Lesson 7-3

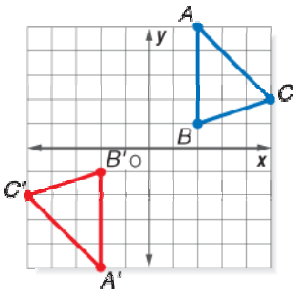
Example 1

Draw the image of $\triangle ABC$ with vertices $A(2, 5)$, $B(2, 1)$, and $C(5, 2)$ under a rotation of 180° clockwise about (0, 0).

Solution

The rotation is 180°, so the x-coordinate and y-coordinate become their opposites. Multiply each vertex by –1.

$A(2, 5) \rightarrow A'(2(-1), 5(-1)) \rightarrow A'(-2, -5)$
$B(2, 1) \rightarrow B'(2(-1), 1(-1)) \rightarrow B'(-2, -1)$
$C(5, 2) \rightarrow C'(5(-1), 2(-1)) \rightarrow C'(-5, -2)$



Example 2

ENTERTAINMENT The coordinates of a safety harness on a roller coaster are $A(-3, 2)$, $B(-5, 2)$, and $C(-5, -1)$ after being rotated 90° counterclockwise about the origin. What were the coordinates of the harness in its original position?

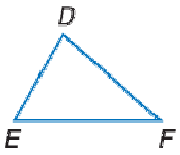
Solution

To find the coordinates of the safety harness in its original position, rotate its current image 90° clockwise about the origin. Do so by multiplying the x-coordinate of each point by –1. Then transpose the x- and y-coordinates.

$A(-3, 2) \rightarrow A'(2, -3(-1)) \rightarrow A'(2, 3)$
$B(-5, 2) \rightarrow B'(2, -5(-1)) \rightarrow B'(2, 5)$
$C(-5, -1) \rightarrow C'(-1, -5(-1)) \rightarrow C'(-1, 5)$

Example 3

Draw the image of △DEF after a 60° turn clockwise about point *P*.



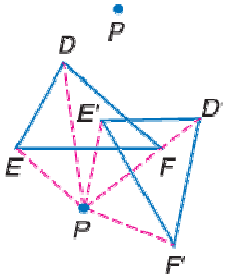
Solution

Step 1: Draw a segment from vertex F to point P.

Step 2: Use a protractor to draw a ray from point P that creates a 60° angle with $\overline{FP}$.

Step 3: Use a compass to measure the length of $\overline{FP}$.

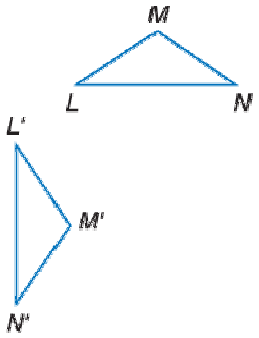
Step 4: Use this measure to locate point F' on the ray drawn in Step 2. Label point F'.



Repeat steps 1–4 to locate D' and E'. Draw $\overline{D'E'}$, $\overline{D'F'}$, and $\overline{E'F'}$. The rotated image is $\triangle D'E'F'$.

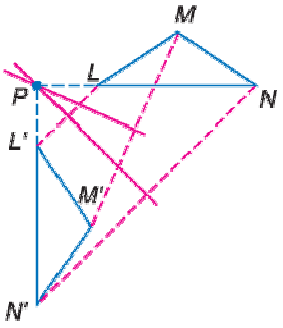
Example 4

For the image $\triangle LMN$, identify the center of rotation, the angle of rotation, and the direction of rotation.



Solution

Draw a segment connecting each pair of corresponding vertices. Construct the perpendicular bisectors of $\overline{LL'}$, $\overline{MM'}$, and $\overline{NN'}$. Label the point where the bisectors intersect as P. Draw a segment that connects two corresponding vertices to P. Then measure the angle formed by these segments.



Point P is the center or rotation, and the angle of rotation is either 90° clockwise or 270° counterclockwise.