



## Transformations = How to describe

Translations →

$(x, y) \rightarrow (x + 1, y - 7)$  Translation Rule  
 $\langle 1, -7 \rangle$  Component Form of a **Vector**  
 Right 1, Down 7 Words

Reflections →

$x = 0$	$y = 0$	$y = x$	$y = -x$
<b>Vertical</b> (y-axis)	<b>Horizontal</b> (x-axis)		
		$(x, y) \rightarrow (y, x)$	$(x, y) \rightarrow (-y, -x)$

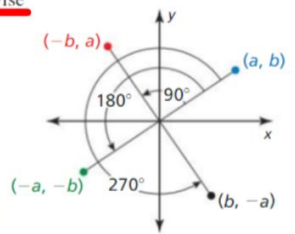
Rotations →

- 3 Components
- Center
  - Angle of Rotation
  - Direction (CW or CCW)

**Coordinate Rules for Rotations about the Origin**

When a point  $(a, b)$  is rotated counterclockwise about the origin, the following are true.

- For a rotation of  $90^\circ$ , | Same as  $270^\circ$  CW  
 $(a, b) \rightarrow (-b, a)$ .
- For a rotation of  $180^\circ$ , | Same as  $180^\circ$  CW  
 $(a, b) \rightarrow (-a, -b)$ .
- For a rotation of  $270^\circ$ , | Same as  $90^\circ$  CW  
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\*If no direction is listed, ALWAYS assume CCW\*

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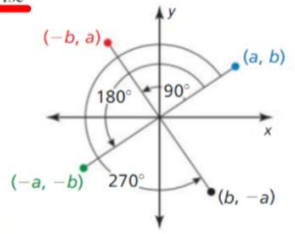
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