

Cross-Curricular Argumentation Guide A

Name: _____ Date: _____ Class: _____ Topic: Rotation of a Shape (Use information on following page.)

<p>1. Clarify the claim with any qualifier and define the key terms. For triangle XYZ shown in Figure 2 to move to the position of triangle X'Y'Z', it <u>must</u> be rotated counterclockwise 180°.</p> <p>2. List the evidence.</p> <ul style="list-style-type: none"> The table (Figure 1) shows the mathematical relationship of points of a triangle when rotated a set number of degrees in a set direction. The graph (Figure 2) provides the following information about rotated triangles XYZ and X'Y'Z' : <ul style="list-style-type: none"> Coordinates of point X = (1,2) Coordinates of corresponding point X' = (-1, -2) Coordinates of point Y = (3,5) Coordinates of corresponding point Y' = (-3, -5) Coordinates of point Z = (-3,4) Coordinates of corresponding point Z' = (3, -4) 	<p>3. Analyze the reasoning.</p> <ul style="list-style-type: none"> Because the table in Figure 2 shows Shape Rotation Rules, then identifying the relationships between corresponding points in triangles XYZ and X'Y'Z' will tell us the number of degrees and the direction of rotation of the triangle. Because the pattern of points on the original triangle is always (x,y) and the pattern of points on the triangle after rotation is always (-x,-y), according to the table in Figure 1, the image <u>could</u> have been rotated 180° in a counterclockwise direction as stated in the claim, but there is another possibility. The triangle also could have been rotated 180° in a clockwise direction.
<p>4. Identify other arguments for or against the claim. Since the table for rotation shows that triangle XYZ could have been rotated 180° in either a clockwise or counterclockwise direction and gotten to the position of triangle X'Y'Z', the qualifier <u>must</u> makes the claim inaccurate.</p>	<p>5. Make a judgment about the quality of evidence, reasoning, and other arguments. The evidence is good because it is based on accepted mathematical rules and direct observation. The reasoning is logical because it links the observations to the math facts, but it is incomplete due to the qualifier <u>must</u>. The result could be found in another way.</p>
<p>6. State why you accept or reject the claim. I reject the claim because of the qualifier <u>must</u>. Triangle XYZ <u>could</u> have rotated 180° in a counterclockwise direction, but it could also have rotated 180° in a clockwise direction to get to the same position.</p>	

Background information to analyze the claim about rotation of a shape

For triangle XYZ shown in Figure 2 to move to the position of triangle X'Y'Z', it must be rotated counterclockwise 180° .

Type of Rotation of image	Point on the original triangle	Point on the triangle after rotation
Rotation of 90° clockwise	(x, y)	$(y, -x)$
Rotation of 90° counterclockwise	(x, y)	$(-y, x)$
Rotation of 180° clockwise or counterclockwise	(x, y)	$(-x, -y)$
Rotation of 270° clockwise	(x, y)	$(-y, x)$
Rotation of 270° counterclockwise	(x, y)	$(y, -x)$

Figure 1.
Shape Rotation Rules

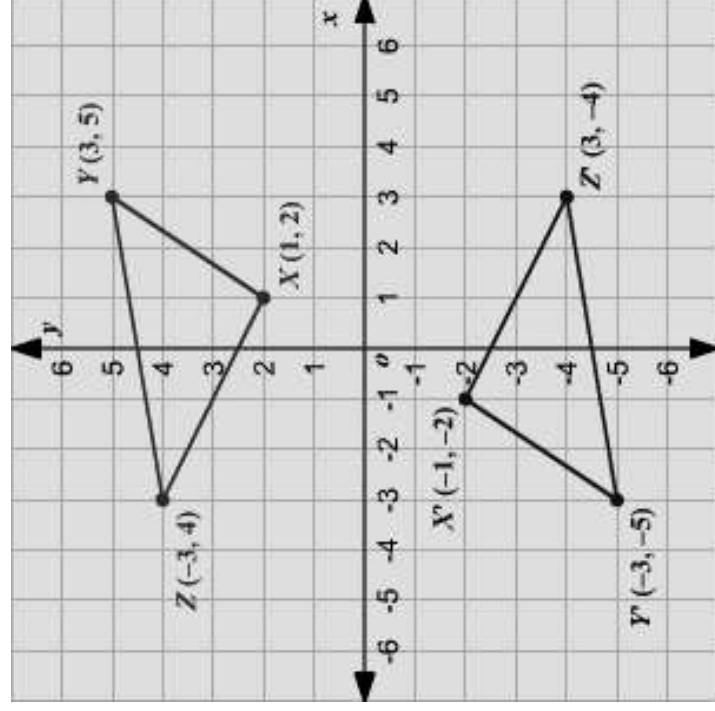


Figure 2.
Rotated Triangles