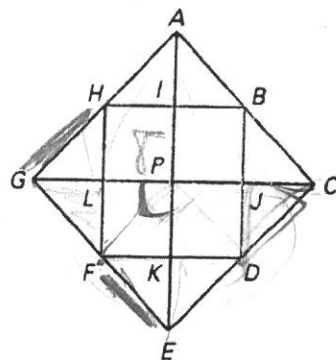


Name: Key

Transformations Test Review Homework

Using the figure shown, find the image for the specified transformation.



- 90° clockwise rotation of  $\overline{AB}$  about P. CD
- 90° clockwise rotation of D about P. F
- 90° counterclockwise rotation of  $\overline{GH}$  about P. FE
- 180° counterclockwise rotation of  $\overline{EF}$  about P. AB
- 180° clockwise rotation of  $\triangle CJD$  about P.  $\triangle GLH$
- 90° counterclockwise rotation of  $\triangle GLF$  about P.  $\triangle EKD$

7. Rotate the quadrilateral with coordinates A(1, 1), B(3, 1), C(6, 4), and D(1, 3), given the angles shown. Then graph the quadrilaterals on the same coordinate plane.

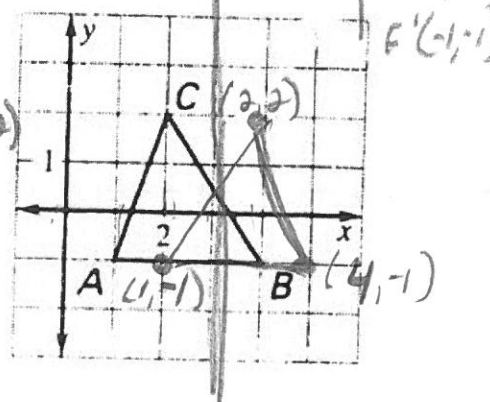
- (x, y) → (-y, x) a. 90° b. 180° (x, y) → (-x, -y) c. 270° (x, y) → (y, -x) d. 360° (x, y) → (x, y) SAME
- A'(-1, 1) B'(-1, 3) C'(4, 6) D'(-3, 1) A'(1, -1) B'(3, -1) C'(-6, -1) D'(-1, -3) A'(1, -1) B'(1, 3) C'(4, -6) D'(3, -1)

8. Reflect the triangle with coordinates D(-3, 0), E(-4, 4), and F(1, 1) in each line. Then graph each pair of triangles on the same coordinate plane.

- a. y-axis (-x, y) b. x-axis (x, -y) c. y = x (y, x) d. y = -x (-y, -x)
- D'(3, 0) E'(4, 4) F'(-1, 1) D'(3, 0) E'(-4, -4) F'(1, -1) D'(0, -3) E'(4, -4) F'(1, 1) D'(0, 3) E'(4, 4) F'(-1, -1)

Perform the stated transformation on the preimage,  $\triangle ABC$ . Give the coordinates of the image,  $\triangle A'B'C'$ .

- Rotation 90° clockwise about the origin (x, y) → (y, -x)
- Reflection in x = 3 → A'(-1, -1) B'(1, 1) C'(2, 2)
- Translation (x, y) → (x + 3, y - 2)



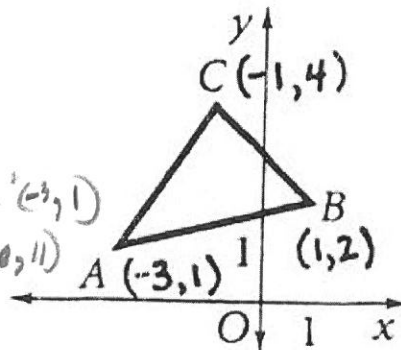
A''(5, 0) A'(4, -3) B'(7, -3)

Perform the stated algebraic rule on the preimage,  $\triangle ABC$ . Give the coordinates of the image,  $\triangle A'B'C'$ . Specifically describe the transformation.

- (x, y) → (-x, -y) 180° Rot.
- (x, y) → (x - 3, y - 2) Translation left 3, down 2
- (x, y) → (-2y, -2x)  $R_{y=-x}$  Dilated by 2

For #15-22, use  $\triangle ABC$ . Write the coordinates of each image, then write its algebraic rule.

- a dilation four times the original size (x, y) → (4x, 4y)
- a dilation half the original size (x, y) → (1/2 x, 1/2 y)
- a rotation of 90° A'(-1, 3) B'(-2, 1) C'(-4, -1)
- a rotation of 180° A'(3, -1) B'(-1, -2) C'(1, -4)
- a translation 2 units left and 3 units down A'(-5, -2) B'(-1, -1) C'(-3, 1)
- a translation 1 unit right and 7 units up A'(-2, 8) B'(2, 9) C'(0, 11)
- a reflection in y = x (x, y) → (y, x)
- a reflection in the x-axis



$R_{x\text{-axis}}$  (x, y) → (x, -y)  
 A'(-3, -1) B'(1, -2) C'(-1, -4)

Find a single transformation that has the same effect as the composition of transformations indicated. Describe the transformation specifically. Then write the algebraic rule for the composition.

23.  $\langle -5, -7 \rangle$  followed by  $\langle 3, 6 \rangle = \langle -2, -1 \rangle$

24.  $\langle 10, -9 \rangle$  followed by  $\langle 1, 5 \rangle = \langle 11, -4 \rangle$

25. Translation up 3 and right 4, and a reflection over  $y = -x$ .  $(x+4, y+3) \rightarrow (-y+3, -(x+4))$

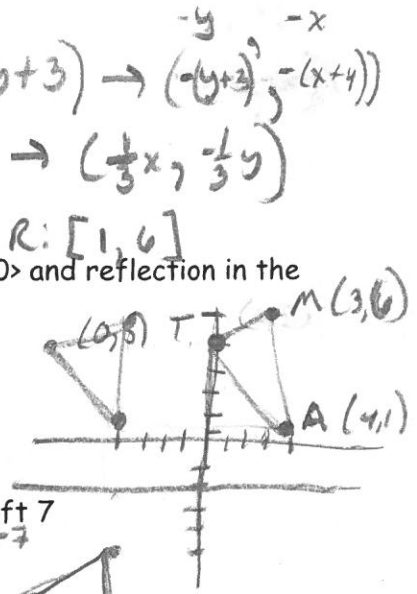
26. Reflection over  $y = 0$  and reduction by  $1/3$ .  $(x, y) \rightarrow (x, -y) \rightarrow (\frac{1}{3}x, \frac{1}{3}y)$

Triangle TAM has vertices  $T(0, 5)$ ,  $A(4, 1)$ , and  $M(3, 6)$ .

27. What is the domain and range of TAM in interval notation?  $D: [0, 4]$   $R: [1, 6]$

28. Find the image of triangle TAM after performing the glide vector  $\langle -4, 0 \rangle$  and reflection in the line  $y = -2$ . Label the image  $T'A'M'$ .

29. What is the domain and range of  $T'A'M'$  in interval notation?



Find a function rule for the transformation of  $c(x)$  with...

31. Translation left 5, up 3, vertical stretch by 2.  $2 \cdot c(x+5) + 3$

32. Reflection over the  $x$ -axis, vertical compression of  $\frac{1}{2}$ , and translation left 7.  $-\frac{1}{2}c(x+7)$

33. Reflection over  $y$ -axis and translation down 4.  $c(-x) - 4$

Given the function rule shown, determine the transformations of  $h(x)$ .

34.  $y = -3h(x-2) + 1$  Reflect over  $x$ -axis, vert. stretch by 3, right 2, up 1

35.  $y = \frac{1}{2}h(-x) - 4$  Vertically compress by  $\frac{1}{2}$ , Reflect over  $y$ -axis, down 4

36.  $y = -h(x+7) + 5$  reflect over  $x$ -axis, left 7, up 5

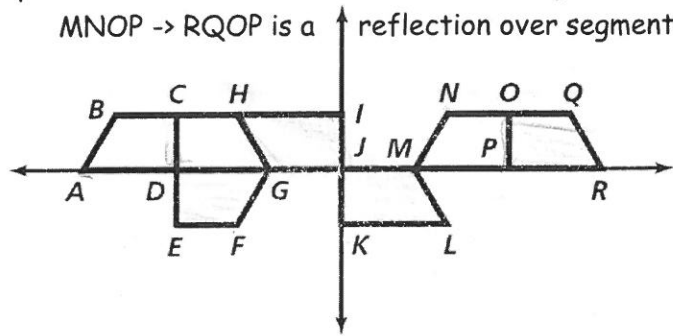
Specifically describe each transformation. Examples:  $ABCD \rightarrow GFED$  is a rotation 180 degrees about D.  $MNOP \rightarrow RQOP$  is a reflection over segment OP.

37.  $\triangle ABCD \rightarrow \triangle GHCD$   $R_{\overline{CD}}$

38.  $\triangle HGJI \rightarrow \triangle LMJK$   $R_{O, 180^\circ}$

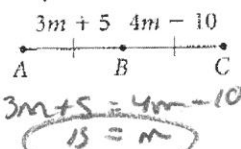
39.  $\triangle GFED \rightarrow \triangle RQOP$   
Glide Reflect

40.  $\triangle MNOP \rightarrow \triangle ABCD$   
Translation



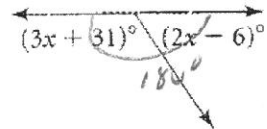
Solve given the information provided

41. a. Solve for  $m$ .



b. Solve for  $x$ .

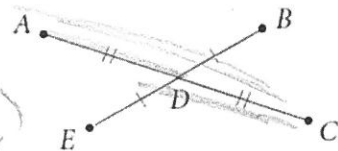
$5x + 25 = 180$   
 $5x = 155$   
 $x = 31$



42. If  $AD = 12$  and  $AC = 4y - 36$ , find  $y$ . Then find  $AE$  and  $DC$ .

$2(12) = 4y - 36$   
 $24 = 4y - 36$   
 $60 = 4y$   
 $15 = y$

$AE = 24$   
 $DC = 12$

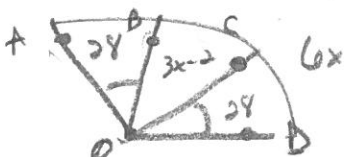
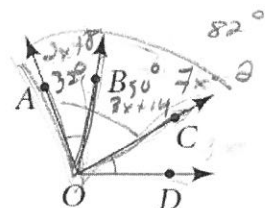


Use the diagram, below right, for Exercises 43 and 44. Solve for  $x$ .

(Hint: Find the angle measures to check your work.)

43.  $m\angle AOC = 7x - 2$ ,  $m\angle AOB = 2x + 8$ .  $(2x+8) + (3x+4) = 7x-2$   
 $m\angle BOC = 3x + 14$   
 $5x + 22 = 7x - 2$   
 $24 = 2x$   
 $12 = x$

44.  $m\angle AOB = 28$ ,  $m\angle BOC = 3x - 2$ ,  $m\angle AOD = 6x$   
 $2(28) + 3x - 2 = 6x$   
 $56 + 3x - 2 = 6x$   
 $54 + 3x = 6x$   
 $54 = 3x$   
 $18 = x$



★ Key ★

## Honors Math 2 Unit 2 Transformations Review

For each problem, you will complete the following parts:

- I) Graph and label pre-image on graph paper
- II) Write the algebraic rule or transformation description (whichever is missing in the problem)
- III) Graph and label the image on the same graph
- IV) Write coordinates of the image on the side of the graph

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1) Translations                      B (1, 3)                      A (-1, 1)                      T (4, -3)

Task: Perform the following translations of triangle BAT on the same graph.

- a) Translate triangle BAT left 2, up 1       $B'(-1, 4)$        $A'(-3, 2)$        $T'(2, -2)$
- b) Transform triangle BAT according to the rule  $(x, y) \rightarrow (x + 1, y - 3)$   
 $B'(2, 0)$        $A'(0, -2)$        $T'(5, -6)$

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2) Reflections Part 1                      B (1, 3)                      A (-1, 1)                      T (4, -3)

Task: Perform the following reflections of triangle BAT on the same graph.

- a) Reflect triangle BAT over the x-axis       $(x, y) \rightarrow (x, -y)$        $B'(1, -3)$        $A'(-1, -1)$        $T'(4, 3)$
- b) Reflect triangle BAT over the y-axis       $(x, y) \rightarrow (-x, y)$        $B'(-1, 3)$        $A'(1, 1)$        $T'(-4, -3)$

Reflections Part 2                      B (1, 3)                      A (-1, 1)                      T (4, -3)

Task: Perform the following reflections of triangle BAT on the same graph.

- a) Reflect triangle BAT over the line  $y = x$        $(x, y) \rightarrow (y, x)$        $B'(3, 1)$        $A'(1, 1)$        $T'(3, 4)$
- b) Reflect triangle BAT over the line  $y = -x$        $(x, y) \rightarrow (-y, -x)$        $B'(-3, -1)$        $A'(-1, -1)$        $T'(-3, -4)$

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3) Rotations                      B (1, 3)                      A (-1, 1)                      T (4, -3)

Task: Perform the following rotations of triangle BAT on the same graph.

- a) Rotate triangle BAT 90 degrees       $(x, y) \rightarrow (-y, x)$
  - b) Rotate triangle BAT 180 degrees       $(x, y) \rightarrow (-x, -y)$
  - c) Rotate triangle BAT 90 degrees clockwise       $(x, y) \rightarrow (y, -x)$   
 $270^\circ \text{ ccw}$        $270^\circ \text{ ccw}$
- 
- $90^\circ \text{ cw}$

4) Dilations

B (1, 3)

A (-1, 1)

T (4, -3)

Task: Perform the following dilations of triangle BAT on the same graph.

- a) Dilate triangle BAT with a scale factor of  $\frac{1}{2}$ .  $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$   
 b) Transform triangle BAT according to the rule  $(x, y) \rightarrow (2x, 2y)$

multi. values by 2.

5) Compositions

B (1, 3)

A (-1, 1)

T (4, -3)

Task: Perform the following translations of triangle BAT on the same graph.

- a) Translate triangle BAT right 2, down 1 THEN dilate by scale factor of 3  
 b) Transform triangle BAT according to the rule  $(x, y) \rightarrow (-y - 5, -x + 2)$   
 c) If  $f(x)$  represents triangle BAT, find  $f(-x) + 2$   
 d) If  $f(x)$  represents triangle BAT, find  $-3f(x+4)-1$

$(2, -1)$   
 $B'(3, 2)$   $A'(1, 0)$   
 $T'(6, -4)$   
 Dilate by 3  
 $B''(9, 6)$   $A''(3, 0)$   
 $T''(18, -12)$

6) Domain and Range

B (1, 3)

A (-1, 1)

T (4, -3)

Task: Perform the following based on triangle BAT on the same graph.

- a) Graph and label triangle BAT  
 b) Stretch triangle BAT vertically by a factor of 3, then label appropriately.

- I) What is the domain of the preimage?  $[-1, 4]$   
 II) What is the range of the preimage?  $[-3, 3]$   
 III) What is the domain of the image?  $[-5, 0]$   
 IV) What is the range of the image?  $[-10, 8]$

only 3's  
 $B'(1, 9)$   
 $A'(1, 3)$   
 $T'(4, -3)$

b)  $(x, y) \rightarrow (-y - 5, -x + 2)$

$B'(-8, 1)$   $A'(-6, 3)$   $T'(-2, -2)$

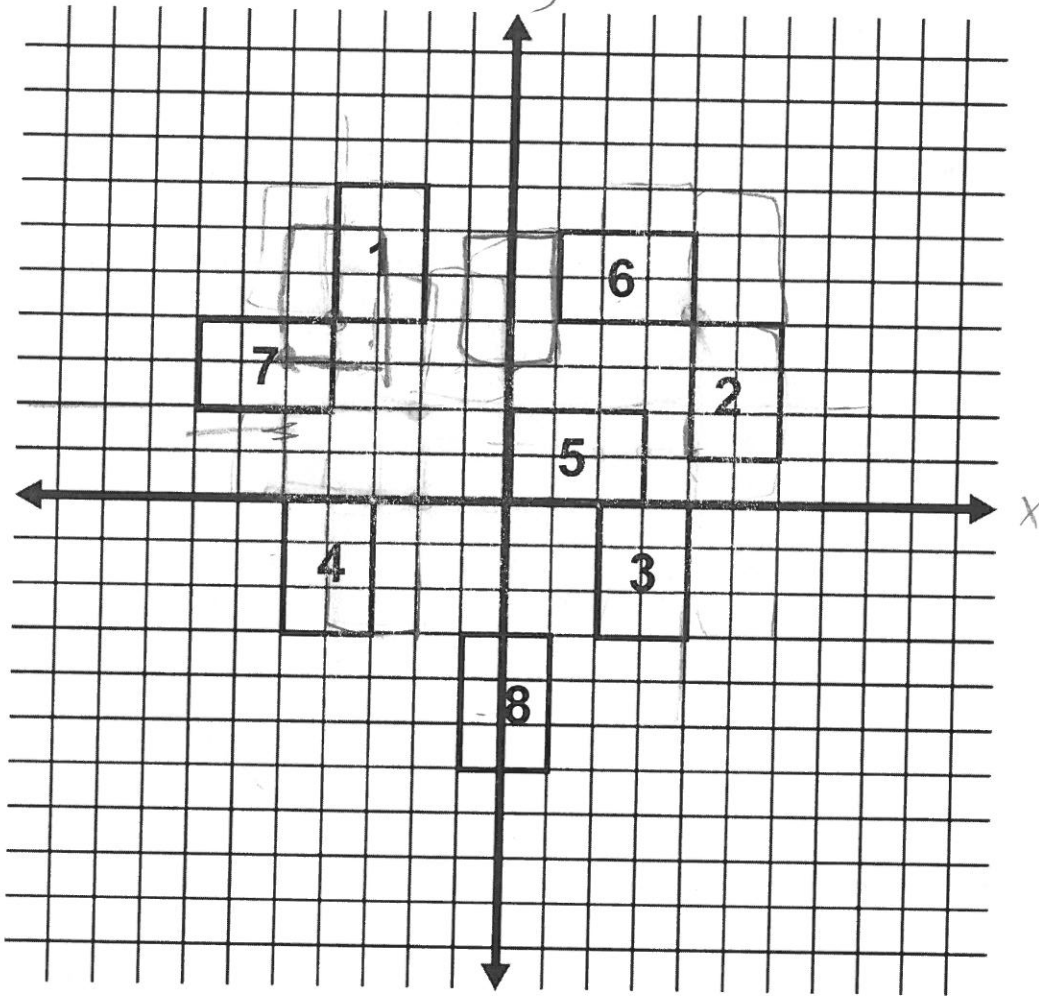
c) opp x up 2  $B'(-1, 5)$   $A'(1, 3)$   $T'(-4, -1)$

d) left 4 opp y, vert stretch by 3, down 1  
 $B'(-3, -10)$   $A'(-5, -4)$   $T'(0, 8)$



# Compositions of Transformations *\* Key \**

All rectangles in the grid below are congruent. Follow the instructions and then write the number of the rectangle that matches the location of the final image.



Which rectangle is the final image of each transformation?

1. Reflect Rectangle 1 over the  $y$ -axis. Then translate down three units and rotate  $90^\circ$  counterclockwise around the point  $(3, 1)$ . (Hint: redraw the axes so that the origin corresponds to  $(3, 1)$ .) **(5)**
2. Translate Rectangle 2 down one unit and reflect over the  $x$ -axis. Then reflect over the line  $x = 4$ . **(3)**
3. Reflect Rectangle 3 over the  $y$ -axis and then rotate  $90^\circ$  clockwise around the point  $(-2, 0)$ . Finally, glide five units to the right. **(5)**
4. Rotate Rectangle 4  $90^\circ$  clockwise around the point  $(-3, 0)$ . Reflect over the line  $y = 2$  and then translate one unit left. **(7)**
5. Translate Rectangle 5 left five units. Rotate  $90^\circ$  clockwise around the point  $(-2, 2)$  and glide up two spaces. **(1)**
6. Rotate Rectangle 6  $90^\circ$  clockwise around the point  $(4, 4)$  and translate down three units. **(2)**
7. Rotate Rectangle 7  $90^\circ$  clockwise around  $(-4, 4)$  and reflect over the line  $x = -4$ . **(1)**
8. Reflect Rectangle 8 over the  $x$ -axis. Translate four units left and reflect over the line  $y = 1.5$ . **(4)**