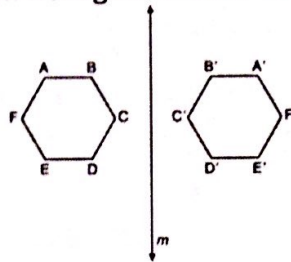# Unit 1 Test Review: Transformations in the Coordinate Plane

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 ✗, size ✓

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.

y = 1

x = -1
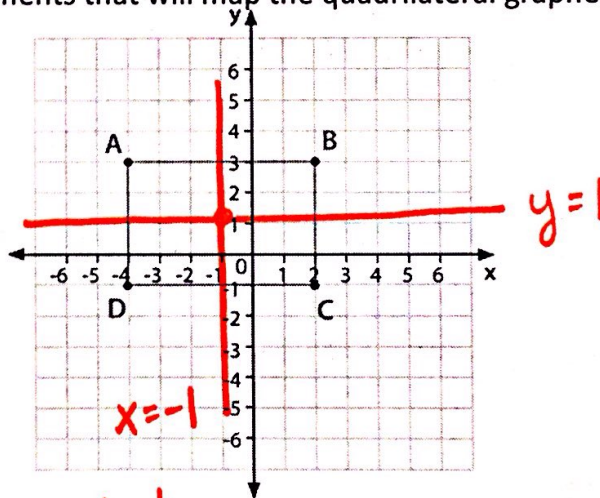
- Reflection over the line __y=1__
- 180 degree rotation about the point __(-1,1)__
- Reflection over the line __x=-1__

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

180° rotation

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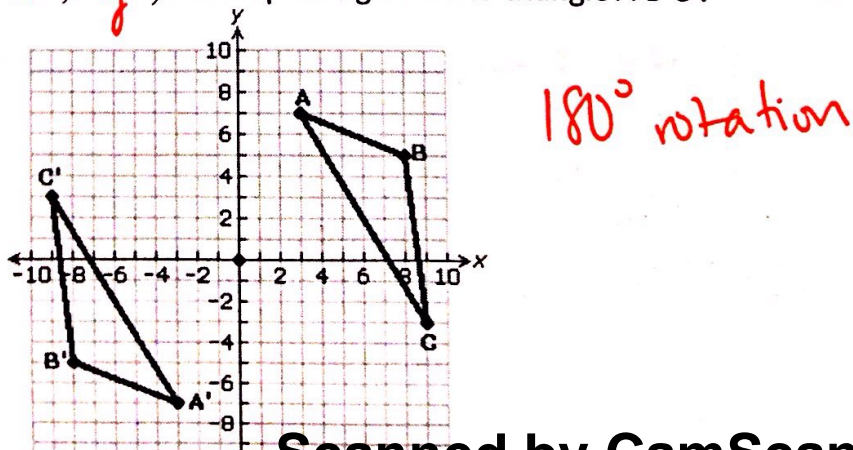
List the all the degrees of rotations (less than 360) that will map the figure below onto itself.

(handwritten annotations) 360°   360÷5 = 72°

285°   72°   216°   144°
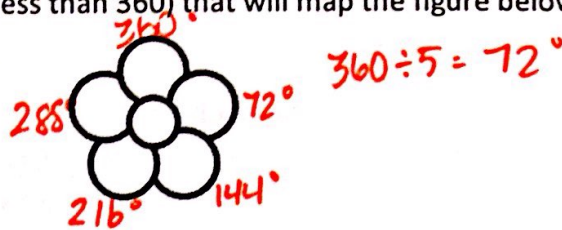
6. If the segment below is reflected over the line y = 1, then translated 3 units to the left, the coordinates of the endpoints of the image are __(2,0)__ and __(-4,6)__ .

(-1, 8)

(5, 2)
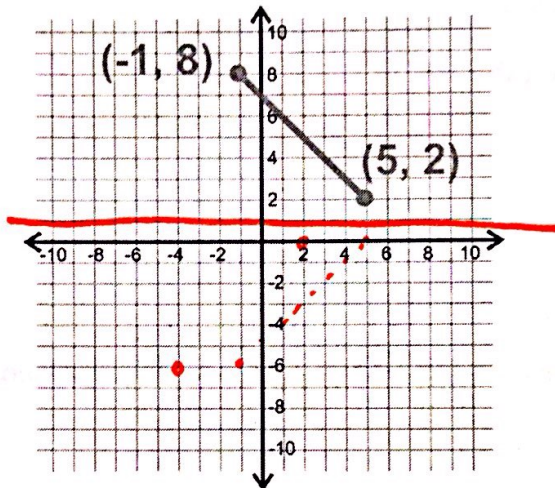
7. Quadrilateral *JKLM* and its reflected image are shown. Fill in the blanks
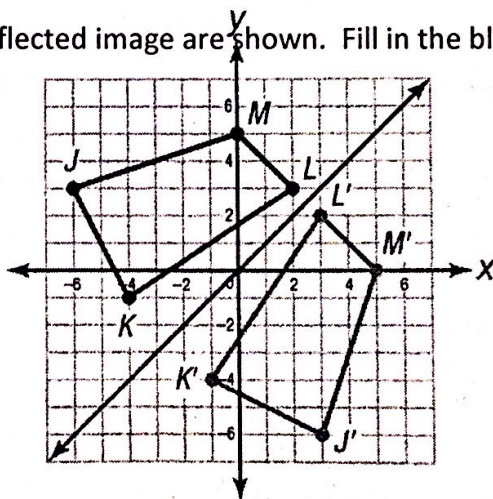
- The image shows the result of a reflection across the line __y=x__ .
- Each point (x, y) on quadrilateral *JKLM* maps to a point (__y__ , __x__) on its image.
- Corresponding sides of quadrilateral *JKLM* and its image are __congruent__ .

8. The trapezoid below is translated such that A′ = D. The coordinates of the image B′ after the translation is __(0,2)__ .
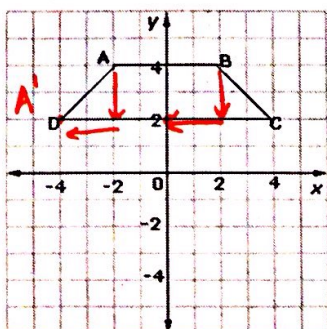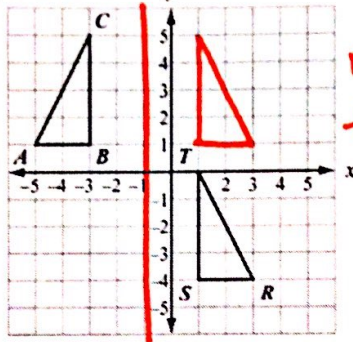
(handwritten) down 2 left 2

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 ✓

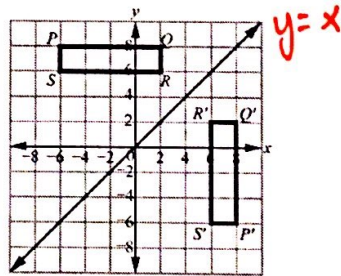10. List a series of transformations that maps $\triangle ABC$ to $\triangle RST$.

reflect over X = -1
then translate 5 units down

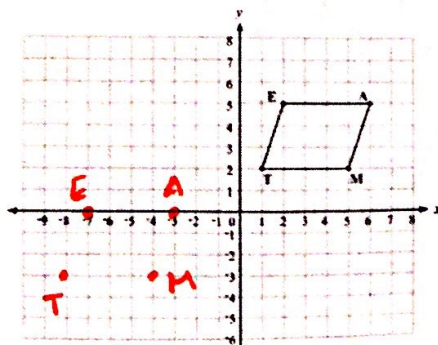11. The image of point Q after a counterclockwise rotation of 270 degrees about the origin is $(3, -2)$.
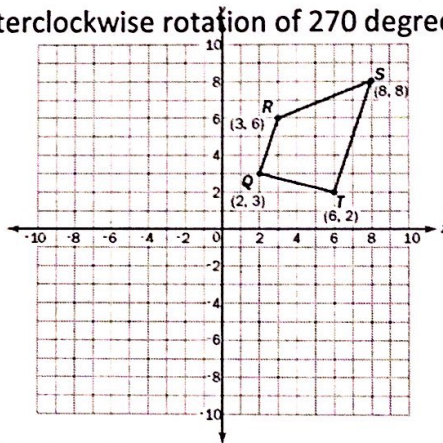
$(x, y) \rightarrow (y, -x)$
$(2, 3) \rightarrow (3, -2)$

12. The function $T(x, y) \rightarrow (\underline{y}, \underline{x})$ describes the transformation of rectangle PQRS to P'Q'R'S'.

y = x

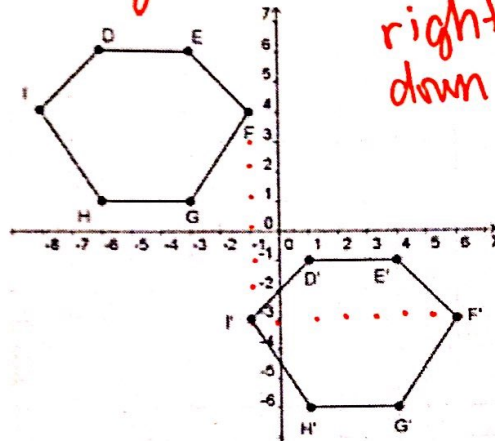13. The graph below shows parallelogram *TEAM*. A congruent parallelogram *T'E'A'M'* has coordinates $E'(-7, 0), A'(-3, 0), M'(-4, -3)$, and $T'(\underline{-8}, \underline{-3})$.?

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

90°

preimage

image after rotation
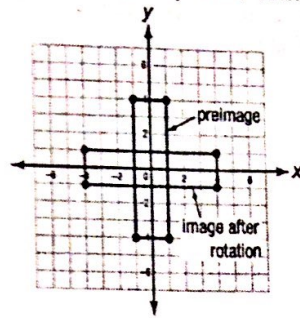
15. The function $T(x, y) \rightarrow ($ **X + 7, y − 7** $)$ describes the transformation graphed below.

**right 7
down 7**

D   E

H   G

D'   E'   F'

H'   G'

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

y = −1

D   E

G   F

D'
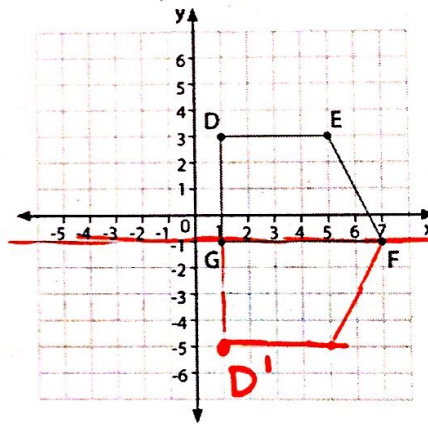
17. The function $(x, y) \rightarrow ($ **−y, X** $)$ describes the rotation.

90° CCW

Y'   Z'

X'   W'

X   Y

W   Z

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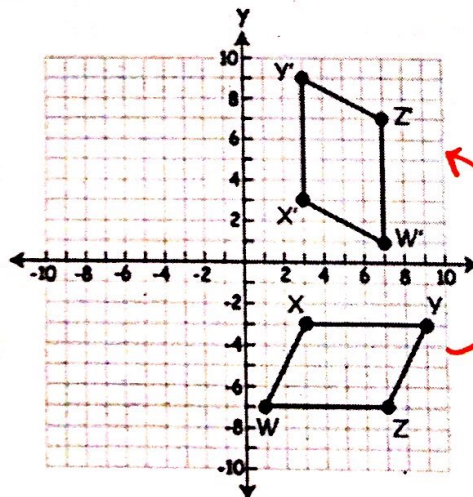
single translation $(x,y) \rightarrow ($ **X+4** , **y-4** $)$ accomplishes the same translation as the following series c
lations: $(x,y) \rightarrow (x+5, y+3)$ followed by $(x,y) \rightarrow (x+2, y-4)$ followed by $(x,y) \rightarrow (x-3, y-3)$.

<div style="color:red">

right 5   right 2   left 3 = right 4

up 3   down 4   down 3 = down 4

</div>

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

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

(x, ry) • Point P is reflected over the x-axis.   (-2, -4)

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

20.
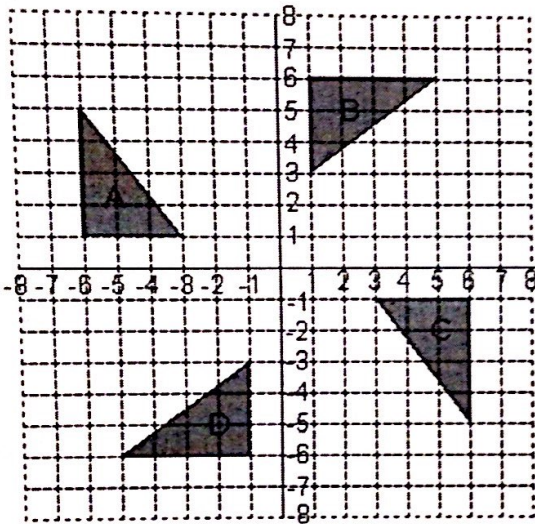
• Triangle D is a 270 degree counterclockwise rotation of triangle C.
• Triangle C is a 90 degree clockwise rotation of triangle B.
• Triangle C is a 180 degree rotation of triangle A.
• Triangle B is a 270 degree clockwise rotation of triangle C

21. In the graph below $\triangle ABC \cong \triangle A'B'C'$. Explain using transformations how you know the triangles are congruent. List the transformation or series of transformations. *(Write in complete sentences.)*
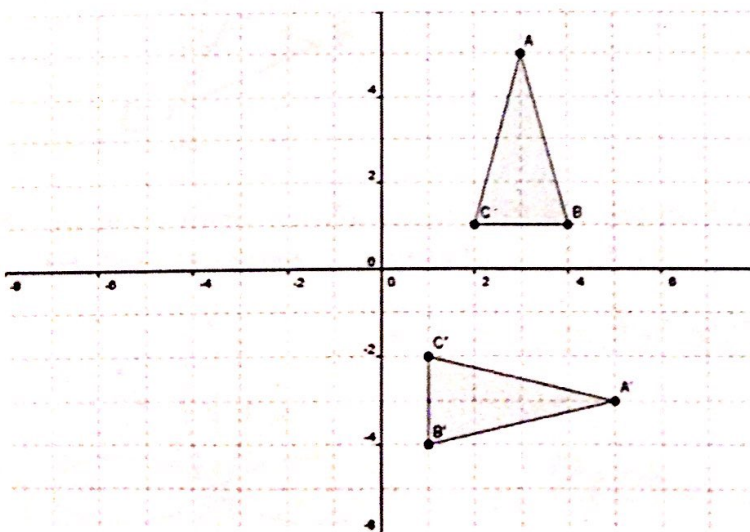
Triangle A'B'C' is a 90° clockwise rotation of ABC. Since rotations are rigid transformations, the triangles must be congruent.
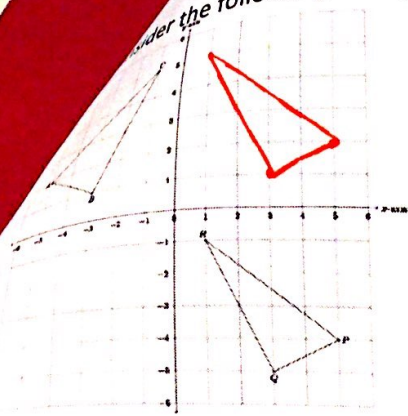
A. What series of transformations will map one of the graphed triangles onto the other triangle?

Reflect over y-axis. Then translate 6 units down.

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

Yes, because reflections and translations always result in congruent images.

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23. Liam says that $\triangle GHJ$ can be mapped to $\triangle XYZ$ 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.)*
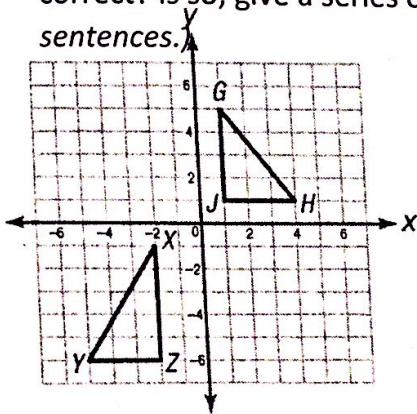
NO because $\triangle XYZ$ is bigger than $\triangle GHJ$ which means the triangles are not congruent.

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24. Triangles ABC and DEF are congruent.
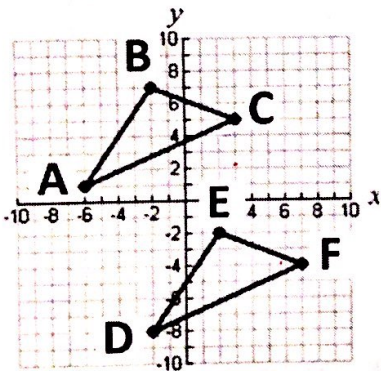
A. Write a function/rule to describe the translation that maps triangle ABC to triangle DEF. **$(x,y) \rightarrow (x+4, y-9)$**

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

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25. List all the **single** transformations that will map the figure onto itself. Rotations should be **clockwise** ad **less than 360 degrees.** Name all lines of reflection.
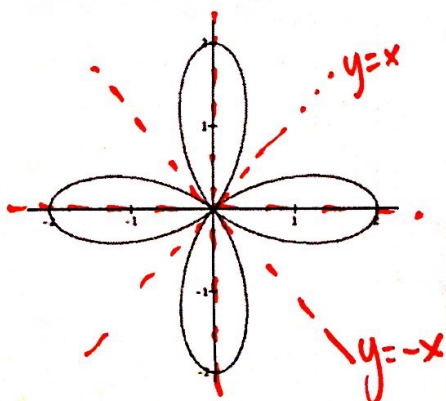
Rotations: 90°, 180°, 270° about the point (0,0)

Reflections: x-axis, y-axis, y=x, y=-x

$y=x$

$y=-x$

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