

MAT.08.ER.3.0000G.B.059 Claim 3

Sample Item ID:	MAT.08.ER.3.0000G.B.059
Grade:	08
Primary Claim:	Claim 3: Communicating Reasoning 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 B: Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. 1 G: Understand congruence and similarity using physical models, transparencies, or geometry software. 2 B: Select and use appropriate tools strategically. 3 F: Base arguments on concrete referents such as objects, drawings, diagrams, and actions.
Standard(s):	8.G.3
Mathematical Practice(s):	1, 3, 5, 7
DOK:	3
Item Type:	ER
Score Points:	3
Difficulty:	H
Key:	See Sample Top-Score Response.
Stimulus/Source:	
Target-Specific Attributes (e.g., accessibility issues):	This item will need a graphing feature that can be used multiple times (if needed) to give illustrations of the reasoning being given. The points graphed should be labeled with their coordinates.
Notes:	Students should be able to plot points on the coordinate plane to help them answer the question. Requires AI scoring.

A student made this conjecture about reflections on an xy coordinate plane.

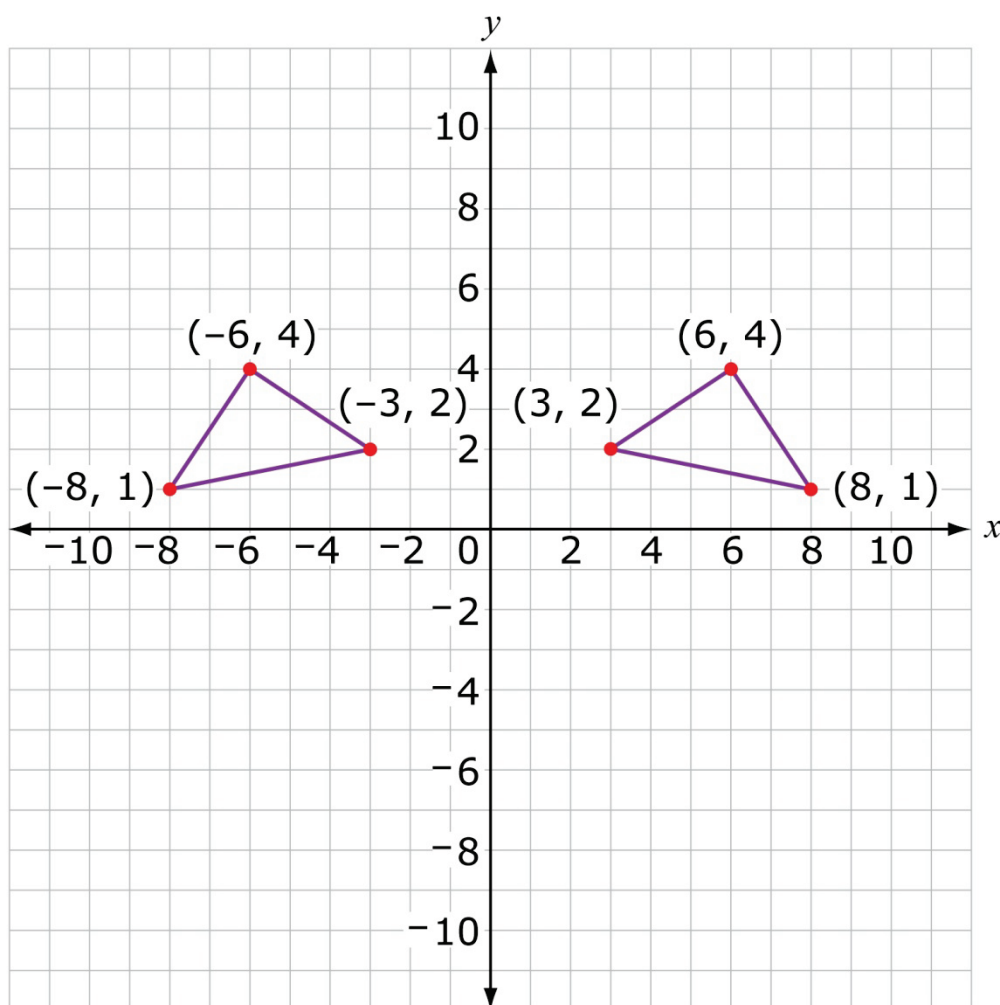
When a polygon is reflected over the y -axis, the x -coordinates of the corresponding vertices of the polygon and its image are opposite, but the y -coordinates are the same.

Develop a chain of reasoning to justify or refute the conjecture. You must demonstrate that the conjecture is always true or that there is at least one example in which the conjecture is not true. You may include one or more graphs in your response.

To include a graph to support your reasoning, put your cursor where you want the graph to be, and then click the Graph icon to insert a graph.

Sample Top-Score Response:

When a polygon is reflected over the y -axis, each vertex of the reflected polygon will end up on the opposite side of the y -axis but the same distance from the y -axis. So, the x -coordinates of the vertices will change from positive to negative or negative to positive, but the absolute value of the number will stay the same, so the x -coordinates of the corresponding vertices of the polygon and its image are opposites. Since the polygon is being reflected over the y -axis, the image is in a different place horizontally but it does not move up or down, which means the y -coordinates of the vertices of the image will be the same as the y -coordinates of the corresponding vertices of the original polygon. As an example, look at the graph below, and notice that the x -coordinates of the corresponding vertices of the polygon and its image are opposites but the y -coordinates are the same. This means the conjecture is correct.



Scoring Rubric:

Responses to this item will receive 0-3 points, based on the following:

3 points: The student shows a thorough understanding of how to construct a chain of reasoning to justify a statement regarding reflections. The student provides a chain of reasoning that demonstrates that it is ALWAYS true that the x -coordinates of the corresponding vertices of the polygon and its image are opposites but the y -coordinates are the same when a polygon is reflected over the y -axis.

2 points: The student shows a partial understanding of how to construct a chain of reasoning to justify a statement regarding reflections. The student makes progress in providing a chain of reasoning that demonstrates that it is always true that the x -coordinates of the corresponding vertices of the polygon and its image are opposites but the y -coordinates are the same when a polygon is reflected over the y -axis. However, there are gaps in the student's reasoning, such as not fully addressing the distance of the x -coordinates from the y -axis or the opposite signs of the x -coordinates on either side of the y -axis or why the y -coordinates are the same. **OR** The student provides a thorough justification that shows that the conjecture is not true for reflections over the x -axis.

1 point: The student shows a limited understanding of how to construct a chain of reasoning to justify a statement regarding reflections. The student only uses specific examples to show that the x -coordinates of the corresponding vertices of the polygon and its image are opposites but the y -coordinates are always the same when a polygon is reflected over the y -axis. **OR** The student makes progress in providing a justification that shows that the conjecture is not true for reflections over the x -axis. **OR** The student provides a thorough justification that shows that the conjecture is not true for a transformation other than a reflection.

0 points: The student shows inconsistent or no understanding of how to construct a chain of reasoning to justify a statement regarding reflections.