

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. Also, mark the image with the problem letter (a, b, etc.)
- IV) Write coordinates of the image on the side of the graph. Label appropriately.

1) Translations G (1, 3) E (-1, 1) O (4, -3)

Task: Perform the following translations of triangle GEO on the same graph. $G'(-1, 4)$ $E'(-3, 2)$

- a) Translate triangle GEO left 2, up 1 $(x, y) \rightarrow (x-2, y+1)$ $O'(2, -2)$
- b) Transform triangle GEO according to the rule $(x, y) \rightarrow (x+1, y-3)$
 translated right 1, down 3
 $G'(2, 0)$ $E'(0, -2)$ $O'(5, -6)$

2) Reflections G (1, 3) E (-1, 1) O (4, -3)

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

- a) Reflect triangle GEO over the x-axis $(x, y) \rightarrow (x, -y)$ $G'(1, -3)$ $E'(-1, -1)$ $O'(4, 3)$
- b) Transform triangle GEO according to the rule $(x, y) \rightarrow (-y, -x)$ Reflect over $y = -x$
- c) Reflect triangle GEO over the line $y = -x$ $(x, y) \rightarrow (-y, -x)$
- d) Transform triangle GEO according to the rule $(x, y) \rightarrow (-x, y)$
 Reflect over y-axis
 $G'(-1, 3)$ $E'(1, 1)$ $O'(-4, -3)$ $G'(-3, -1)$ $E'(-1, 1)$ $O'(3, -4)$

3) Rotations G (1, 3) E (-1, 1) O (4, -3)

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

- a) Rotate triangle GEO 90 degrees $(x, y) \rightarrow (-y, x)$ $G'(-3, 1)$ $E'(-1, -1)$ $O'(3, 4)$
- b) Rotate triangle GEO 90 degrees clockwise Same as 270 ccw $(x, y) \rightarrow (y, -x)$
- c) Transform triangle GEO according to the rule $(x, y) \rightarrow (-x, -y)$
 Rotate 180° about the origin
 $G'(-1, -3)$ $E'(1, -1)$ $O'(-4, 3)$ $G'(3, -1)$ $E'(1, 1)$ $O'(-3, -4)$

4) Dilations G (1, 3) E (-1, 1) O (4, -3)

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

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

Enlargement by 2 centered on the origin

$G'(2, 6)$ $E'(-2, 2)$ $O'(8, -6)$

$G'(\frac{1}{2}, \frac{3}{2})$ $E'(-\frac{1}{2}, \frac{1}{2})$
 $O'(2, -\frac{3}{2})$

5) Compositions G (1, 3) E (-1, 1) O (4, -3)

Task: Perform the following transformations of triangle GEO on the same graph.

- a) Translate triangle GEO right 2, down 1 THEN dilate by scale factor of 3 $(x, y) \rightarrow (3x+6, 3y-3)$
- b) Transform triangle GEO according to the rule $(x, y) \rightarrow (-y-5, -x+2)$
- c) If $f(x)$ represents triangle GEO, find $f(-x) + 2$ *Reflected over y-axis*
- d) If $f(x)$ represents triangle GEO, find $-3f(x+4) - 1$ *Reflected over x-axis, vertical stretch by 3, translated left 4 and down 1*

Reflected over $y = -x$, translated left 5 and up 2

$G'(-1, 5)$ $E'(1, 3)$ $O'(-4, -1)$

$G'(-3, -10)$ $E'(5, 4)$ $O'(0, 8)$

$G'(-8, 1)$
 $E'(-6, 3)$
 $O'(-2, -2)$

6) Domain and Range G (1, 3) E (-1, 1) O (4, -3)

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

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

- I) What is the domain of the preimage? $[1, 4]$ in interval notation
- II) What is the range of the preimage? $[-3, 3]$ in interval notation
- III) What is the domain of the image? $[1, 4]$ (is same because stretched vertically only, not enlarged/dilated by 3)
- IV) What is the range of the image? $[-9, 9]$

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| 1. Translation (F) | A. $(x, y) \rightarrow (y, x)$ |
| 2. Reflection over x-axis (D) | B. $(x, y) \rightarrow (-y, x)$ |
| 3. Reflection over y-axis (I) | C. $(x, y) \rightarrow (ax, ay)$ |
| 4. Reflection over $y = x$ (A) | D. $(x, y) \rightarrow (x, -y)$ |
| 5. Reflection over $y = -x$ (E) | E. $(x, y) \rightarrow (-y, -x)$ |
| 6. Rotation 90 degrees counter-clockwise (B) | F. $(x, y) \rightarrow (x + a, y + b)$ |
| 7. Rotation 90 degrees clockwise (H) <small>same as 270 CCW</small> | G. $(x, y) \rightarrow (-x, -y)$ |
| 8. Rotation 180 degrees (clockwise or counter-clockwise) (G) | H. $(x, y) \rightarrow (y, -x)$ |
| 9. Dilation (C) | I. $(x, y) \rightarrow (-x, y)$ |