



**Mappings for Common Rotations Around the Origin**

Rotation	180° around origin	90° CW around origin	90° CCW around origin
Preimage → Image	$(a, b) \rightarrow (-a, -b)$	$(a, b) \rightarrow (b, -a)$	$(a, b) \rightarrow (-b, a)$
How to find the new coordinates	Change the sign of $x$ and $y$	Change the sign of $x$ , then switch $x$ and $y$	Change the sign of $y$ , then switch $x$ and $y$
Examples	$(40, 31) \rightarrow$	$(40, 31) \rightarrow$	$(40, 31) \rightarrow$
Examples	$(-81, 25) \rightarrow$	$(-81, 25) \rightarrow$	$(-81, 25) \rightarrow$
Examples	$(57, 0) \rightarrow$	$(57, 0) \rightarrow$	$(57, 0) \rightarrow$

**Practice:** What would the coordinates of the following points be after being rotated around the origin at the given direction and degrees?

14)  $(9, -8)$ ; 90° CW

15)  $(5, -5)$ ; 90° CCW

16)  $(2, -1)$ ; 180°

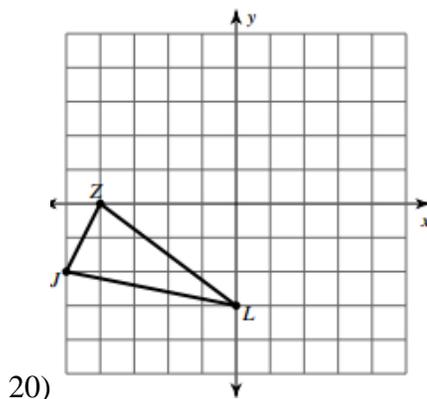
17)  $(-7, -1)$ ; 180°

18)  $(14, -4)$ ; 90° CCW

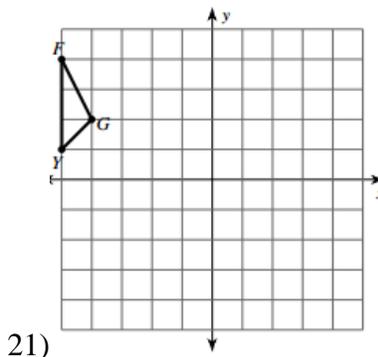
19)  $(0, -5)$ ; 90° CW

**More practice:** Graph the images under the given transformations.

1) rotation 90° counterclockwise about the origin



2) translation: 4 units right and 1 unit down



3) reflection across the x-axis

