A rotation is a transformation in which a figure is rotated, or turned, about a fixed point. The center of rotation is the fixed point.

Rotations can be described in degrees and direction. For example, 90° clockwise, or 270° counterclockwise.
Triangle LMN with vertices L(5, 4), M(5, 7), and N(8, 7) represents a desk in Jackson’s bedroom. He wants to rotate the desk counterclockwise 180° about vertex L. Graph the figure and its image. Then give the coordinates of the vertices for triangle L'M'N'.

Hint: What is another term for a 180° angle?
Triangle JKL has vertices J(3, 1), K(3, -3), and L(0, -3). Graph the figure and its image after a clockwise rotation of 90° about vertex J. Then give the coordinates of the image.
Rotations about the origin:
A rotation is a transformation around a fixed point. Each point of the original figure and its image are the same distance from the center of rotation.

90° rotation clockwise

270° counterclockwise

180° rotation

270° rotation clockwise

90° counterclockwise

(x, y) → (y, -x)

(5, 2) → (-2, -5)

(x, y) → (-x, y)

(5, 2) → (-5, 2)

(5, -2) → (2, 5)
If point $T(4, -3)$ is rotated $90^\circ$ counterclockwise about the origin, what are the coordinates of $T'$?
Triangles DEF has vertices D(-4, 4), E(-1, 2), and F(-3, 1). Graph the figure and its image after a clockwise rotation of 90° about the origin. Then give the coordinates of the vertices of the image.

\[
\begin{align*}
(x, y) &\rightarrow (y, -x) \\
(-4, 4) &\rightarrow (4, 4) \\
(-1, 2) &\rightarrow (2, 1) \\
(-3, 1) &\rightarrow (1, 3)
\end{align*}
\]
Partner: Triangle XYZ has vertices X(3, -1), Y(5, -4), and Z(1, -5). Graph the triangle and its image after each rotation. Then give the coordinates of the vertices of the image.

270° counterclockwise about vertex X

180° clockwise about the origin
What is the difference between rotating a figure about a given point that is a vertex and rotating the same figure about the origin if the rotation is less than 360°?

vertex: stays the same
origin: all points change

Which capital letters in VIRGINIA produce the same letter after being rotated 180°?

I  N
Whiteboards:
Triangle RST has vertices R(-7, 8), S(-7, 2), and T(-2, 2). Graph the figure and its rotated image after a clockwise rotation of 180° about the origin. Then give the coordinates of the vertices for the image.

Quadrilateral ABCD has vertices at A(-3, -4), B(-1, -1), C(2, -2), and D(3, -4). Graph the quadrilateral and its image after a 90° clockwise rotation about vertex A. Then give the coordinates of the vertices of the image.