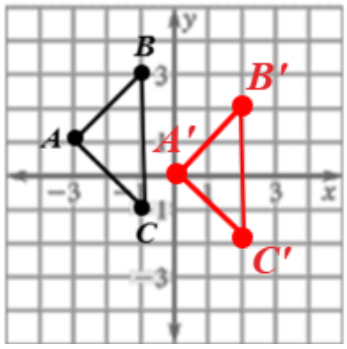
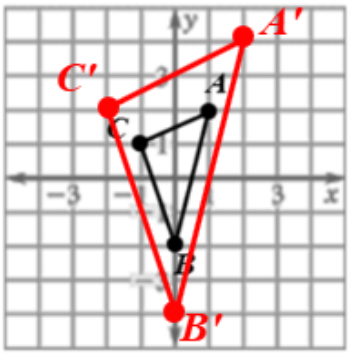
Transformations in the Coordinate Plane

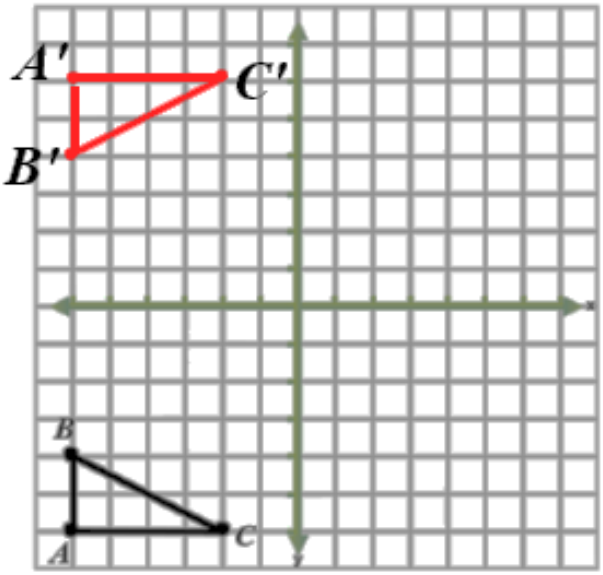
Goals: *Reflect figures in the coordinate plane across various lines
*Translate figures in the coordinate plane
*Rotate figures around a point by 90° and 180°
*Dilate figures in the coordinate plane by scale factors

Transformations: changes a figure's size, shape, position or orientation. Original shape is called pre-image and coordinates are labeled *A, B, C,* etc. New shape is called image and is labeled *A', B', C',* etc.

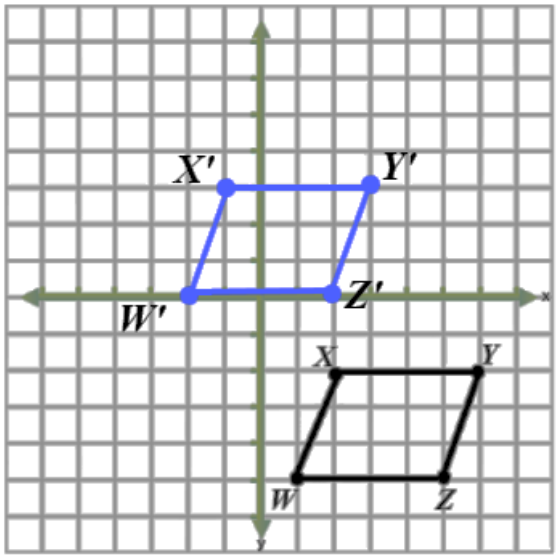
TRANSFORMATIONS		
Type	**Explanation**	**Symbols/Example**
Reflection **FLIP**	A transformation in which a figure is reflected (flipped) across a line, creating a mirror image.	If reflecting across the *x*-axis you can use the formula: $(x, y) \rightarrow (x, -y)$ If reflecting across the *y*-axis you can use the formula: $(x, y) \rightarrow (-x, y)$
Translation **SLIDE**	A transformation that shifts a figure vertically and/or horizontally, but does not change its size, shape, or orientation.	Translate ΔABC 3 units right and 1 unit down. 
Dilation **STRETCH/SHRINK**	A transformation that produces an image that is the same shape as the original, but is a different size. A **dilation** stretches or shrinks the original figure by a scale factor of *k*.	Dilate ΔABC by a scale factor of 2 Formula: $(x, y) \rightarrow (kx, ky)$ 
Rotation **TURN**	A transformation in which a figure turns around a fixed center point.	90° counterclockwise around the origin: $(x, y) \rightarrow (-y, x)$ 180° rotation: $(x, y) \rightarrow (-x, -y)$

Perform the transformation indicated.

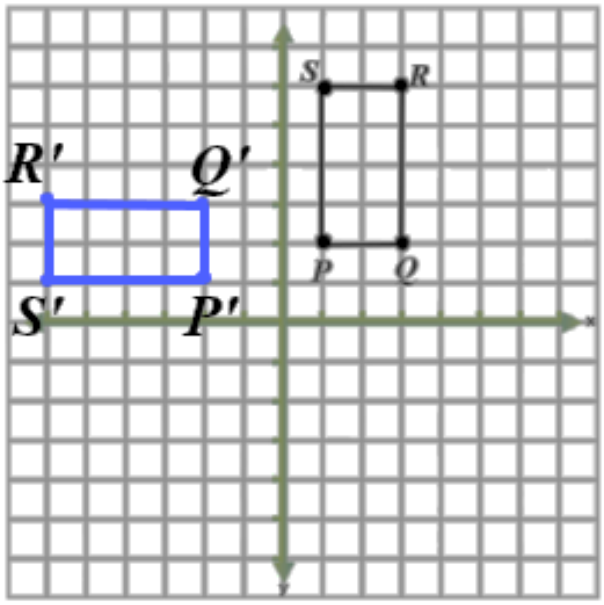
Ex: Reflect Δ*ABC* over the *x*-axis.



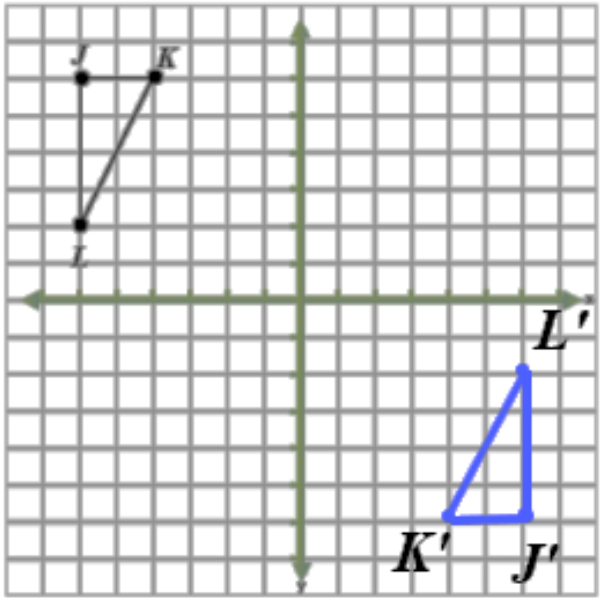
Ex: Translate parallelogram *WXYZ* 5 units up and 3 units left



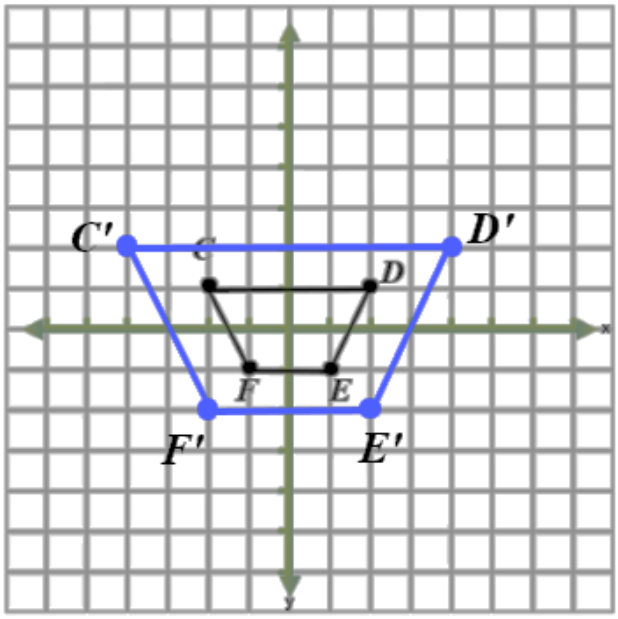
Ex: Rotate rectangle *PQRS* by 90° *counterclockwise* about the origin



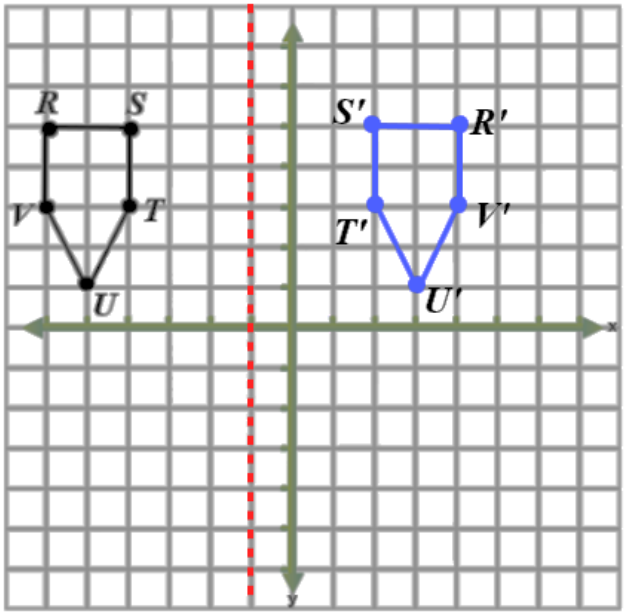
Ex: Rotate Δ*JKL* 180° about the origin



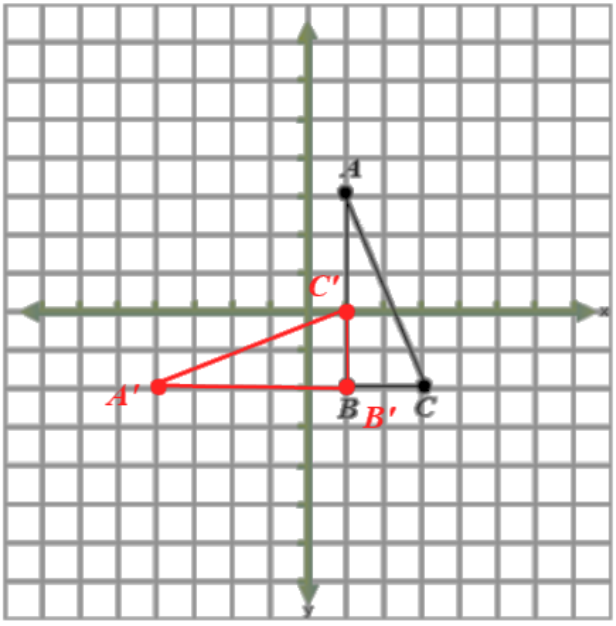
Ex: Dilate trapezoid *CDEF* by a scale factor of 2.



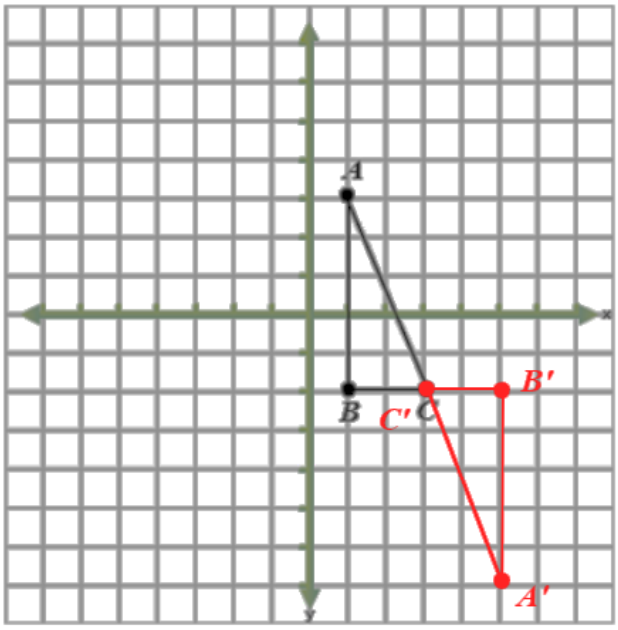
Ex: Reflect pentagon *RSTUV* across the line $x = -1$



Ex: Rotate ΔABC 90° counterclockwise about point *B*



Ex: Rotate ΔABC 180° about point *C*



Ex: Rotate ΔABC 90° clockwise about point A