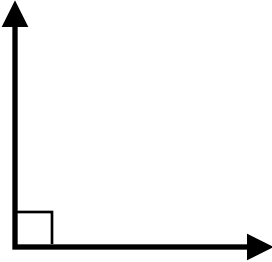

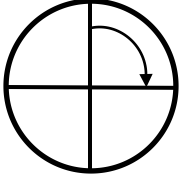
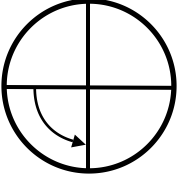
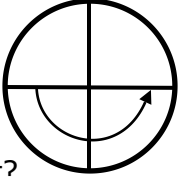
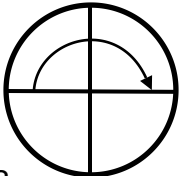


## Isometric Transformations: Rotations

**Rotation:** A transformation that turns the plane through a given angle about (around) a given point.

In other words, a translation is a turn around a center point. The angle is called the angle of rotation and the point around which the plane is turned is called the center point of rotation.

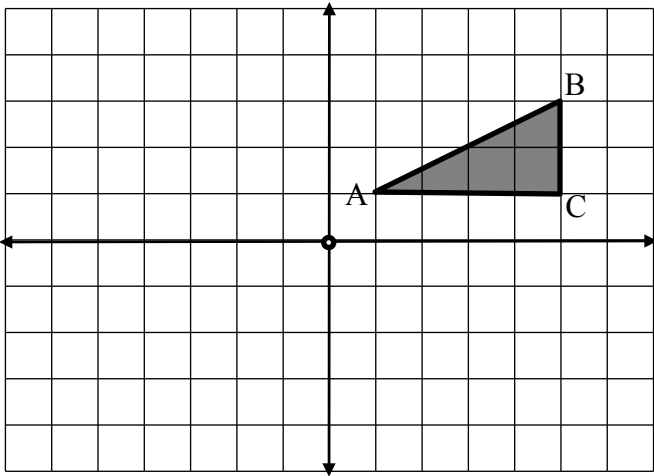
But before we start spinning around, lets talk about angles and clocks.

<p><b>1.</b> What kind of angle is this?</p> <p>How many degrees does it measure?</p> <div style="text-align: center;">  </div>	<p><b>2.</b></p> <div style="text-align: center;">  </div> <p>What kind of angle is this?</p> <p>How many degrees does it measure?</p>
<p><b>3.</b> How many degrees are there in a quarter rotation clockwise?</p> <p>Did this rotate the same direction as a clock or against it?</p> <div style="text-align: center;">  </div> <p>So a rotation counter-clockwise means rotate _____ a clock. We can also say this is a <math>-90^\circ</math> rotation.</p>	<p><b>4.</b> How many degrees are there in a quarter rotation counter-clockwise?</p> <p>Did this rotate the same direction as a clock or against it?</p> <div style="text-align: center;">  </div> <p>So a rotation counter-clockwise means rotate _____ a clock. We can also say this is a <math>90^\circ</math> rotation.</p>
<p><b>5.</b> How many degrees are there in a half rotation counter-clockwise?</p> <p>Did this rotate the same direction as a clock or against it?</p> <div style="text-align: center;">  </div> <p>So a rotation counter-clockwise means rotate _____ a clock. We can also say this is a <math>180^\circ</math> rotation.</p>	<p><b>6.</b> How many degrees are there in a half rotation clockwise?</p> <p>Did this rotate the same direction as a clock or against it?</p> <div style="text-align: center;">  </div> <p>So a rotation counter-clockwise means rotate _____ a clock. We can also say this is a <math>-180^\circ</math> rotation.</p>

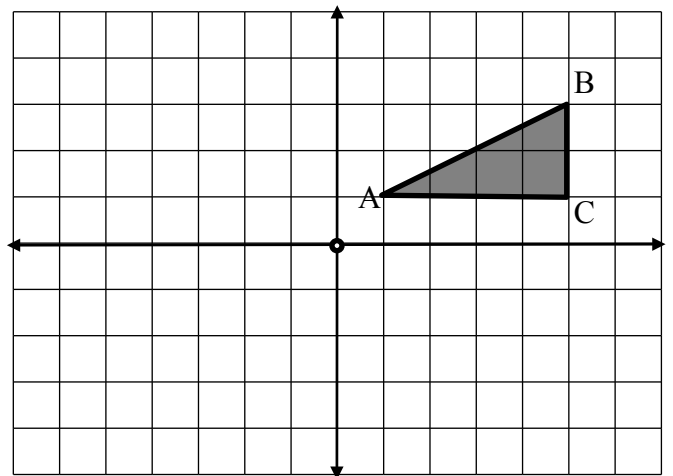
**Directions:** Use patty paper, Geometry software, or any other method available to you to rotate each figure as directed. Make sure to label your new figure.

**1.** Rotate ABC 90° clockwise about the origin.

$R_{O,-90^\circ}$

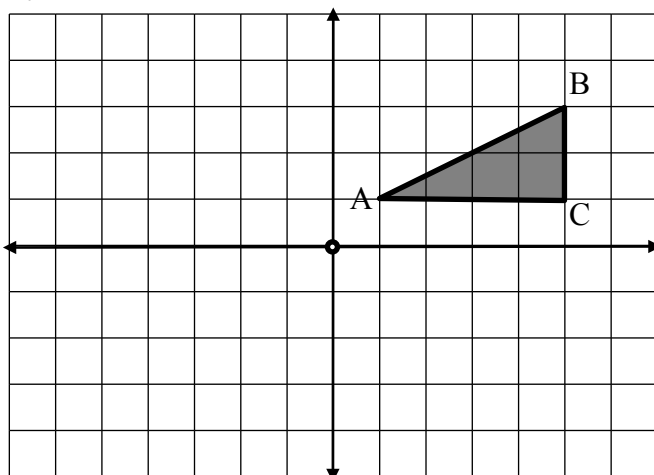


**2.** Rotate ABC 90° counter-clockwise about the origin.  $R_{O,90^\circ}$

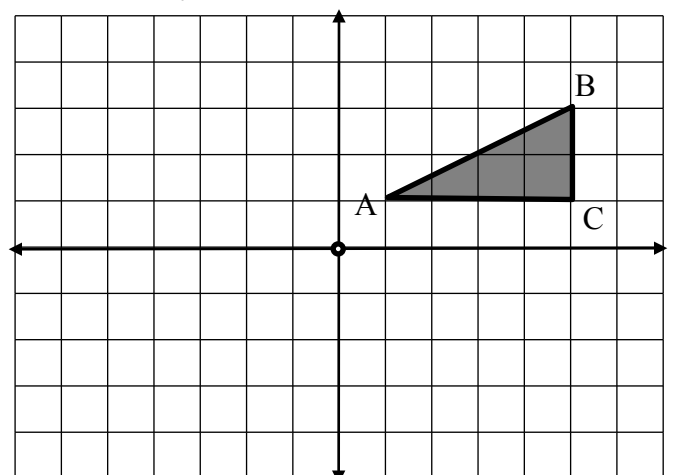


**3.** Rotate ABC 180° clockwise about the origin.

$R_{O,-180^\circ}$



**4.** Rotate ABC 180° counter-clockwise about the origin.  $R_{O,180^\circ}$



**5a.** What do you think happens to the center point of rotation? Does it move?

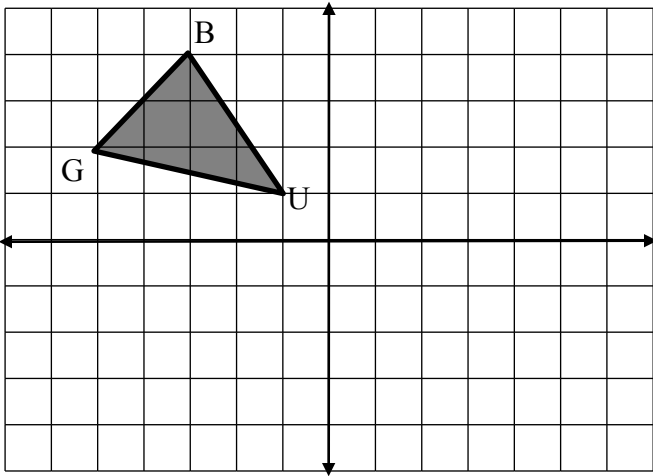
**b.** What do think... is each points in image the same distance from the center as in the original figure? Why?

**6.** Is a rotation an isometric transformation?

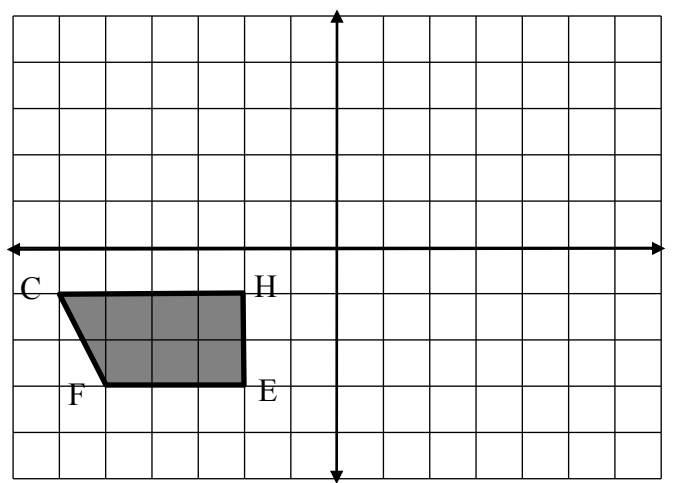
**Directions:** Use patty paper, Geometry software, or any other method to rotate each figure as directed. Make sure to label your image figure correctly.

1. Rotate BUG 180° clockwise about the origin.

$R_{O,-180^\circ}$

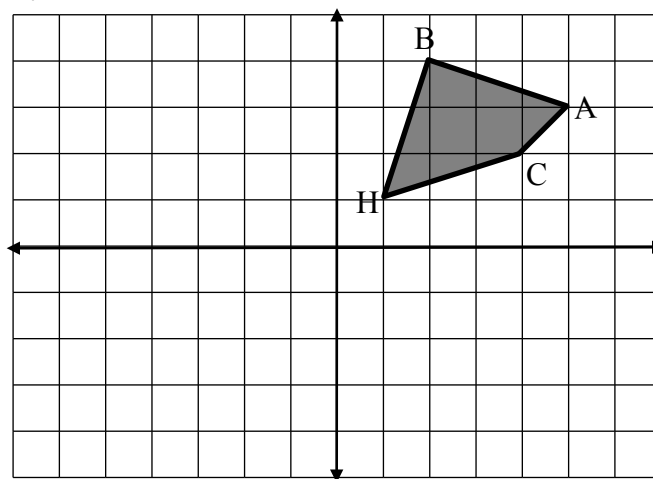


2. Rotate CHEF 180° counter-clockwise about the origin.  $R_{O,180^\circ}$

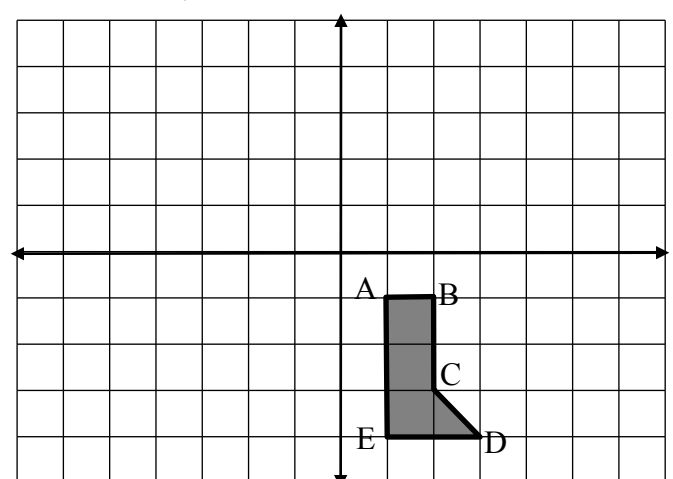


3. Rotate BACH 90° clockwise about the origin.

$R_{O,-90^\circ}$

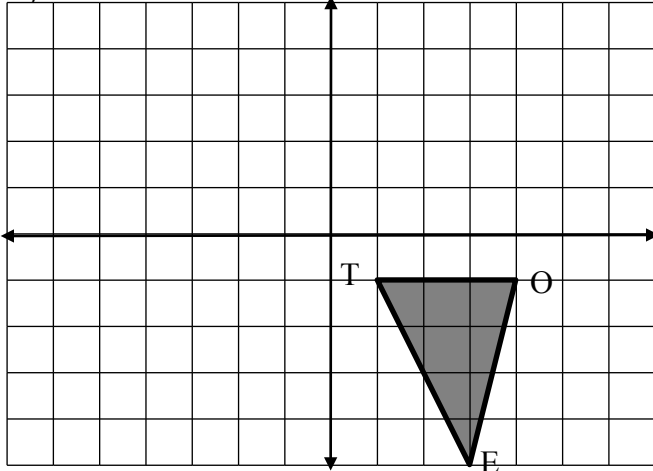


4. Rotate ABCDE 90° counter clockwise about the origin.  $R_{O,90^\circ}$

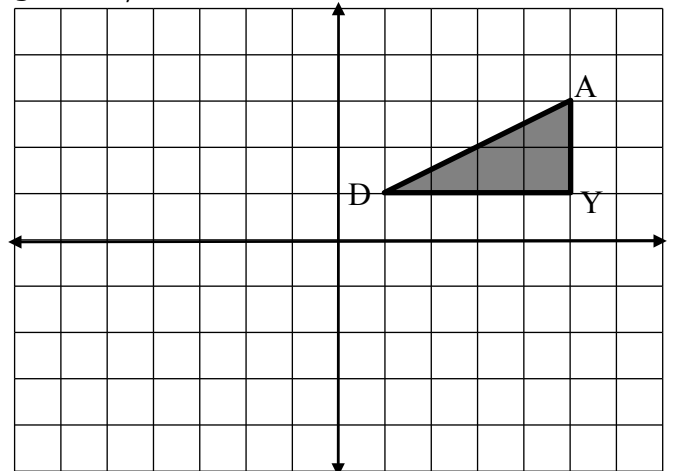


5. Rotate TOE 90° clockwise about the origin.

$R_{O,-90^\circ}$



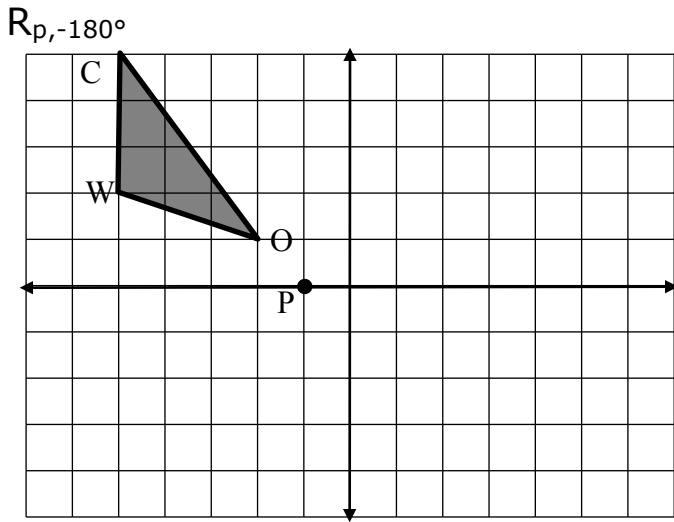
6 Rotate DAY 90° counter- clockwise about the origin.  $R_{O,90^\circ}$



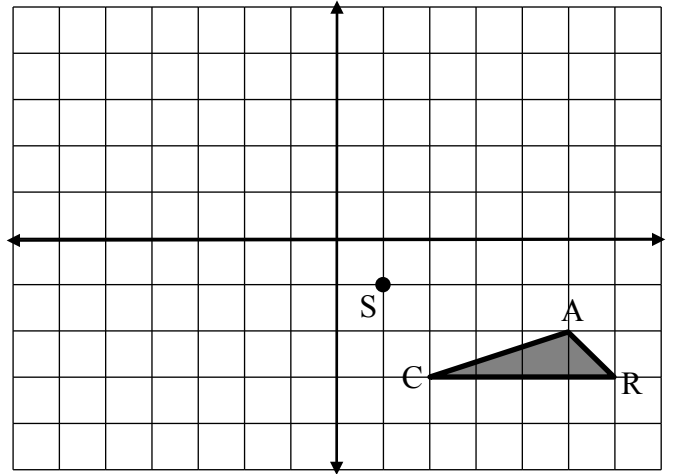


**Directions:** We can also rotate figures around other points. Use patty paper, Geometry software, or any other method to rotate each figure as directed. Make sure to label figure.

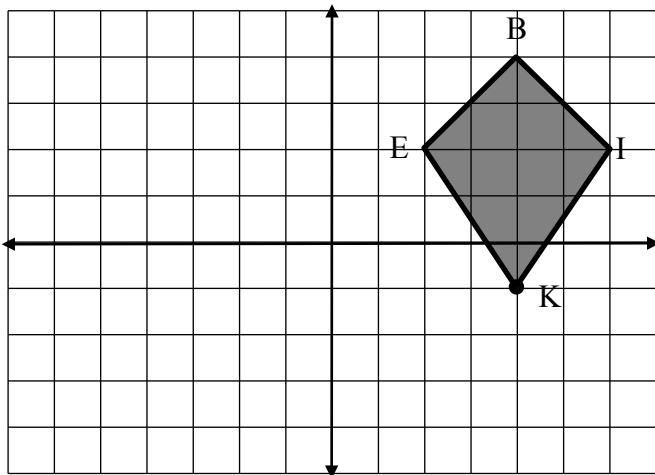
**1.** Rotate COW 180° clockwise about point P.  $R_{P,-180^\circ}$



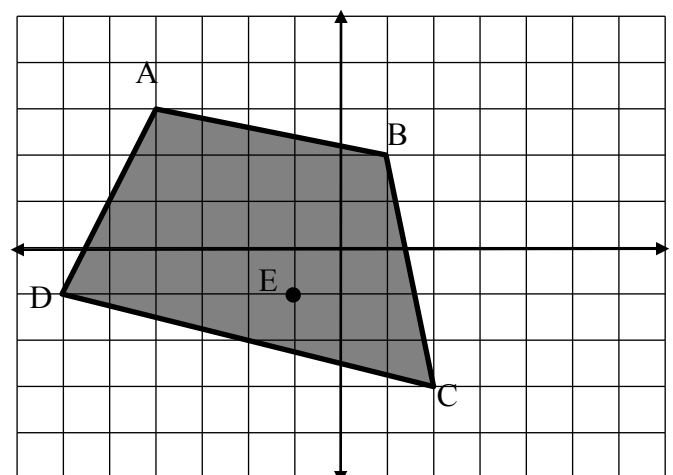
**2.** Rotate CAR 90° counter-clockwise about point S.  $R_{S,90^\circ}$



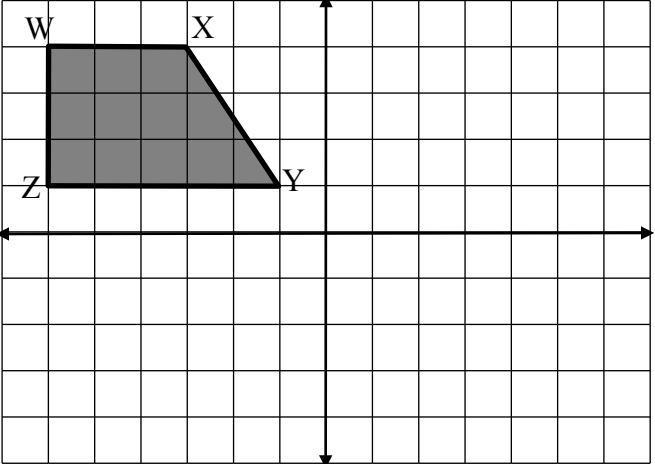
**3.** Rotate BIKE 90° counter-clockwise about the point K.  $R_{K,90^\circ}$



**4.** Rotate ABC 90° clockwise about point E.  $R_{E,-90^\circ}$



**5.** Rotate ABC 180° counter-clockwise about point Y.  $R_{Y,180^\circ}$



**6.** Rotate PIN 90° clockwise about point R.  $R_{R,-90^\circ}$

