Part A* and provides a correct conjecture in *Part B*, but the justification of the conjecture is incorrect. **OR** The student makes 1 or 2 minor mistakes when listing the coordinates of the triangles in *Part A*, provides a correct conjecture in *Part B*, but the justification of the conjecture is incomplete (e.g., only specific examples are given) although it demonstrates progress.

**1 point:** The student shows limited understanding of how to rotate figures on the plane and make and justify conjectures regarding rotated figures. The student gives the correct coordinates of the triangles in *Part A* but *Part B* is incorrect. **OR** The student provides a correct conjecture in *Part B*, but makes 1 or 2 minor mistakes when listing the coordinates of the triangles in *Part A* and the justification of the conjecture in *Part B* is incorrect.

**0 points:** The student shows inconsistent or no understanding of how to rotate figures on the plane and make and justify conjectures regarding rotated figures.