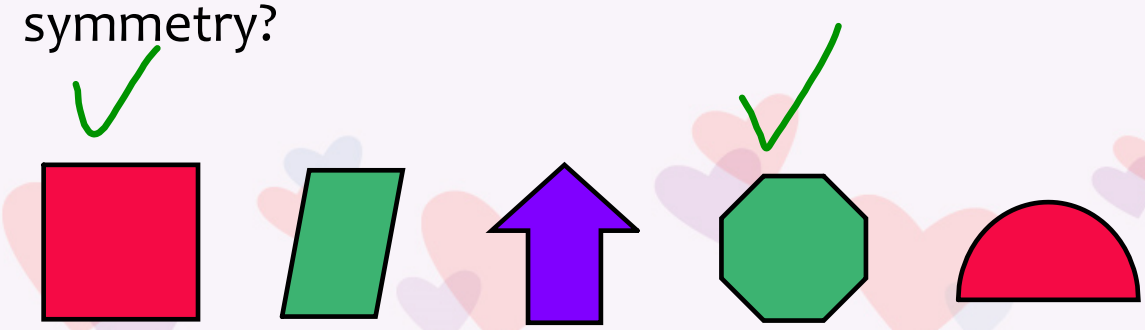
Rotations

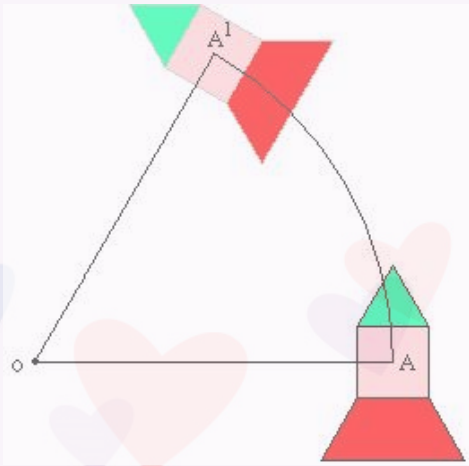
A figure in a plane has rotational symmetry if the figure can be mapped onto itself by a rotation of 180° or less.

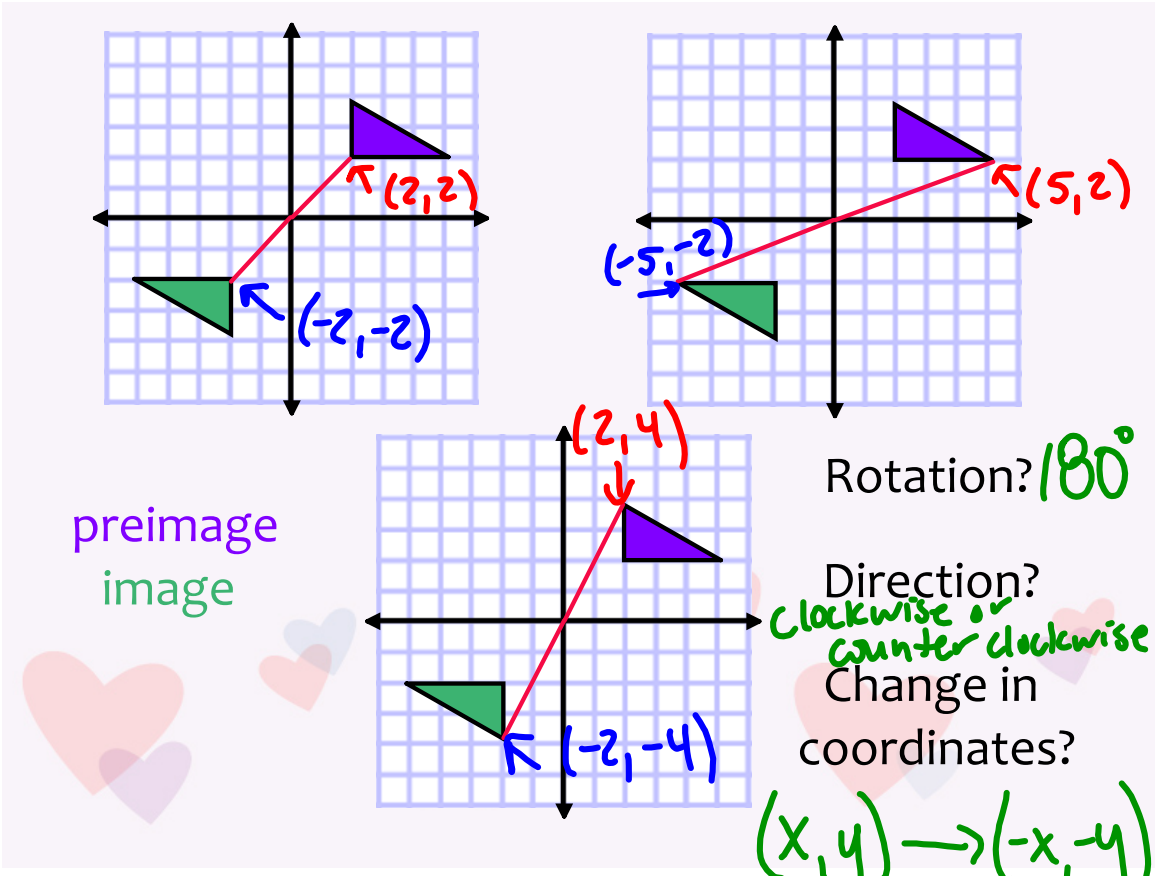
Example 1

Which of the following figures have rotational symmetry?



A rotation is a transformation in which a figure is turned about a fixed point. The fixed point is the center of rotation. Rays drawn from the center of rotation to a point and its image form an angle called the angle of rotation.

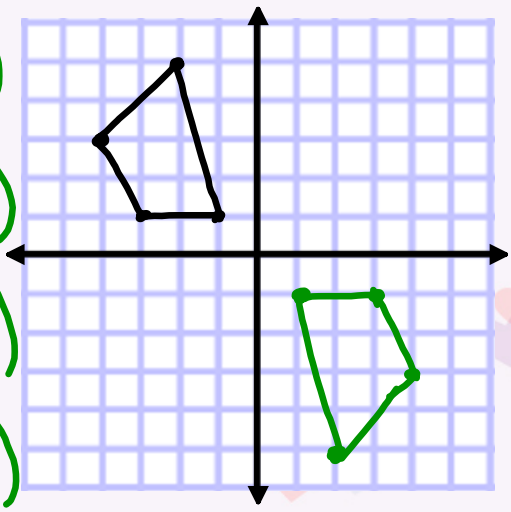


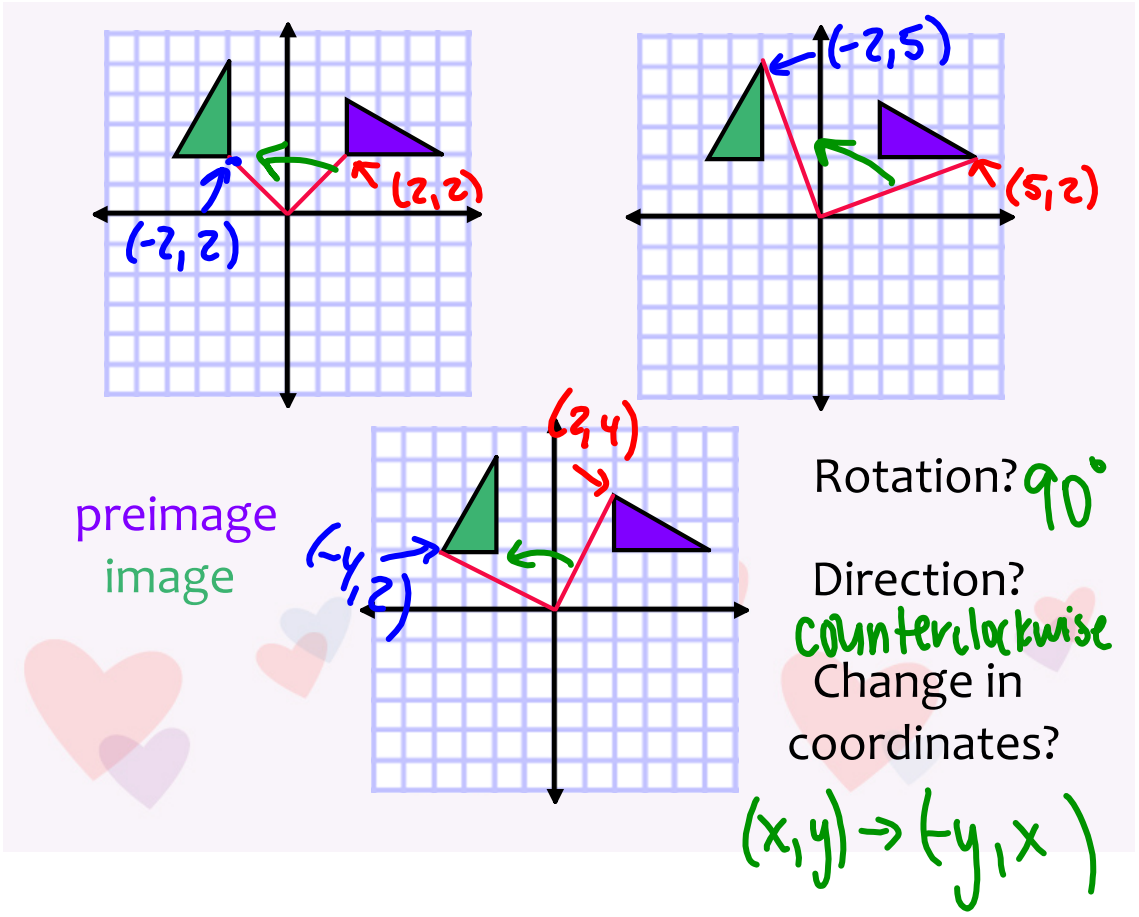


Example 2

In a coordinate plane, sketch the quadrilateral whose vertices are A(-4,3), B(-2,5), C(-1,1), and D(-3,1). Then rotate ABCD 180° about the origin and name the coordinates of the new vertices.

A(-4,3) → A'(4,-3)
B(-2,5) → B'(2,-5)
C(-1,1) → C'(1,-1)
D(-3,1) → D'(3,-1)





Example 3

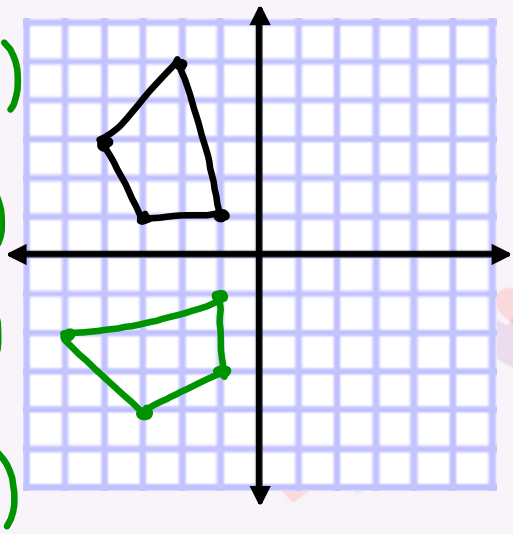
In a coordinate plane, sketch the quadrilateral whose vertices are A(-4,3), B(-2,5), C(-1,1), and D(-3,1). Then rotate ABCD 90° counterclockwise about the origin and name the coordinates of the new vertices.

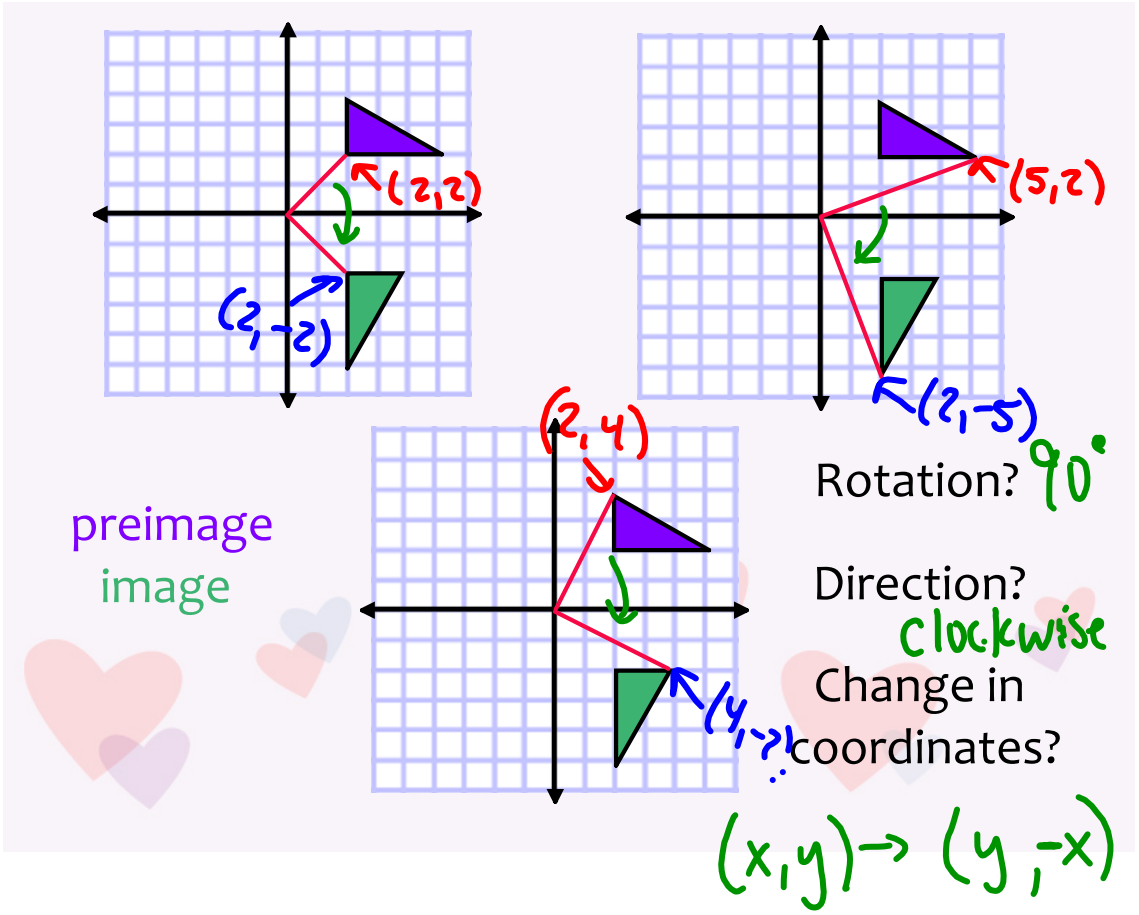
A(-4,3) → A'(-3, -4)

B(-2,5) → B'(-5, -2)

C(-1,1) → C' (-1, -1)

D(-3,1) → D' (-1, -3)





Example 4

In a coordinate plane, sketch the quadrilateral whose vertices are A(-4,3), B(-2,5), C(-1,1), and D(-3,1). Then rotate ABCD 90° clockwise about the origin and name the coordinates of the new vertices.

A(-4,3) → A'(3,+4)
B(-2,5) → B'(5,+2)
C(-1,1) → C'(1,+1)
D(-3,1) → D'(1,+3)