

## Curriculum Outcomes

(SS3) Demonstrate an understanding of similarity of polygons.

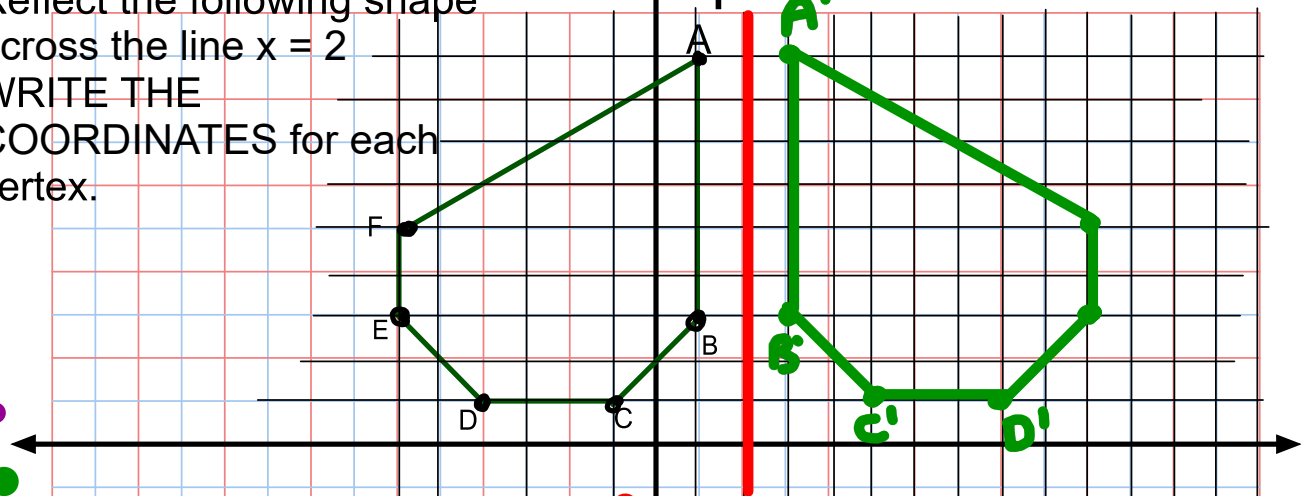
(SS4) Draw and interpret scale diagrams of 2-D shapes.

(SS5) Demonstrate an understanding of line and rotation symmetry.

Student Friendly: Rotating shapes a certain degrees, about specific point.

Warm Up

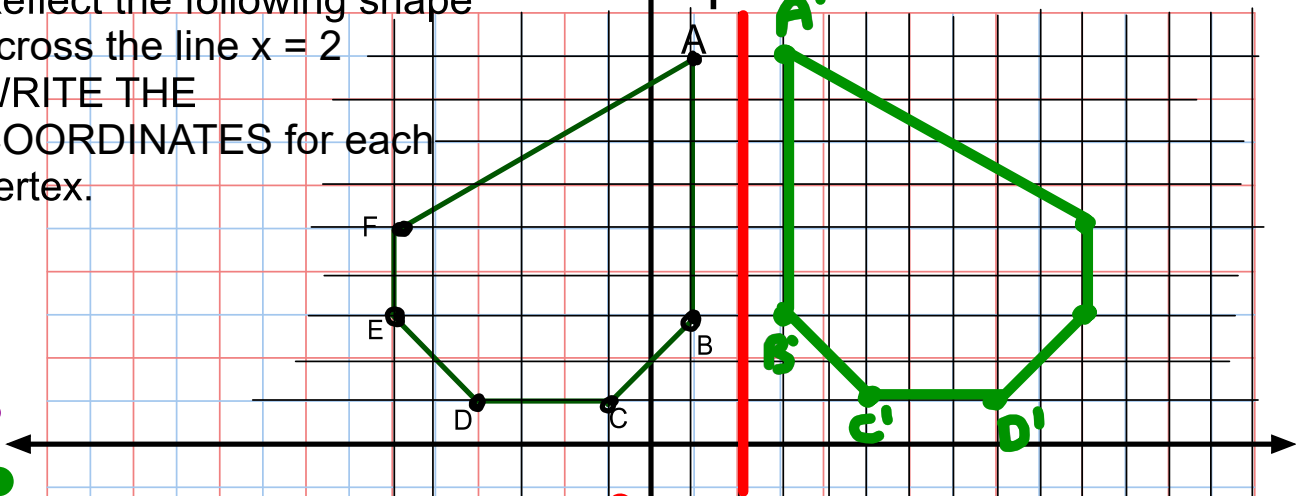
Reflect the following shape across the line  $x = 2$   
 WRITE THE COORDINATES for each vertex.



$A(1, 9)$	$E(-6, 3)$	$A'(3, 9)$	$E'(10, 3)$
$B(1, 3)$	$F(-6, 5)$	$B'(3, 3)$	$F'(10, 5)$
$C(-1, 1)$		$C'(5, 1)$	
$D(-4, 1)$		$D'(8, 1)$	

Warm Up

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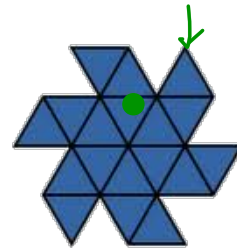
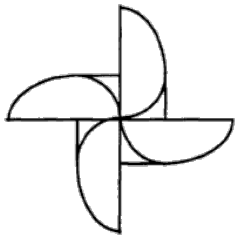


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# Section 7.6

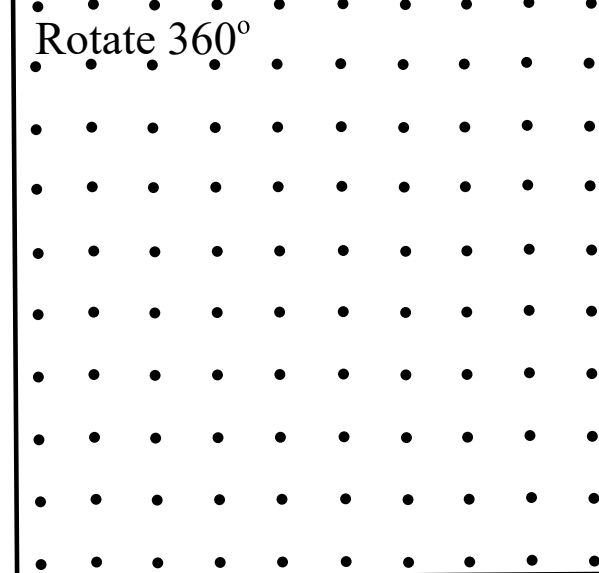
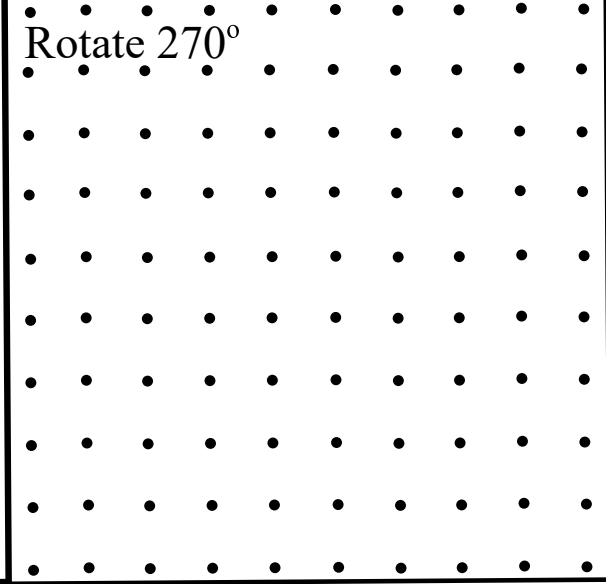
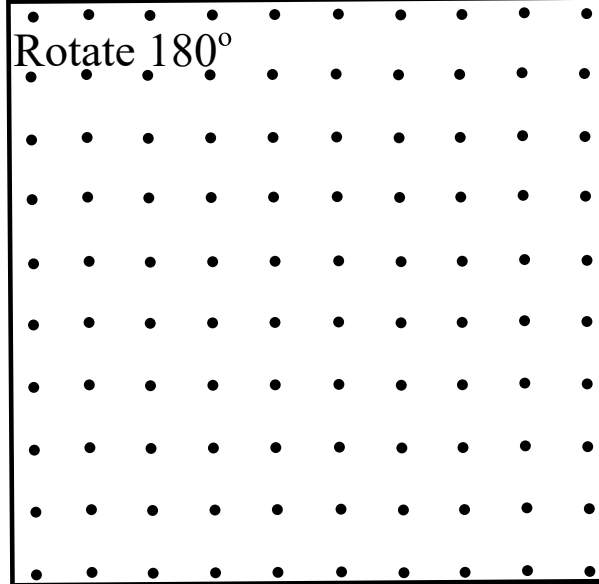
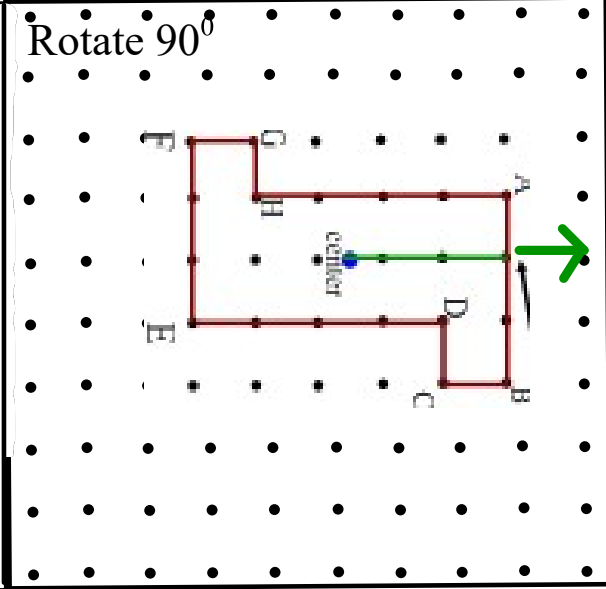
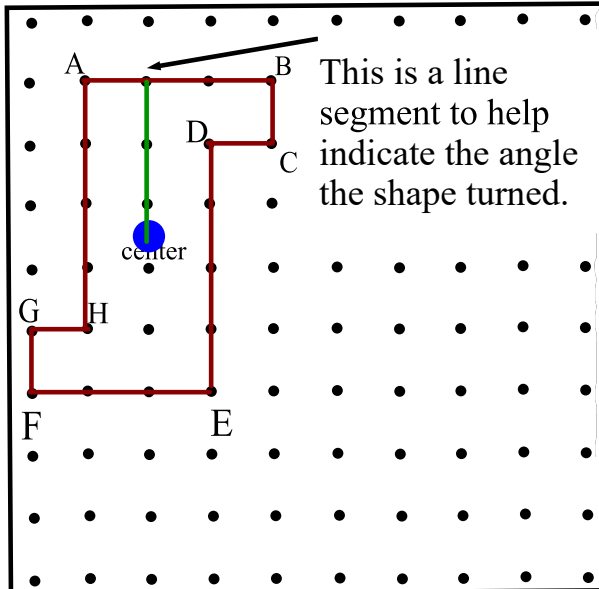


# Rotations & Rotational Symmetry

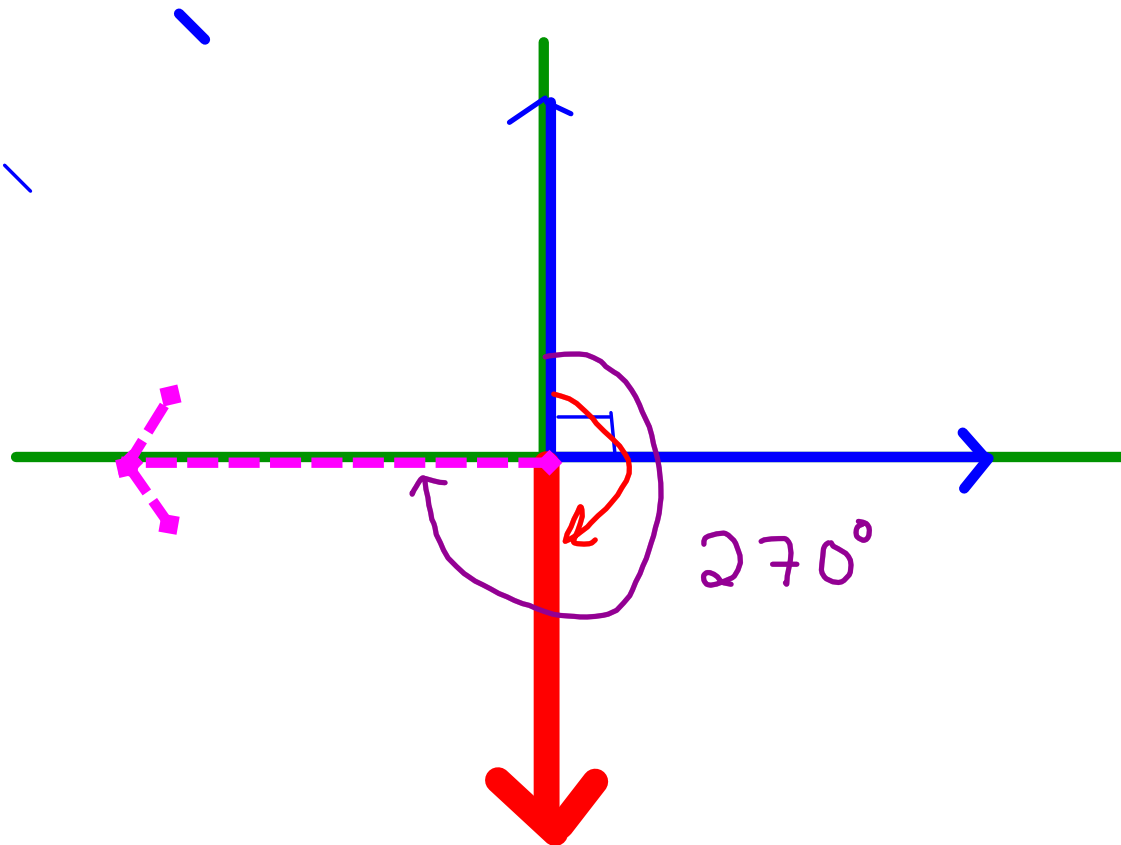


Lets rotate this object about its center

On your copy draw the rotated figure



Which pictures look like the original?



Lets rotate this object about its center

On your copy draw the rotated figure

	<p>Rotate <math>90^\circ</math></p>
<p>Rotate <math>180^\circ</math></p>	<p>Rotate <math>270^\circ</math></p>
<p>Rotate <math>360^\circ</math></p>	<p>Which pictures look like the original?</p> <p>How many ???</p> <p><b>coincides</b> : looks the same as the original</p>

LOOK AT THE NEXT SLIDE THEN COME BACK TO THIS

This object has Rotational symmetry of order 2.

Angle of Rotational Symmetry: \_\_\_\_\_



= \_\_\_\_\_

# Rotations

A shape has rotational symmetry when it coincides with itself after a rotation of  $360^\circ$  about its centre.



Order of Rotation is the number of times a shape coincides with itself during a  $360^\circ$  rotation

How to state this?

rotational symmetry of order \_\_\_\_

Angle of Rotational Symmetry:  $\frac{360^\circ}{\text{the order of rotation}}$

Note:

A shape that requires a rotation of  $360^\circ$  to return to its original shape does not have a rotational symmetry. A shape cannot have a rotational symmetry of 1.

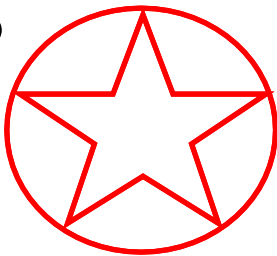
Look at the web book video in rotations

[www.mathmakessense.ca](http://www.mathmakessense.ca)



Determine if the following shapes have rotational symmetry. If so state the order of rotation and the angle of rotationsymmetry.

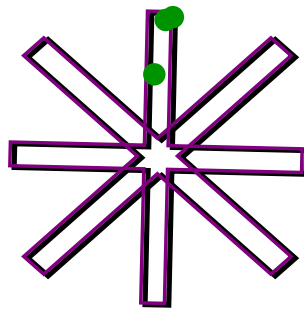
1)



order: 5

$$\begin{aligned} \text{angle} &= \frac{360}{5} \\ &= 72^\circ \end{aligned}$$

2)



order: 8

$$\begin{aligned} \text{angle} &= \frac{360}{8} \\ &= 45^\circ \end{aligned}$$

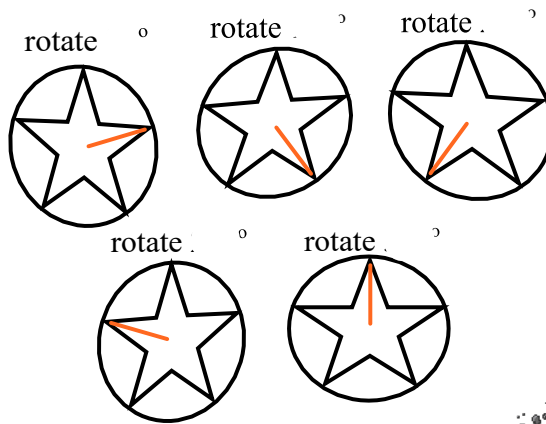
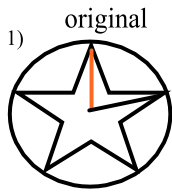
3)



order = 0

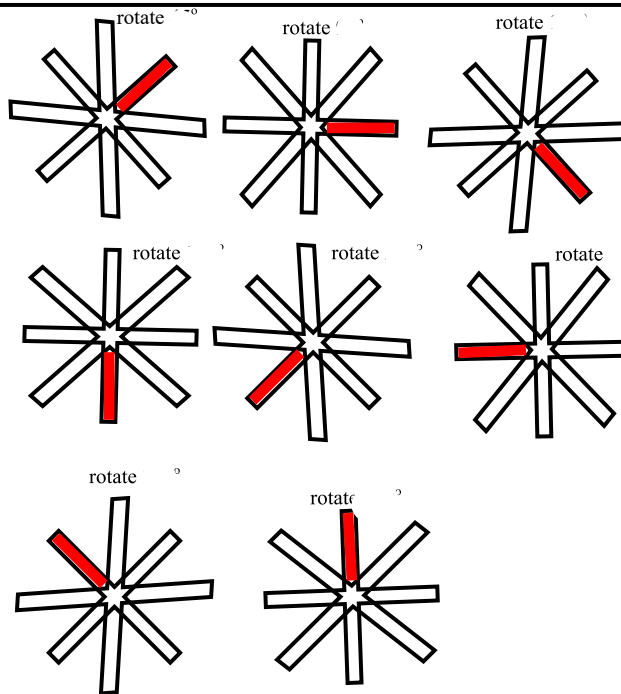
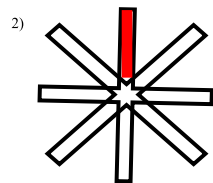
no angle

Determine if the following shapes have rotational symmetry. If so state the order of rotation and the angle of rotationsymmetry.



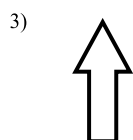
Rotational symmetry of order

Angle of rotation:  $360^\circ = \dots^\circ$



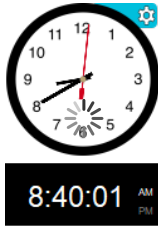
Rotational symmetry of order

Angle of rotation:  $360^\circ = \dots^\circ$



Is rotated one complete turn before it coincides. It **DOES NOT** have rotational symmetry.

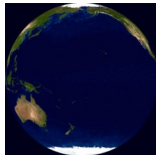
# Rotational Directions



clockwise



Counter - Clock Wise Rotations



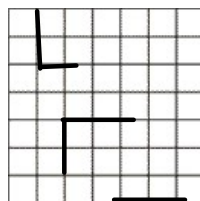
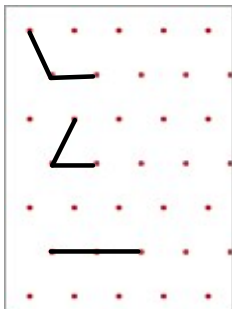
Earth turns counter-clockwise.



## Rotations Are Transformations

Text book

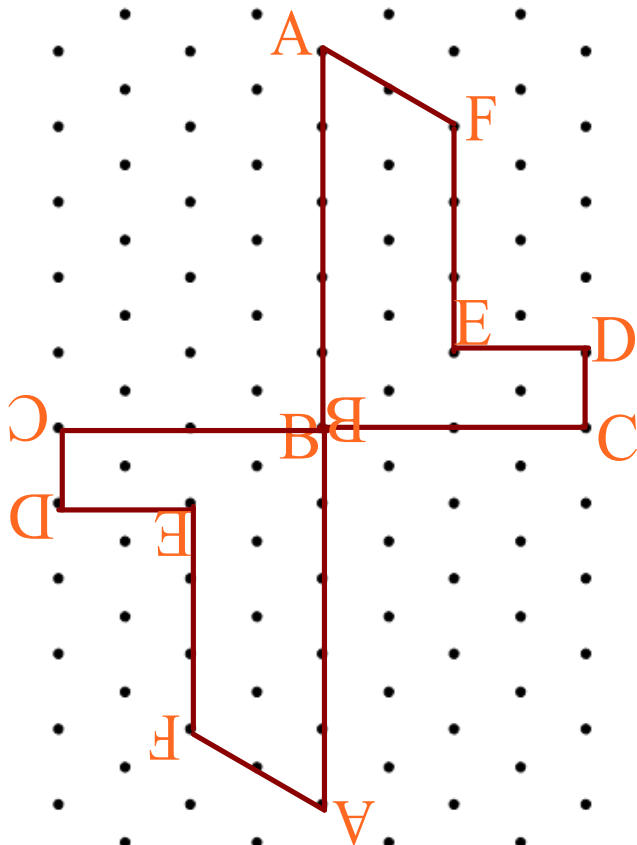
- Grid paper will be used to illustrate rotations of  $90^\circ$  (or  $180^\circ$  or  $270^\circ$ )



# Rotating Images



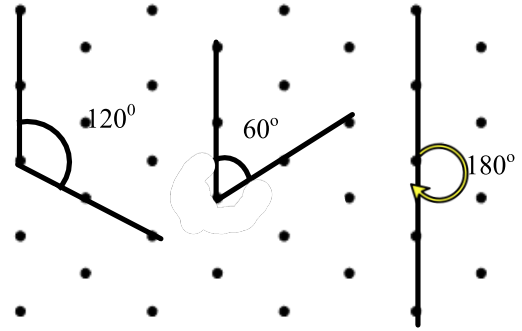
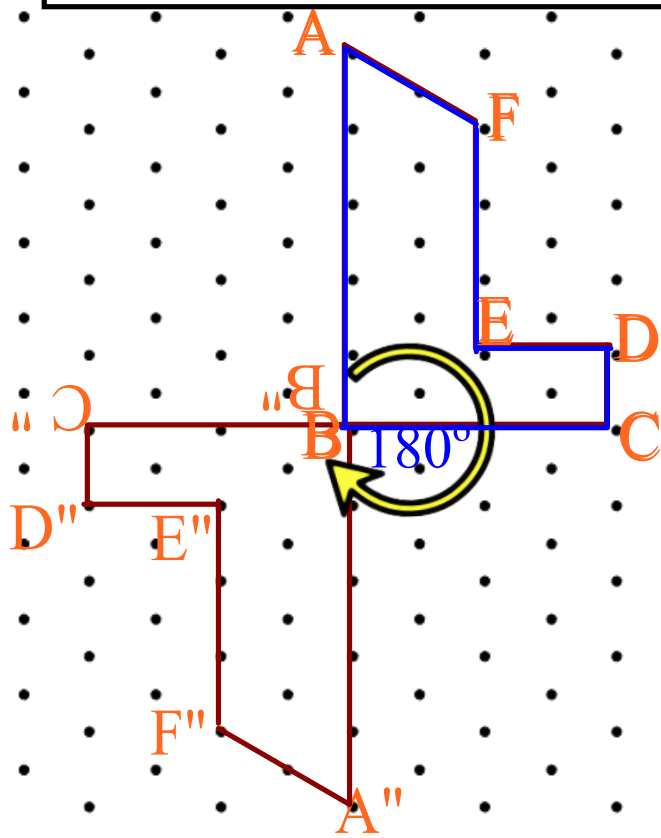
Rotate the image 180° clockwise about vertex B.  
Draw the rotation image.  
Pick a line connected from the vertex of interest



# Rotating Images



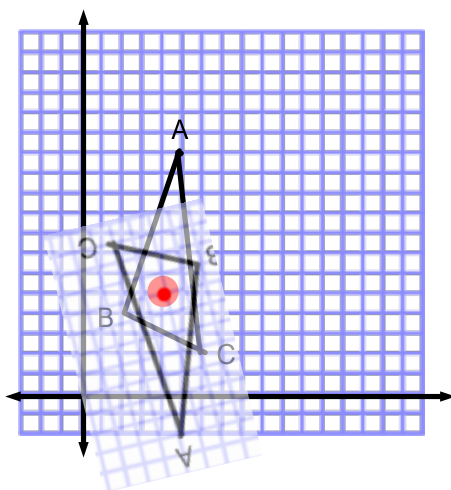
Rotate the image 180° clockwise about vertex B.  
Draw the rotation image.



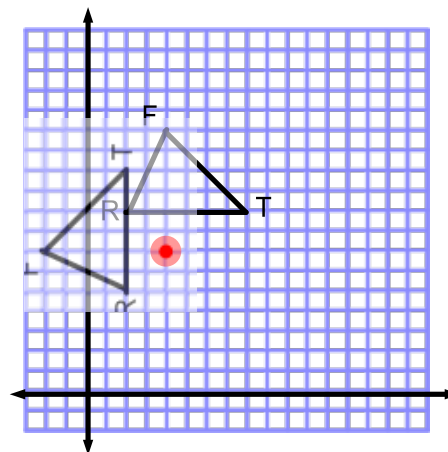
Draw and label the rotated image for each triangle. Label the center of rotation (given in the question)

**Step 1)** Trace the shape on your own paper and rotate that shape holding your finger or pencil at the rotation center.

1) Rotation  $180^\circ$  counterclockwise, center  $R(4, 5)$



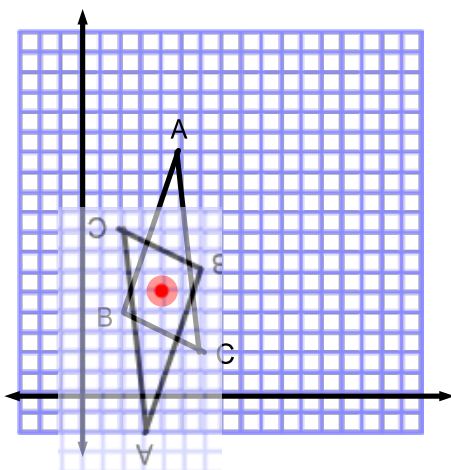
2) Rotation  $90^\circ$  counterclockwise,  $R(4, 7)$



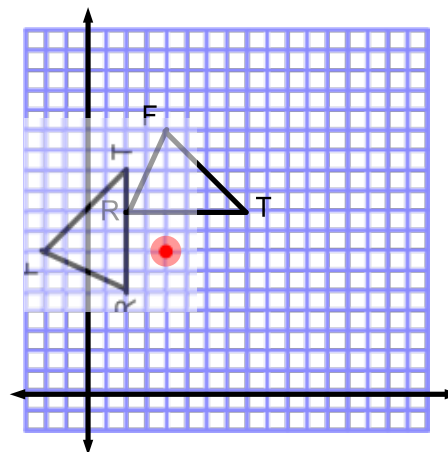
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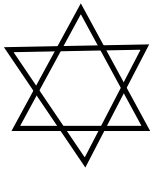


2) Rotation  $90^\circ$  counterclockwise, center  $R(4, 7)$



Determine if the following shapes have rotational symmetry. If so state the order of rotation and the angle of rotationsymmetry.

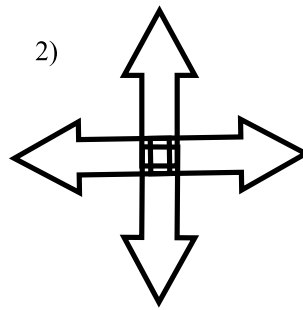
1)



order: 6

$$\begin{array}{l} \text{angle } \frac{360}{6} \\ = 60^\circ \end{array}$$

2)



order: 4

$$\begin{array}{l} \text{angle } : \frac{360}{4} \\ = 90^\circ \end{array}$$



