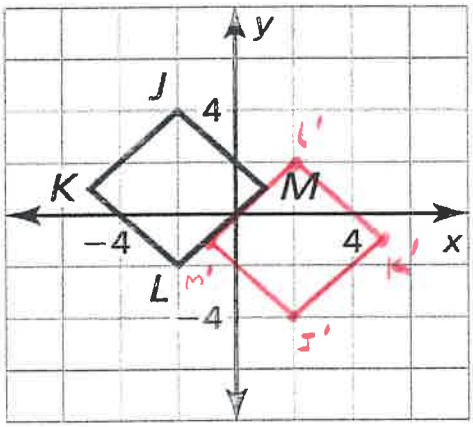
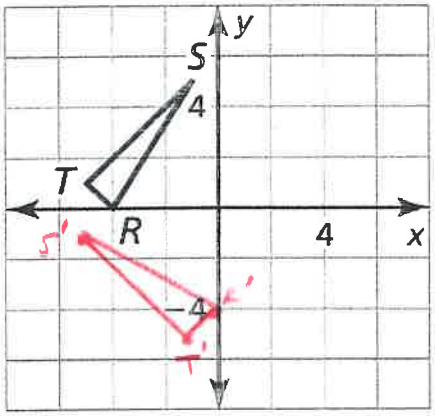
Name _____ Date _____

In Exercises 1–3, graph the image of the polygon after a rotation of the given number of degrees about the origin.

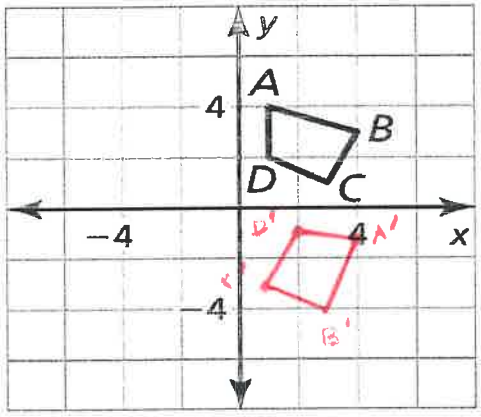
1. 180° $(-x, -y)$



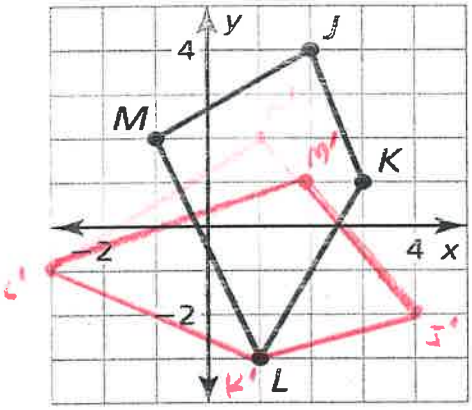
2. 90° $(-y, x)$



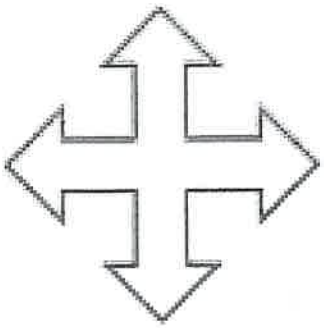
3. 270° $(y, -x)$



4. Graph the polygon after a 270° rotation about the origin. $(y, -x)$



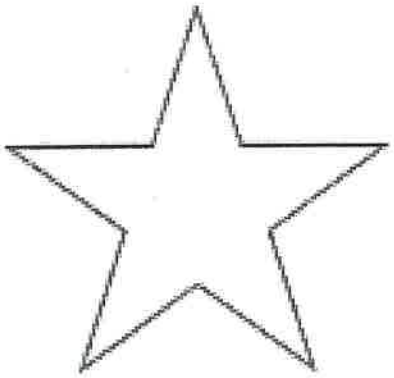
Determine if each figure has rotational symmetry. If so, describe any rotations that map the figure onto itself.



yes 90° intervals

90

180



yes 72° intervals

72

144

216

288

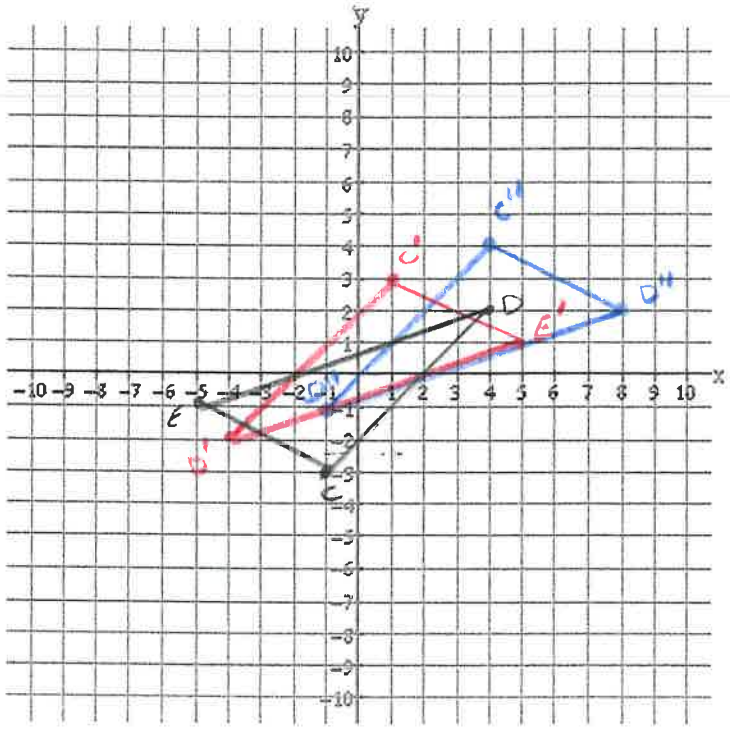
Graph ΔCDE with vertices $C(-1, -3)$, $D(4, 2)$, and $E(-5, -1)$ and its image after the composition.

7. **Rotation:** 180° about the origin $(-x, -y)$
Translation: $(x, y) \rightarrow (x + 3, y + 1)$

$C'(1, 3)$ $C''(4, 4)$

$D'(-4, -2)$ $D''(-1, -1)$

$E'(5, 1)$ $E''(8, 2)$

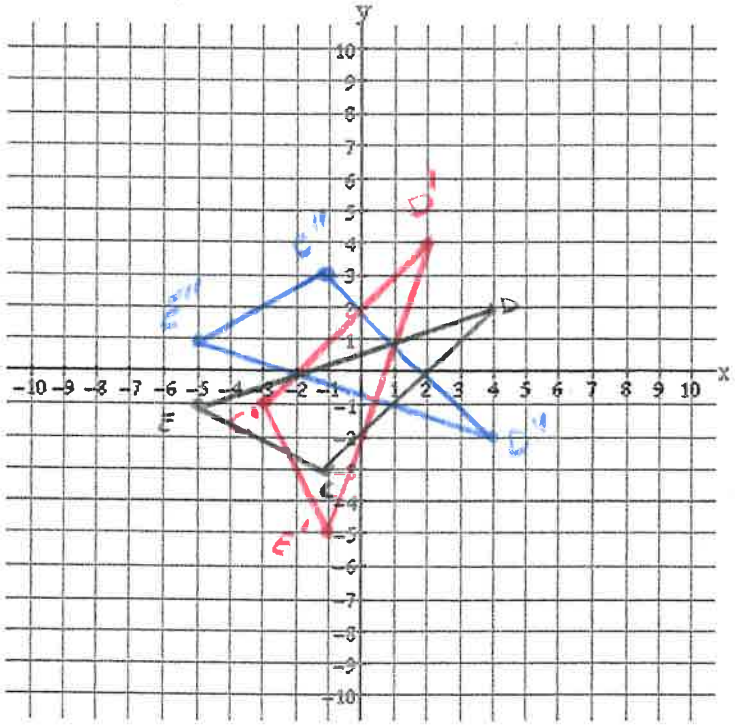


8. **Reflection:** in the line $x = y$ (y, x)
Rotation: 270° about the origin $(y, -x)$

$C'(-3, -1)$ $C''(-1, 3)$

$D'(2, 4)$ $D''(4, -2)$

$E'(-1, 5)$ $E''(-5, 1)$



Name _____ Date _____

A triangle is defined by the following points:
A(10, 2), B(4, 8), C(-3, 3).
Perform a rotation of -90 degrees about the point (3, 4).

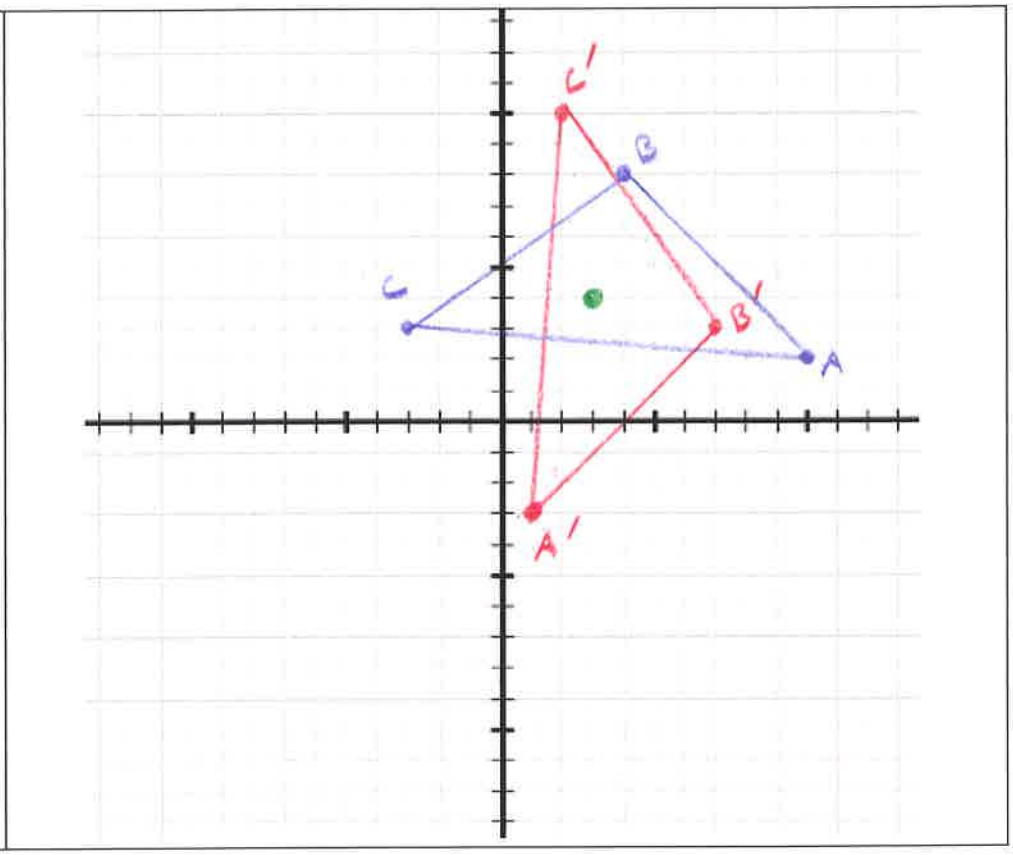
① △ABC

② Translate $\langle -3, 4 \rangle$

③ Rotate -90

$(x, y) \rightarrow (y, -x)$

④ Translate $\langle 3, 4 \rangle$



A triangle is defined by the following points:
A(-8, 4), B(-10, -2), C(-1, -2).
Perform a rotation of 90 degrees about the point (2, 3).

① △ABC

② Translate $\langle -2, -3 \rangle$

③ Rotate 90

$(x, y) \rightarrow (-y, x)$

④ Translate $\langle 2, 3 \rangle$