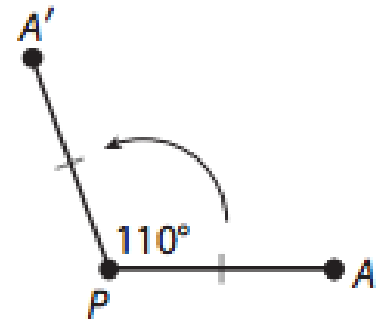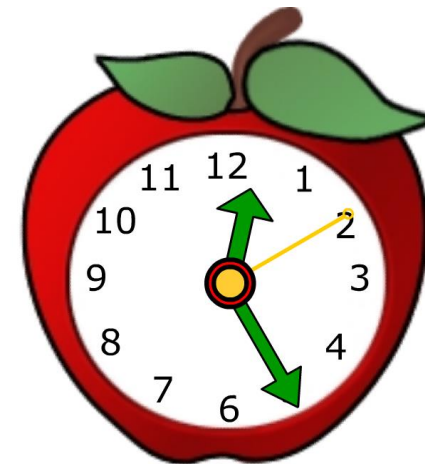## 2.3   Rotations

A <u>rotation</u> turns a figure around a point, called a <u>center of rotation</u>.

- When working with coordinates, we will use 3 rotations.

Rules for Rotations Around the Origin on a Coordinate Plane	
90° rotation counterclockwise	$(x, y) \rightarrow (-y, x)$
180° rotation	$(x, y) \rightarrow (-x, -y)$
270° rotation counterclockwise	$(x, y) \rightarrow (y, -x)$

When no direction is referenced, we will assume it is counter-clockwise.

Ex. Consider the points $D(2, -1)$, $E(3,2)$, and $F(5,1)$.
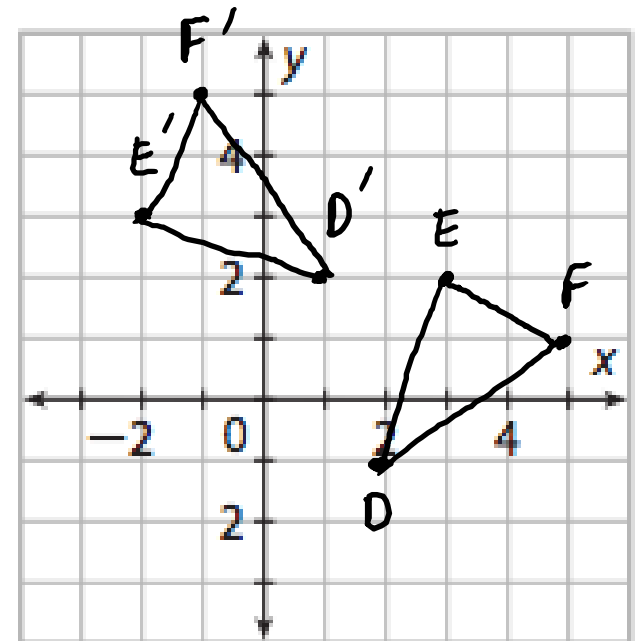
a) Find the image coordinates after rotating 90° CCW.

b) Graph the pre-image and image coordinates.

$$(x, y) \longrightarrow (-y, x)$$

$D(2, -1)$ $D'(+1, 2)$

$E(3, 2)$ $E'(-2, 3)$

$F(5, 1)$ $F'(-1, 5)$

Rules for Rotations Around the Origin on a Coordinate Plane	
90° rotation counterclockwise	$(x, y) \rightarrow (-y, x)$
180° rotation	$(x, y) \rightarrow (-x, -y)$
270° rotation counterclockwise	$(x, y) \rightarrow (y, -x)$

Ex. Consider the points $S(3,4)$, $T(-2,4)$, and $U(-2,1)$.

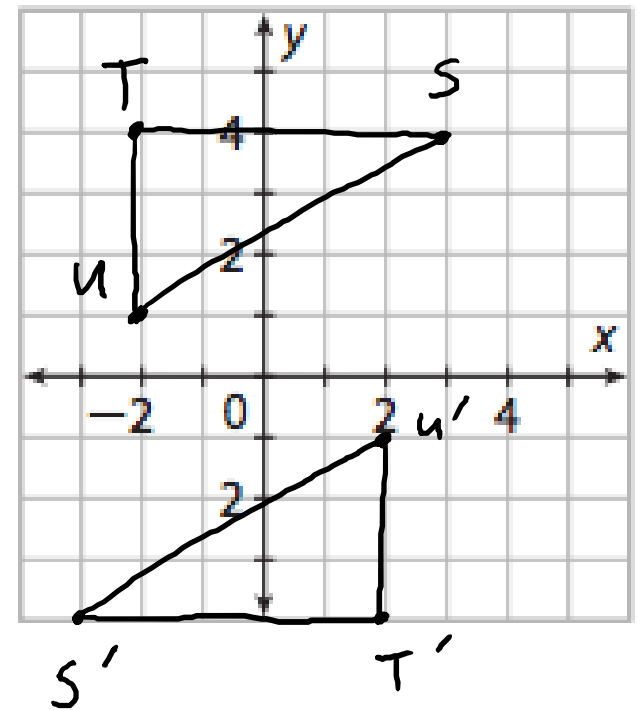a) Find the image coordinates after rotating 180°.

b) Graph the pre-image and image coordinates.

$(x,y) \rightarrow (-x,-y)$

$S(3,4)$ $S'(-3,-4)$

$T(-2,4)$ $T'(2,-4)$

$u(-2,1)$ $u'(2,-1)$

Rules for Rotations Around the Origin on a Coordinate Plane	
90° rotation counterclockwise	$(x,y) \rightarrow (-y,x)$
180° rotation	$(x,y) \rightarrow (-x,-y)$
270° rotation counterclockwise	$(x,y) \rightarrow (y,-x)$

Ex. Consider the points $A(-4, -2)$, $B(-1, -2)$, and $C(-1, -4)$.

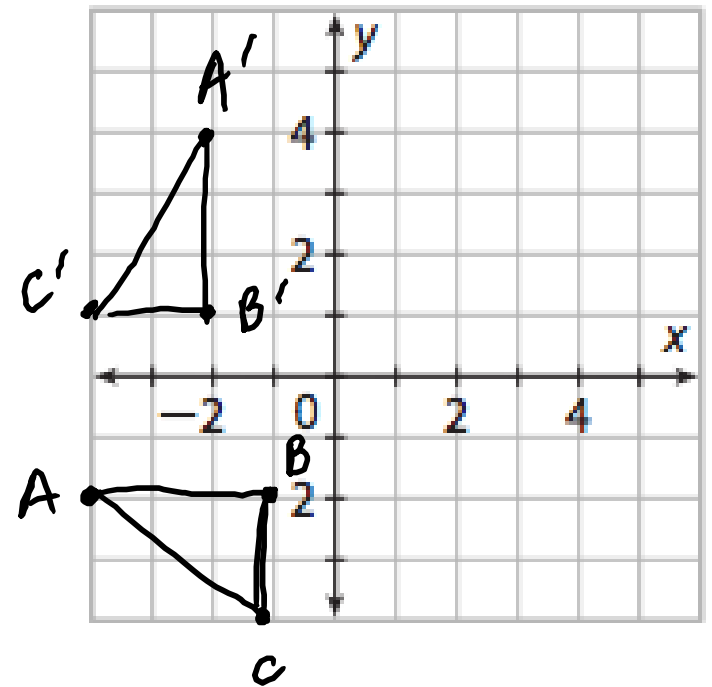a) Find the image coordinates after rotating 270° CCW.

b) Graph the pre-image and image coordinates.

$$(x, y) \rightarrow (y, -x)$$

$A(-4, -2)$ $A'(-2, +4)$

$B(-1, -2)$ $B'(-2, +1)$
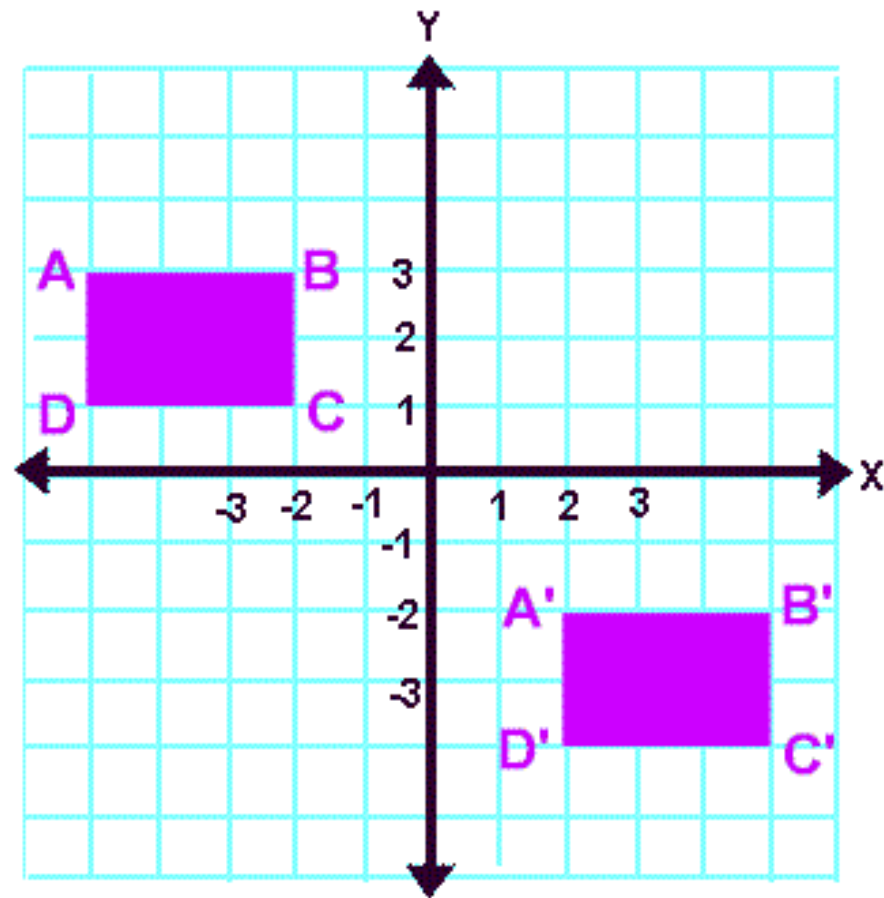
$C(-1, -4)$ $C'(-4, +1)$
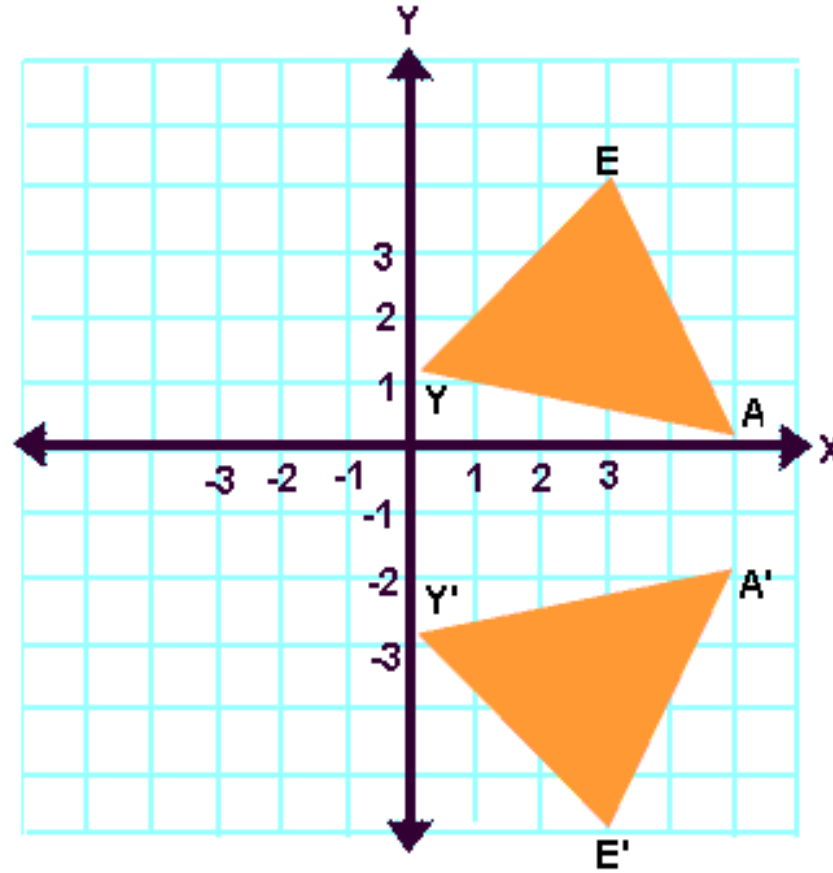
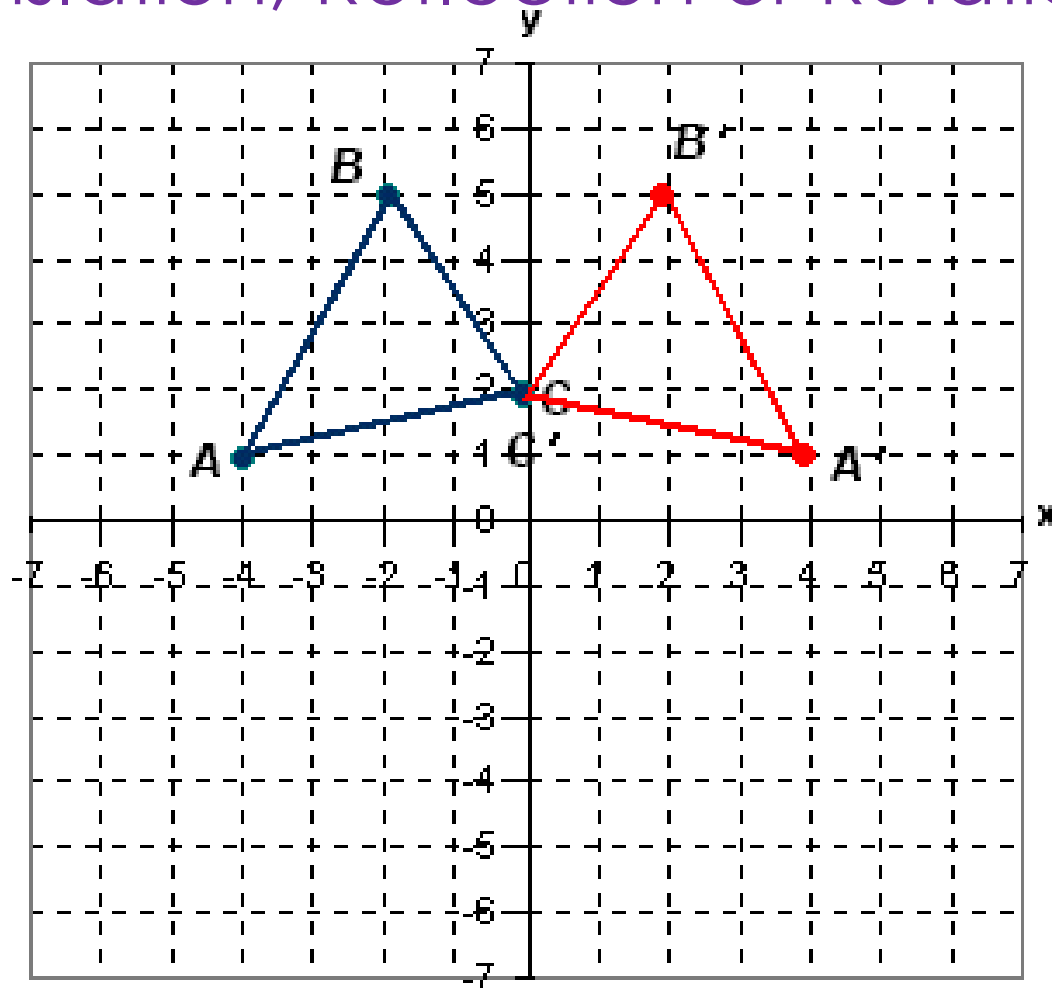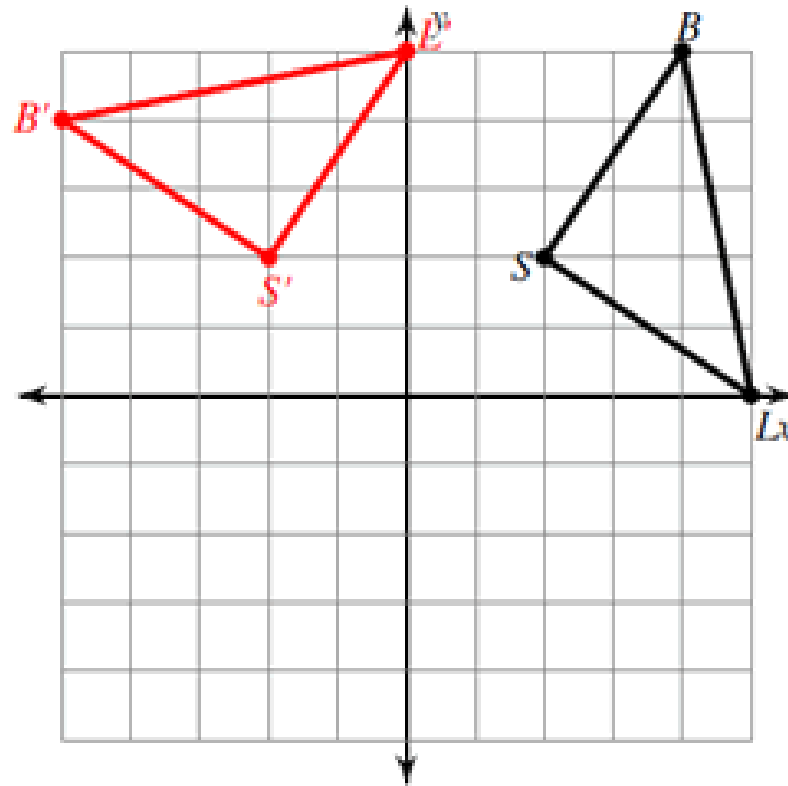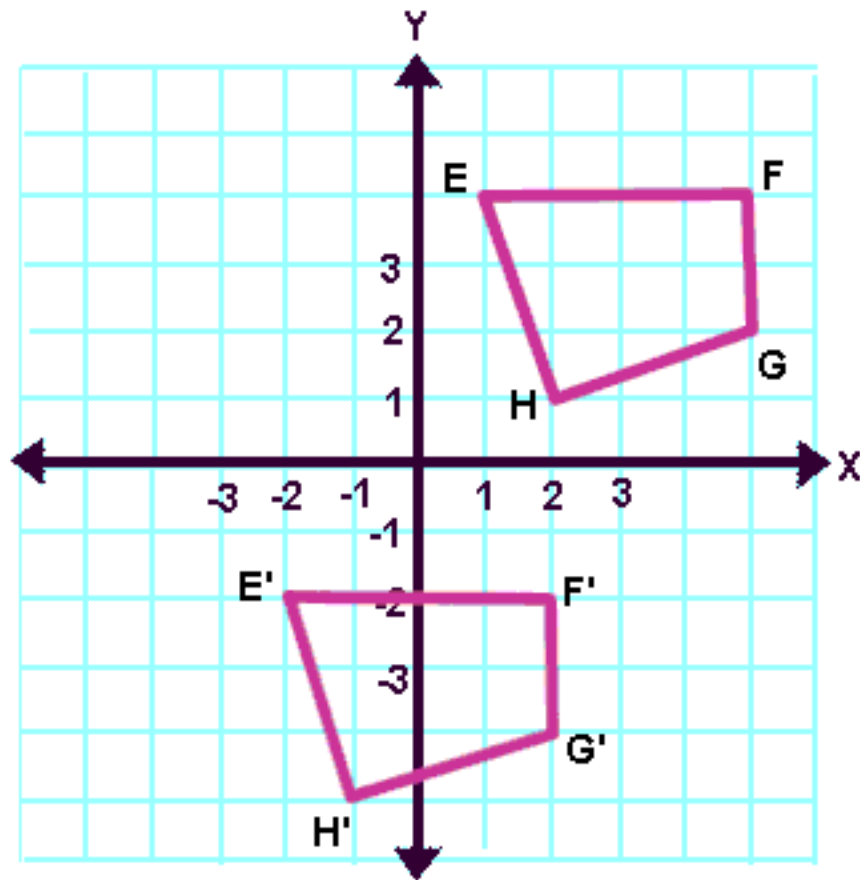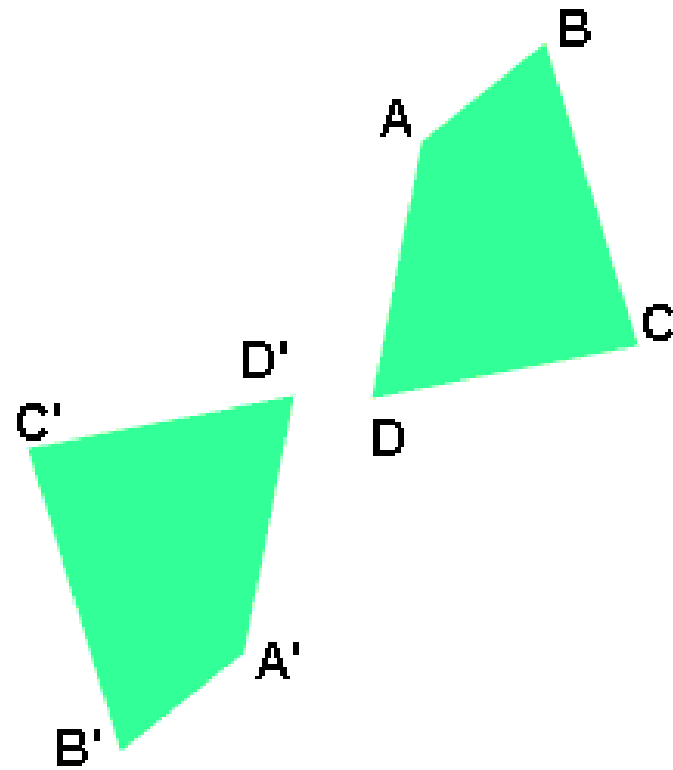| Rules for Rotations Around the Origin on a Coordinate Plane	
90° rotation counterclockwise	$(x, y) \rightarrow (-y, x)$
180° rotation	$(x, y) \rightarrow (-x, -y)$
270° rotation counterclockwise	$(x, y) \rightarrow (y, -x)$

Translation, Reflection or Rotation?

Translation, Reflection or Rotation?

Translation, Reflection or Rotation?

Translation, Reflection or Rotation?

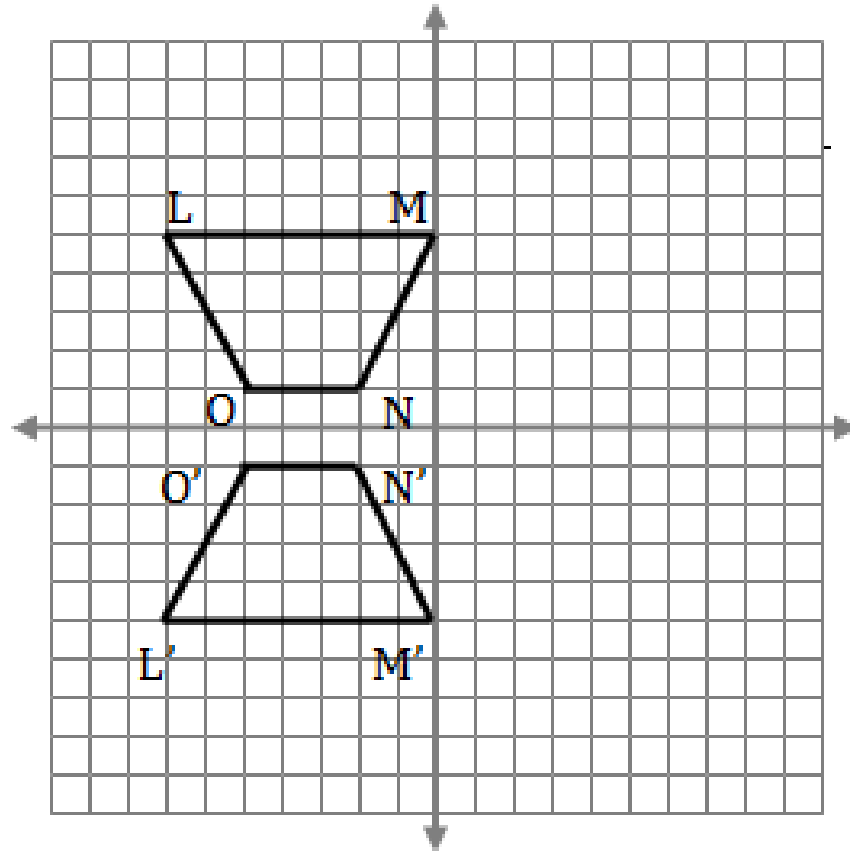# Translation, Reflection or Rotation?

Translation, Reflection or Rotation?

Translation, Reflection or Rotation?

Translation, Reflection or Rotation?