

Honors Geometry Unit 1 Transformations in the Coordinate Plane Test Review

I. Find the coordinates of the reflection without using a coordinate plane.

1. L (2,3) reflected in the x-axis

$L'(2, -3)$

2. M(-2, -4) reflected in the line $x = 2$

$M'(6, -4)$

3. N (-4, 0) reflected in the line $y=x$

$N'(0, -4)$

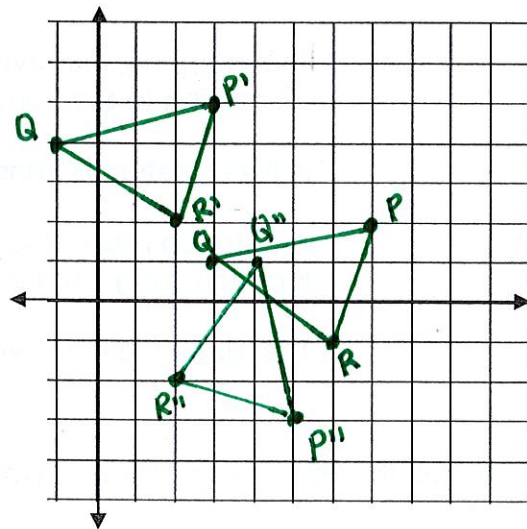
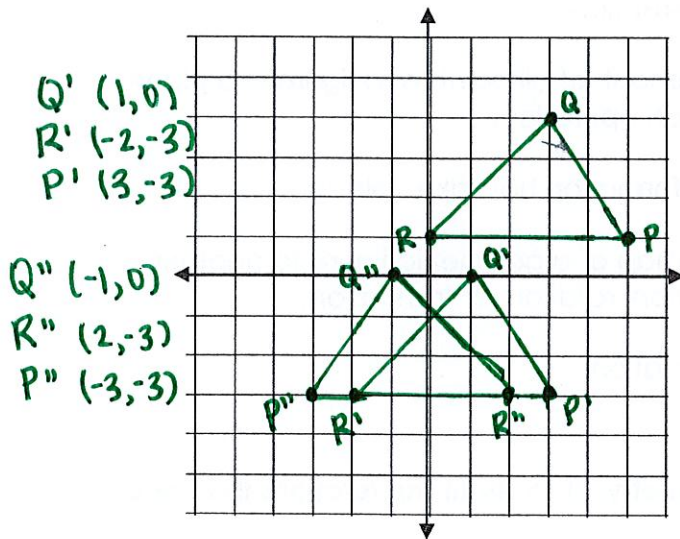
4. P (8.2, -3) reflected in y-axis

$P'(-8.2, -3)$

II. Draw $\triangle PQR$, $\triangle P'Q'R'$, and $\triangle P''Q''R''$ using the given transformations in the order they appear.

5. P (5, 1), Q (3, 4), R (0, 1)
Translation: $(x, y) \rightarrow (x-2, y-4)$
Reflection: in the y-axis

6. P (7, 2), Q (3, 1), R (6, -1)
Translation: $(x, y) \rightarrow (x-4, y+3)$
Rotation: 90° clockwise about the origin



III. Write a rule for the translation.

7. 1 unit to the left and 1 unit up
 $(x, y) \rightarrow (x-1, y+1) \quad \langle -1, 1 \rangle$

8. 3 units down
 $(x, y) \rightarrow (x, y-3) \quad \langle 0, -3 \rangle$

9. 7 units to the left and 4 units down
 $(x, y) \rightarrow (x-7, y-4) \quad \langle -7, -4 \rangle$

10. 10 units right and 8 units up
 $(x, y) \rightarrow (x+10, y+8)$

IV. Rotations

11. Suppose $\triangle ABC$ has vertices $A(-8, -2)$, $B(-5, -2)$, and $C(-8, -7)$. If $\triangle ABC$ is rotated 90° counterclockwise about the origin, what are the coordinates of the vertices of $\triangle A'B'C'$?

$A' (2, -8)$
 $B' (2, -5)$
 $C' (7, -8)$

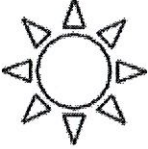


V. Vocabulary

Image Isometry Pre-image Reflection
 Rotation Transformation Translation

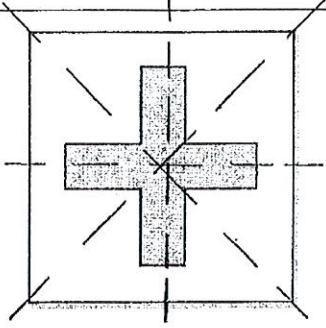
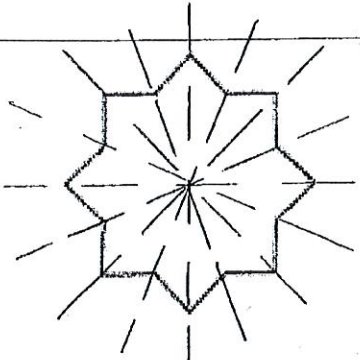
Use only the words in the above to fill in the blanks below.

12. reflection A transformation of a figure that creates a mirror image over a line.
13. translation A transformation that slides each point of a figure the same distance in the same direction.
14. transformation The mapping, or movement, of all points of a figure in a plane according to a common operation.
15. pre-image A figure before a transformation has taken place.
16. isometry A distance preserving map of a geometric figure to another location using a reflection, rotation, or translation.
17. image The result of a transformation.


Determine whether the figure has rotational symmetry. If so, state the rotations that map the figure onto itself.

<p>18. </p> <p>Rotational Symmetry? <u>Yes</u> If yes, state the degree of rotation: 45°</p>	<p>19. </p> <p>Rotational Symmetry? <u>NO</u> If yes, state the degree of rotation:</p>	<p>20. </p> <p>Rotational Symmetry? <u>Yes</u> If yes, state the degree of rotation: 72°</p>
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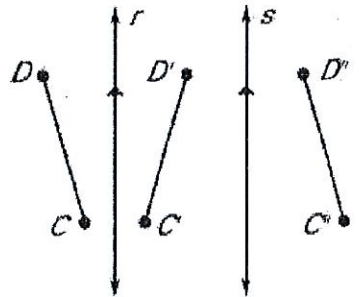
Draw all lines of symmetry.

<p>21.</p> 	<p>22.</p> 
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Draw a figure for the description. If not possible, write "not possible".

<p>23. A trapezoid with exactly one line of symmetry.</p>  <p>an isosceles trapezoid</p>	<p>24. A triangle with exactly two lines of symmetry.</p> <p>not possible</p>
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In the diagram, lines r and s are parallel.

<p>25. A translation maps \overline{CD} onto which segment?</p> <p>$\overline{C''D''}$</p> <p>26. Is the distance from C to r the same as the distance from C' to r? Explain.</p> <p>yes because \overline{CB} and $\overline{C'B'}$ are reflections. Reflections are the same distance from the line of reflection.</p>	
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27. Use the translation $(x, y) \rightarrow (x + 1, y - 7)$ to answer each question below.

a. What is the translation vector? $\langle 1, -7 \rangle$

b. What is the image of A (10, -4)? $A'(11, -11)$

c. What is the image of A' from part b, which would be called A''? $A''(12, -18)$

d. What is the pre-image of C' (-9, 12)? $C(-10, 19)$

28. Given $\triangle ABC$ with A(-1, 0), B(5, 3), and C(2, -4), find the vertices of $\triangle A'B'C'$ given the transformation rules below. Then determine the type of transformation which occurred.

a. $(x, y) \rightarrow (x + 11, y - 5)$ $A' = (10, -5)$ $B' = (16, -2)$ $C' = (13, -9)$

Transformation: translation right 11, down 5

b. $(x, y) \rightarrow (-x, -y)$ $A' = (1, 0)$ $B' = (-5, -3)$ $C' = (-2, 4)$

Transformation: 180° rotation (around the origin)

c. $(x, y) \rightarrow (y, -x)$ $A' = (0, 1)$ $B' = (3, -5)$ $C' = (-4, -2)$

Transformation: 90° CW rotation (around the origin)

d. $(x, y) \rightarrow (y, x)$ $A' = (0, -1)$ $B' = (3, 5)$ $C' = (-4, 2)$

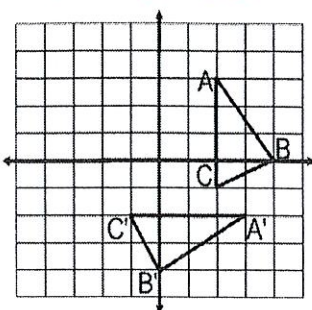
Transformation: reflection across $y = x$

e. $(x, y) \rightarrow (-y, x)$ $A' = (0, -1)$ $B' = (-3, 5)$ $C' = (4, 2)$

Transformation: 90° CCW rotation (around the origin)

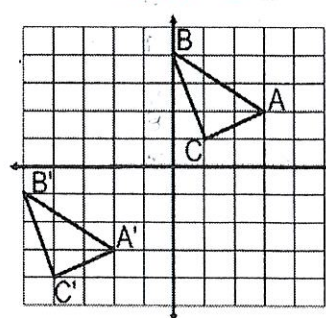
Write the transformation rule for the following graphs.

29. 90° CW rotation



$A(2, 3)$
 $A'(3, -2)$

30. translation $(x, y) \rightarrow$

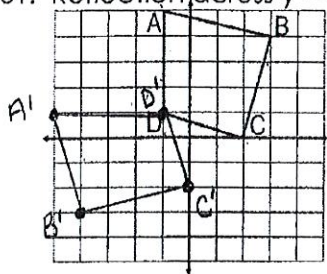


$(x-5, y-5)$
 $\langle -5, -5 \rangle$

$A(-3,-1)$ $C(-1,-4)$
 $B(-4,-4)$

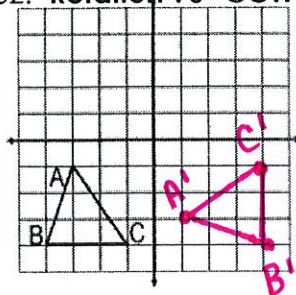
Follow the instructions for each graph.

31. Reflection across $y = -x$.



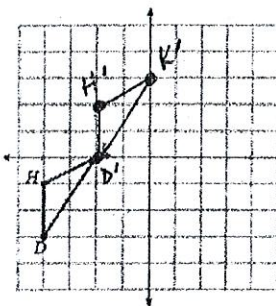
$A(1,5)$ $A'(-5,1)$
 $B(3,4)$ $B'(-4,-3)$
 $C(2,0)$ $C'(0,-2)$
 $D(-1,1)$ $D'(-1,1)$

32. Rotation 90° CCW



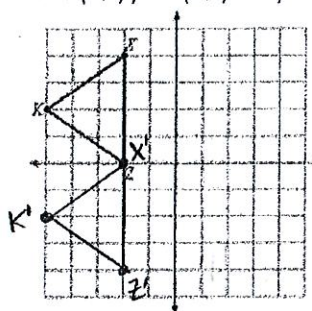
$A'(1,-3)$
 $B'(4,-4)$
 $C'(4,-1)$

33. $\langle 2, 3 \rangle$



$K(-2,0)$ $K'(0,3)$
 $H(-4,-1)$ $H'(-2,2)$
 $D(-4,-3)$ $D'(-2,0)$

34. $(x, y) \rightarrow (x, y - 4)$



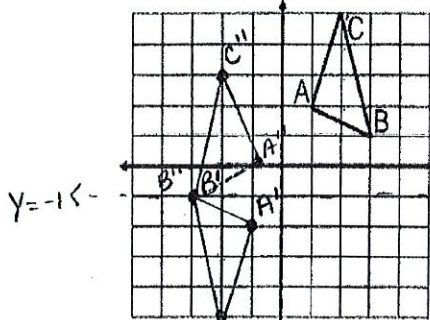
$K(5,2)$ $K'(-5,-2)$
 $X(-2,4)$ $X'(-2,0)$
 $Z(-2,0)$ $Z'(-2,-4)$

Composition of Transformations

Remember to label/name the first transformation with $\Delta A'B'C'$, the second transformation with $\Delta A''B''C''$.

35. a. Rotation 180°

b. reflection over $y = -1$

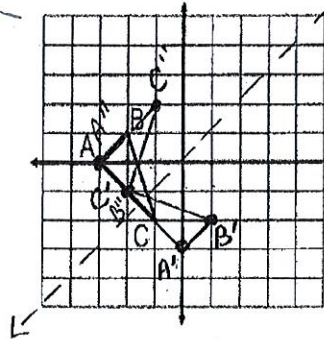


$A(1,2)$
 $B(3,1)$
 $C(2,5)$

$A'(-1,-2)$ $A''(-1,0)$
 $B'(-3,-1)$ $B''(-3,-1)$
 $C'(-2,-5)$ $C''(-2,3)$

36. a. reflection across $y = x$.

b. Rotation 90° CW



$A(-3,0)$
 $B(-2,1)$
 $C(-1,-2)$

$A'(0,-3)$ $A''(-3,0)$
 $B'(1,-2)$ $B''(-2,-1)$
 $C'(-2,-1)$ $C''(-1,2)$