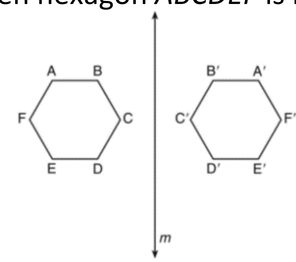
Unit 1 Test Review: Transformations in the Coordinate Plane

1. As shown in the diagram below, when hexagon *ABCDEF* is reflected over line *m*, the image is hexagon *A'B'C'D'E'F'*.

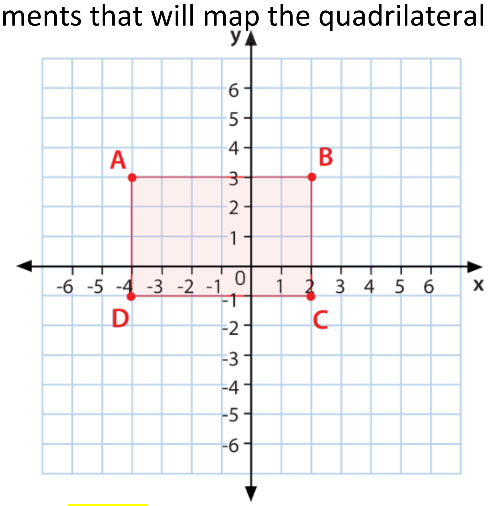


Under this transformation, which properties are preserved? distance, angles, orientation, area

2. Check all of the below series of transformations that will result in a congruent image.

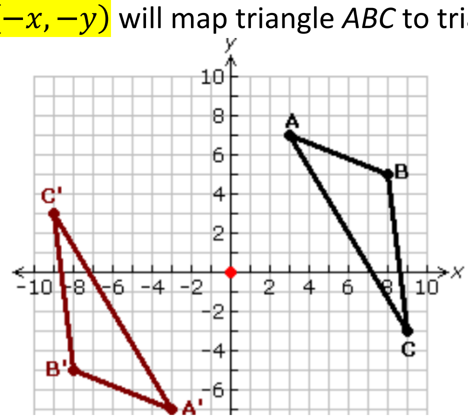
- A translation five units up followed by a dilation using a scale factor of one
- A 270 degree counter clockwise rotation followed by a reflection over the line y = 0
- A 90 degree rotation followed by a reflection over the line y = x
- A reflection over the x-axis followed by a dilation using a scale factor of 2

3. Fill in the blanks to make statements that will map the quadrilateral graphed below onto itself.



- Reflection over the line $y = 1$
- 180 degree rotation about the point $(-1, 1)$
- Reflection over the line $x = 1$

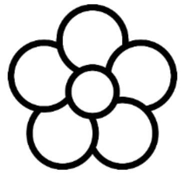
4. The transformation $(x, y) \longrightarrow (-x, -y)$ will map triangle *ABC* to triangle *A'B'C'*.



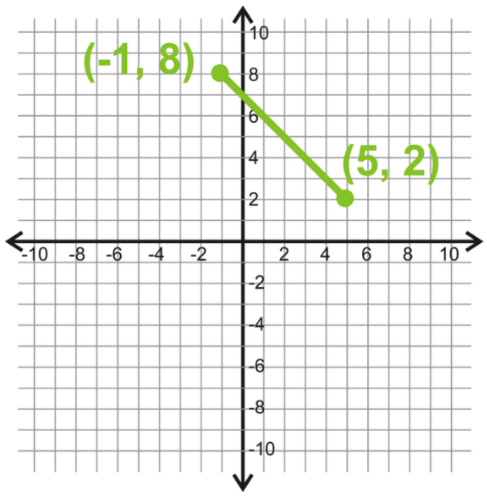
5. List the all the degrees of rotations (less than 360) that will map the figure below onto itself.

$360 \div 5 = 72°$

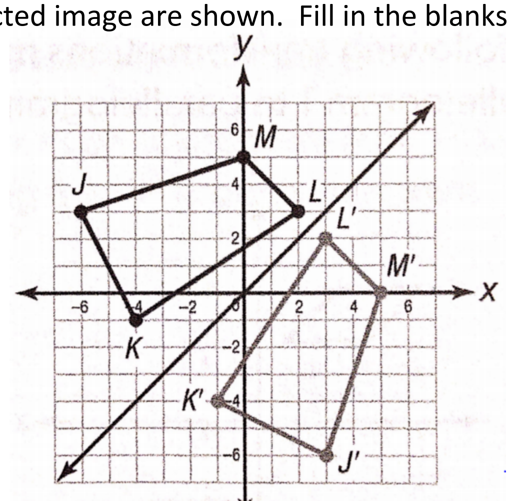
$72°, 144°, 216°, 288°$



6. If the segment below is reflected over the line y = 1, then translated 3 units to the left, the coordinates of the endpoints of the image are $(-4, -6)$ and $(2, 0)$.



7. Quadrilateral *JKLM* and its reflected image are shown. Fill in the blanks



- The image shows the result of a reflection across the line $y = x$.
- The path that point L takes to L' is perpendicular to the line of reflection.
- Each point (x, y) on quadrilateral *JKLM* maps to a point (y, x) on its image.
- Corresponding sides of quadrilateral *JKLM* and its image are not parallel.
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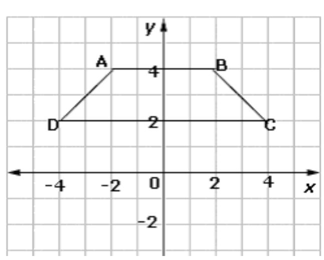
8. The trapezoid below is translated such that *A'* = *D*. The coordinates of the image *B'* after the translation is $(0, 2)$.



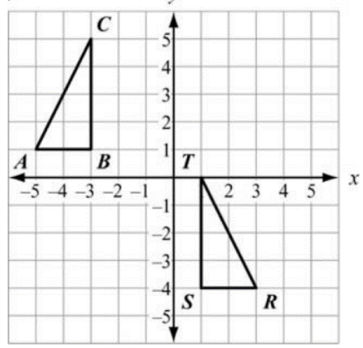
9. Check all of the below transformations on triangle ABC that produces an image congruent to triangle ABC.

- reflection across y = x
- translation 3 units down and 4 units to the right
- dilation by a scale factor of 1.5
- clockwise rotation of 270 degrees

10. Find a series of transformations that maps ABC to RST.

Answers may vary.

Reflect ΔABC across the y-axis, then translate it 2 units left and 5 units down

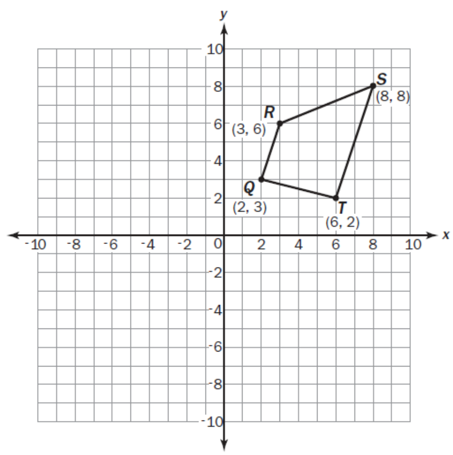


11. The image of point Q after a counterclockwise rotation of 270 degrees about the origin is $(3, -2)$.

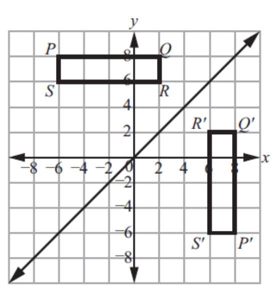
$R_{270°}(x, y) = (y, -x)$

$Q\ (2, 3)$

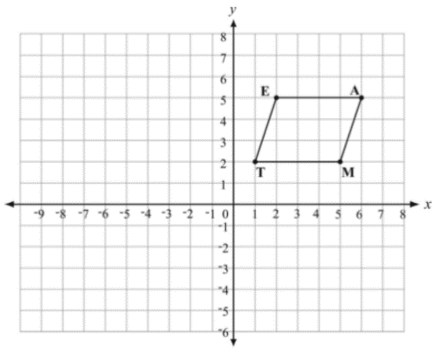
$Q'(3, -2)$



12. The function $R_{y=x}(x, y) = (y, x)$ describes the transformation of rectangle *PQRS* to *P'Q'R'S'*.

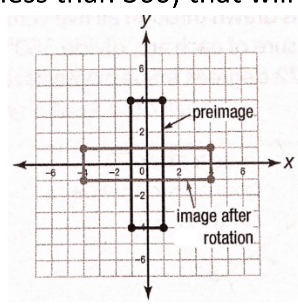


13. The graph below shows parallelogram *TEAM*. A congruent parallelogram *T'E'A'M'* has coordinates $E'(\ 7,0), A'(\ 3,0), M'(\ 4,\ 3)$, and $T'(8,3)$.?

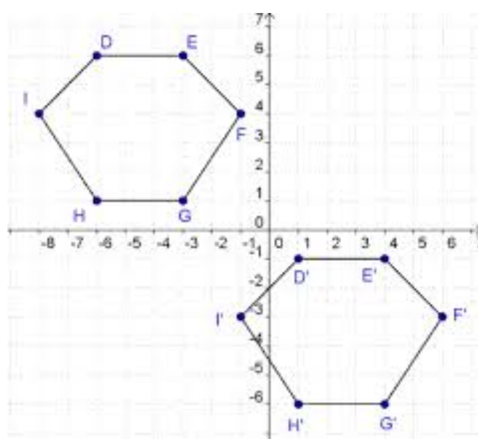


14. List all of the degrees of rotations (less than 360) that will map the preimage to the image below.

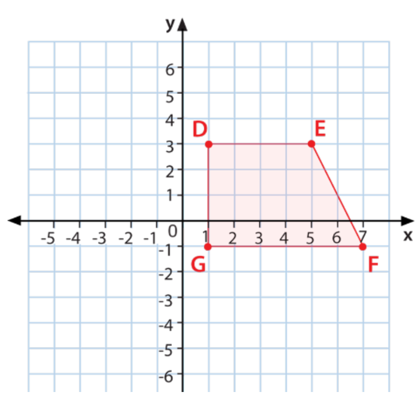
$90°, 270°$



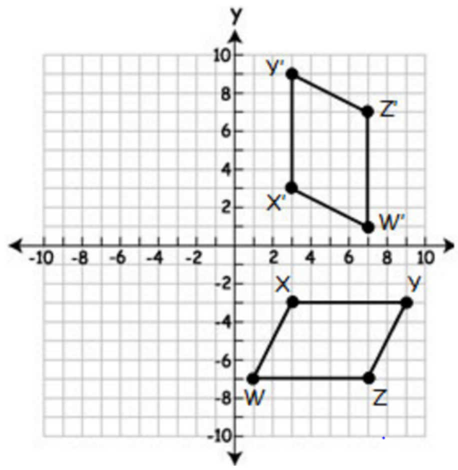
15. The function $T(x, y) = (x + 7, y - 7)$ describes the transformation graphed below.



16. If trapezoid *DEFG* below is reflected so that E'= (5, -5), the line of reflection is $y = -1$.



17. The function $(x, y) \rightarrow (-y, x)$ describes the rotation.

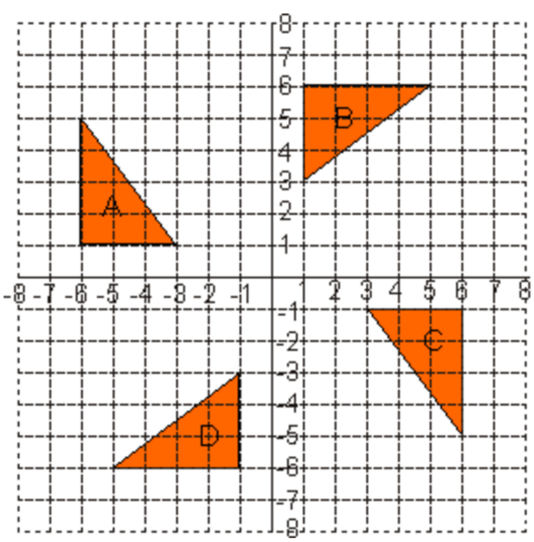


18. The **single** translation $(x, y) \rightarrow (x + 4, y - 4)$ accomplishes the same translation as the following series of translations: $(x, y) \rightarrow (x + 5, y - 3)$followed by $(x, y) \rightarrow (x + 2, y - 4)$ followed b$(x, y) \rightarrow (x - 3, y - 3)$y.

19. List the coordinates for the image of point ***P*** (-2, 4) after each of the following reflections.

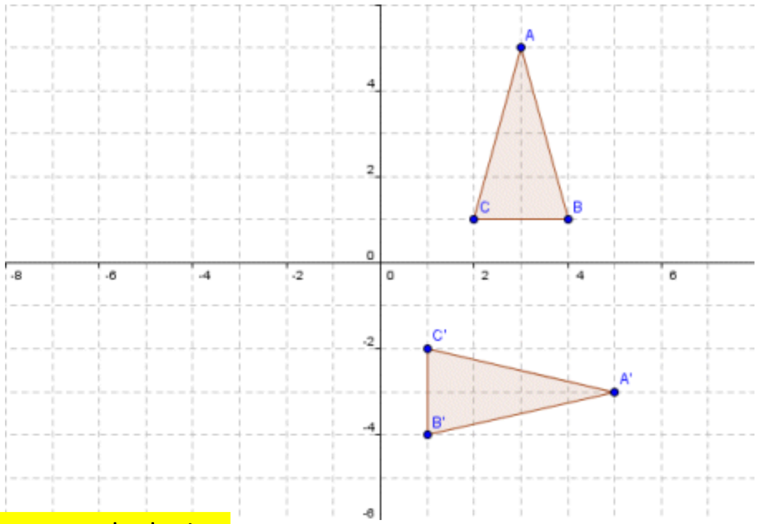
- Point P is reflected over the y-axis. $(2, 4)$
- Point P is reflected over the x-axis. $(-2, -4)$
- Point P is reflected over the line y = x. $(4, -2)$

20.



- Triangle D is a 270 degree **counterclockwise** rotation of triangle C.
- Triangle C is a 90 degree **clockwise** rotation of triangle B.
- Triangle C is a 180 degree rotation of triangle A.
- Triangle B is a 270 degree **clockwise** rotation of triangle C.

21. In the graph below $\Delta ABC \cong \Delta A'B'C'$. Explain using transformations how you know the triangles are congruent. List the transformation or series of transformations. Also list corresponding angles and sides that are congruent. *(Write in complete sentences.)*



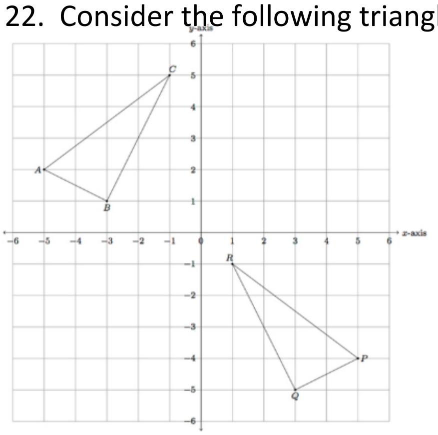
ΔABC was rotated 270° counterclockwise.

$\overline{AB} \cong \overline{A'B'}$ $\angle A \cong \angle A'$

$\overline{AC} \cong \overline{A'C'}$ $\angle B \cong \angle B'$

$\overline{BC} \cong \overline{B'C'}$ $\angle C \cong \angle C'$

22. Consider the following triangles graphed below. *(Write in complete sentences.)*



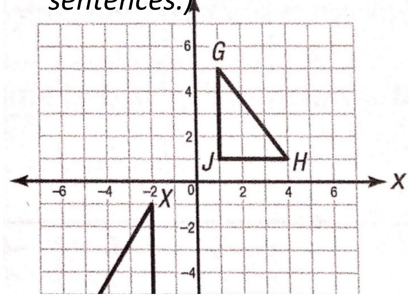
A. What series of transformations will map one of the graphed triangles onto the other triangle?

Reflect across the y-axis, then translate 6 units down.

B. Do the transformations ensure that the triangles are congruent? Explain.

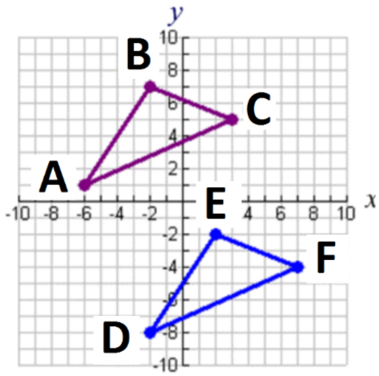
Yes, reflections and translations preserve the shape and size.

23. Liam says that GHJ can be mapped to XYZ with a series of rigid motion transformations. Is he correct? Is so, give a series of transformations that works. If not, explain why not. *(Write in complete sentences.)*



No, Liam is not correct. $\overline{GJ}$ in ΔGHJ is only 4 units long versus its "corresponding side" of $\overline{XZ}$ in ΔXYZ which is 5 units long.

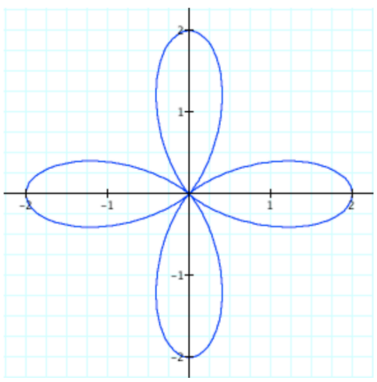
24. Triangles ABC and DEF are congruent.



A. Write a function to describe the translation that maps triangle ABC to triangle DEF. $(x, y) \longrightarrow (x+4, y-9)$

B. Write a function to describe the translation that maps triangle DEF to triangle ABC. $(x, y) \longrightarrow (x-4, y+9)$

25. List all the **single** transformations that will map the figure onto itself. Rotations should be **clockwise** and **less than 360 degrees**. Name all lines of reflection. *(Write in complete sentences.)*



$90°, 180°, 270°$

Lines of reflection: $x = 0, y = 0, y = x,\ y = -x$