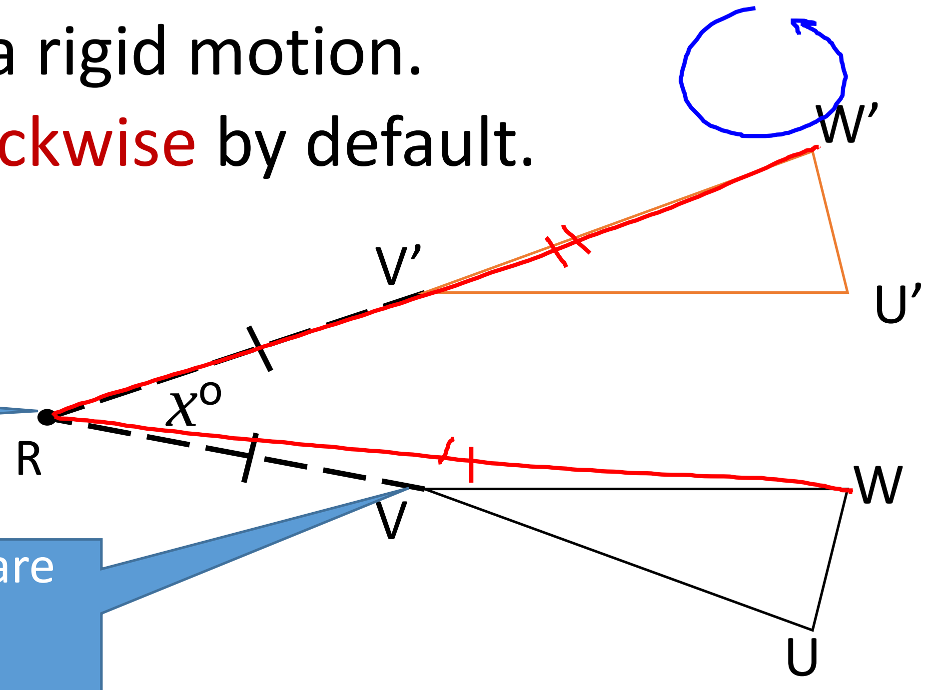
Rotations

Section 4.3

Rotation

A rotation of x^{o} about a point R, called the center of rotation, is a transformation.

- A rotation about a point is a rigid motion.
- All rotations are counterclockwise by default.



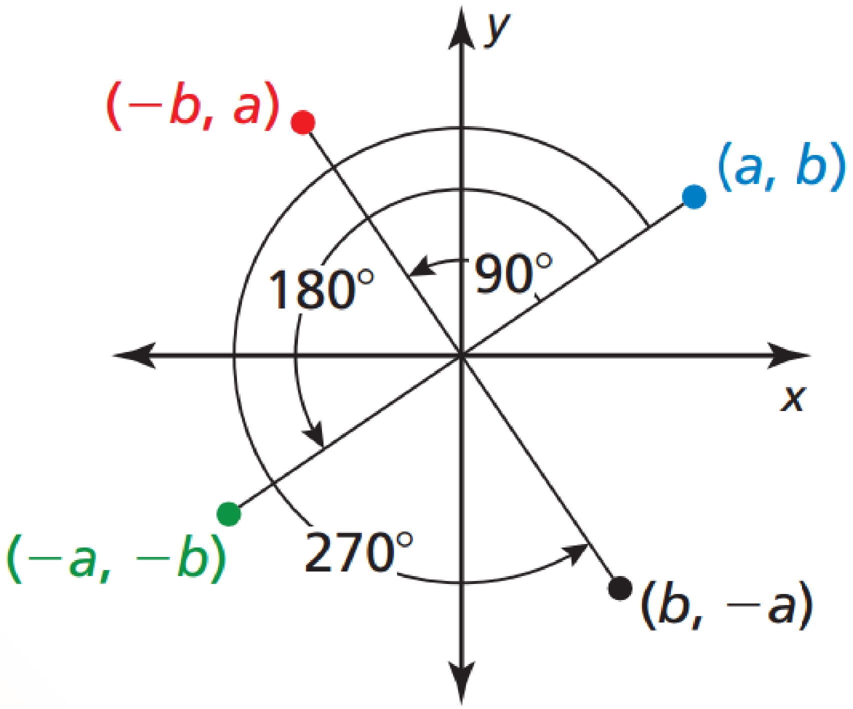
-For any point V, RV' = RV

The preimage V and its image V' are equidistant from the center of rotation.

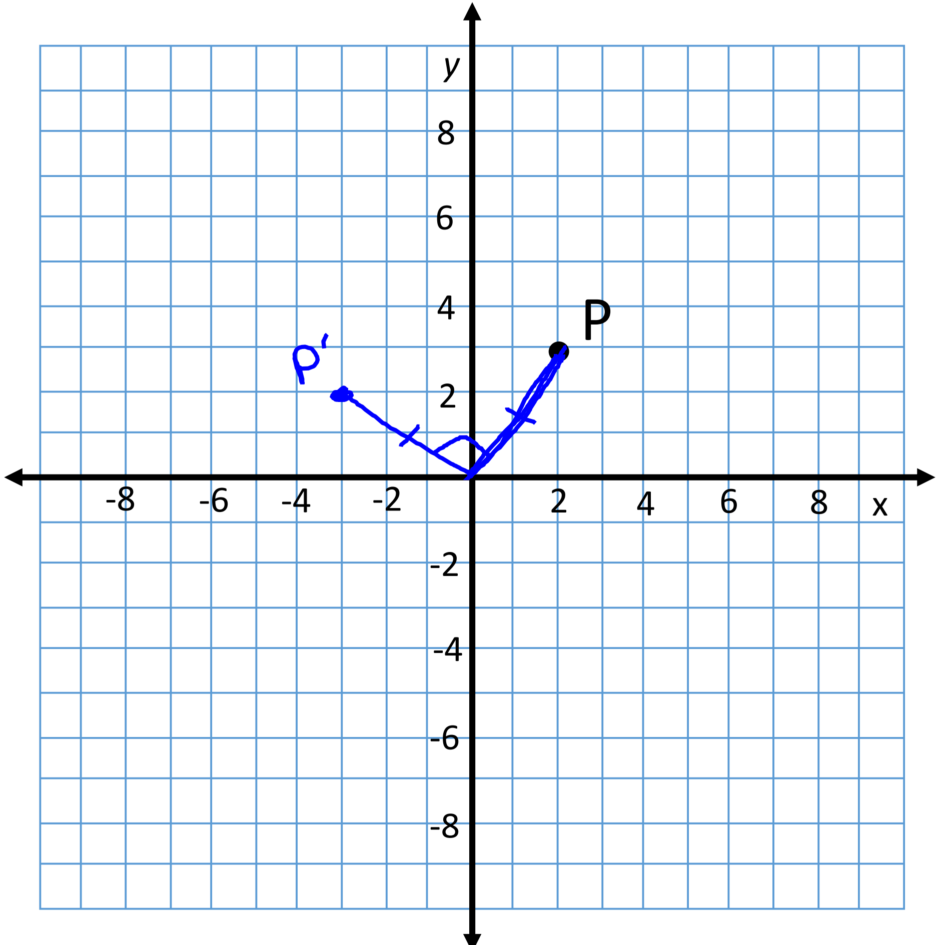
Coordinate Rules for Rotations about the Origin

When a point (a, b) is rotated counterclockwise about the origin, the following are true.

- For a rotation of 90°, $(a, b) \rightarrow (-b, a)$.
- For a rotation of 180°, $(a, b) \rightarrow (-a, -b)$.
- For a rotation of 270°, $(a, b) \rightarrow (b, -a)$.

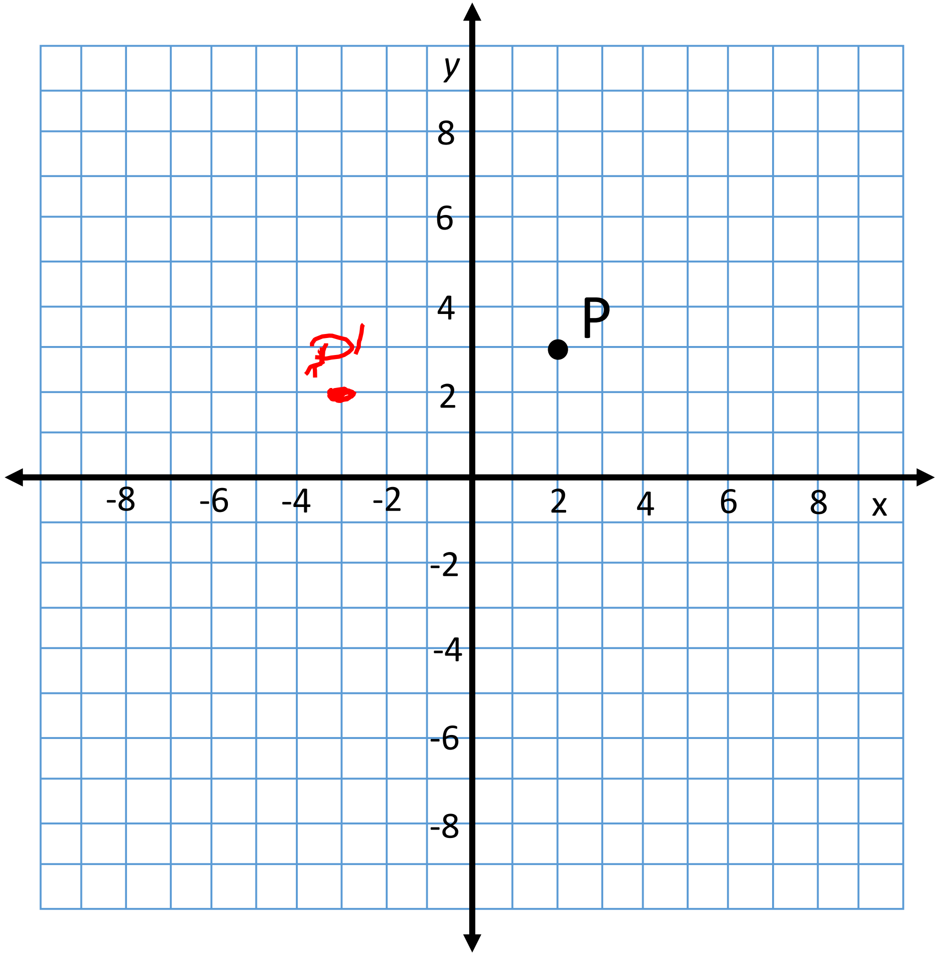


Find the coordinates of P(2, 3) after a 90° rotation about (0, 0).



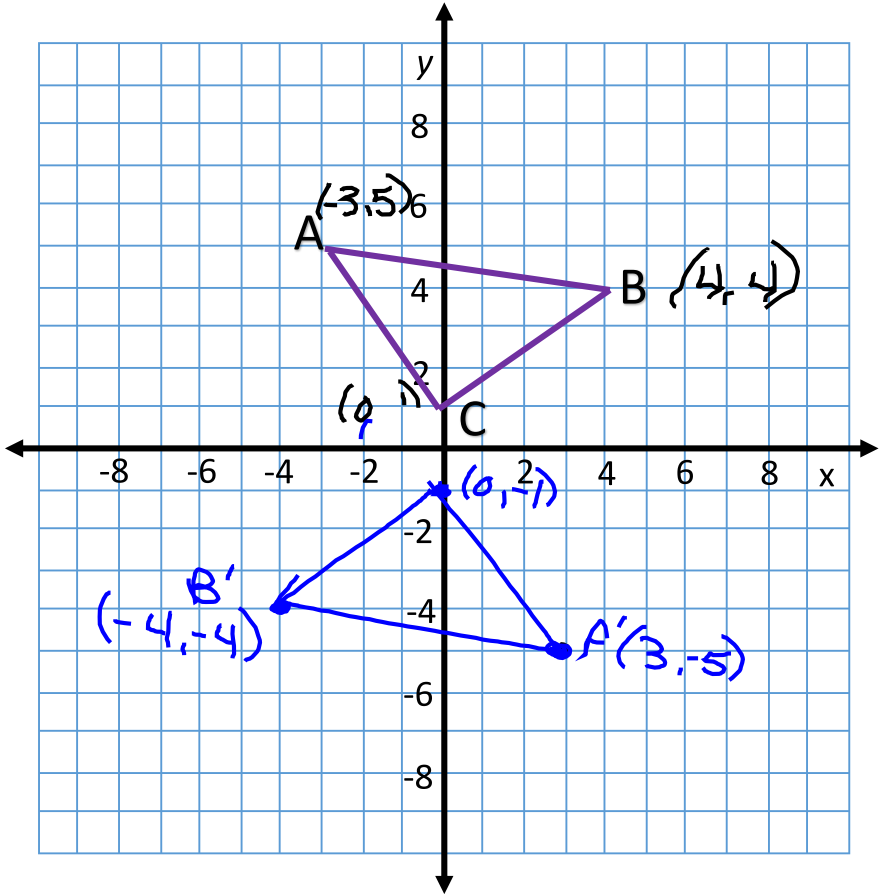
(-3, 2)

Find the coordinates of P(2, 3) after a 90˚ rotation about (0, 0).



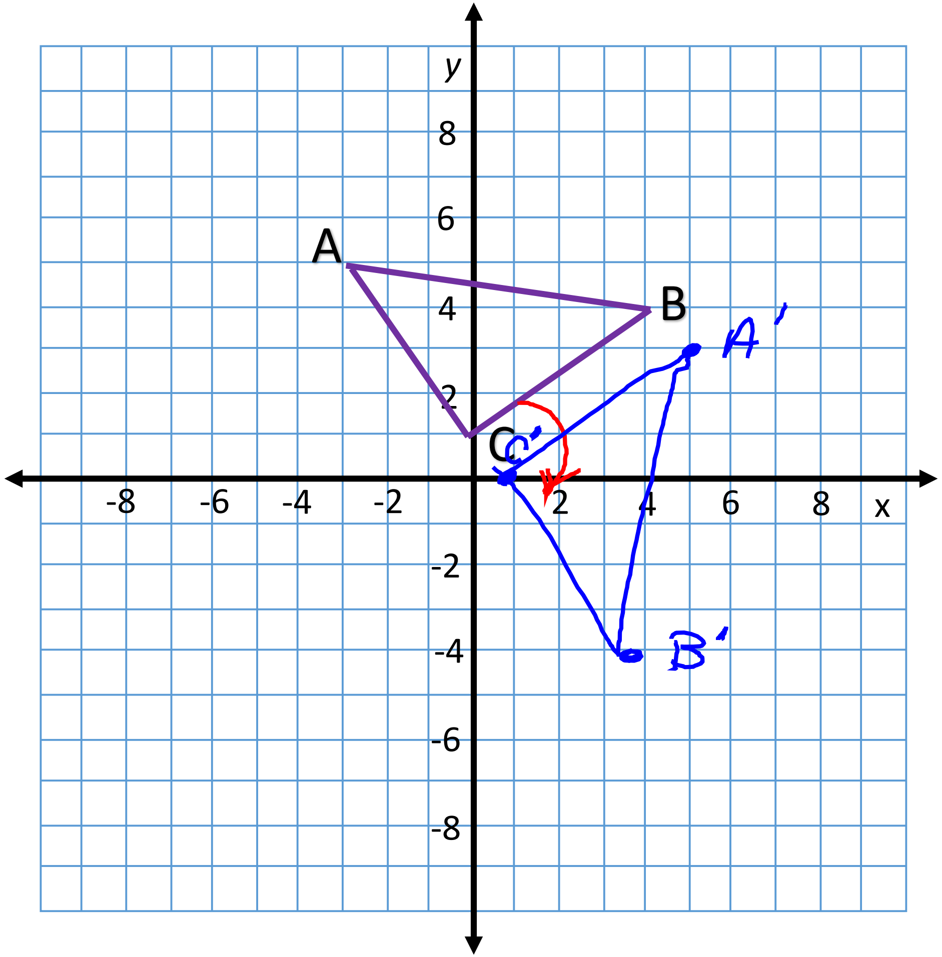
Another way to think about rotations!!!

Find the coordinates of the vertices of ΔABC after a 180˚ rotation about (0, 0).



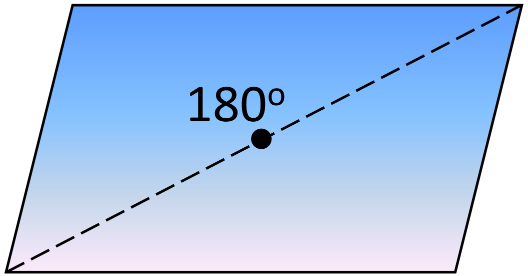
Find the coordinates of the vertices of ΔABC after a 90˚ clockwise rotation about the origin.

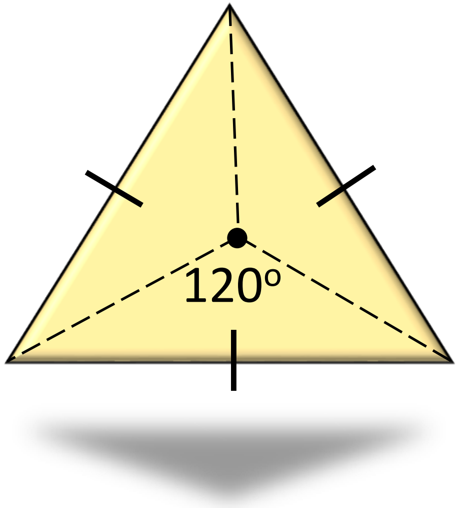
A(-3, 5) → A'(5, 3)
B(4, 4) → B'(4, -4)
C(0, 1) → C'(1, 0)



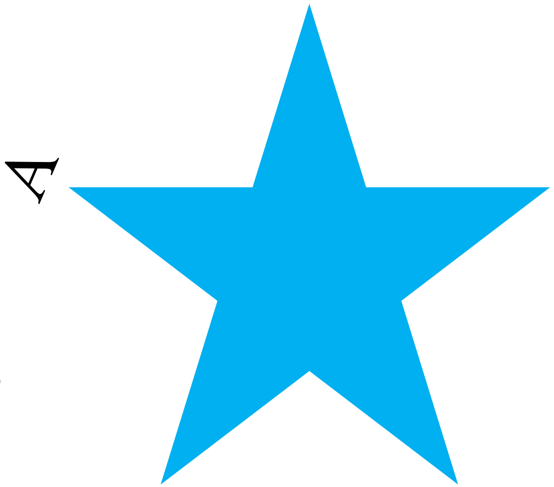
Rotational Symmetry

A figure has rotational symmetry if there is a rotation of 180^{o} or less for which the figure is its own image.





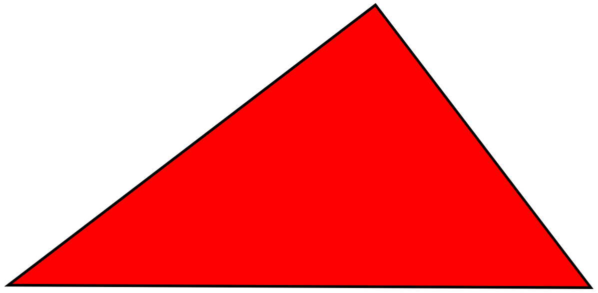
Does the figure have rotational symmetry? If so, what is/are the angle(s) of rotation?



Yes; $\angle_R = \frac{360}{5} = 72°$.

Note: 144˚ also maps the figure to itself.

Does the figure have rotational symmetry? If so, what are the angles of rotation?



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