

G.G.54: Isometries: Define, investigate, justify, and apply isometries in the plane (rotations, reflections, translations, glide reflections)

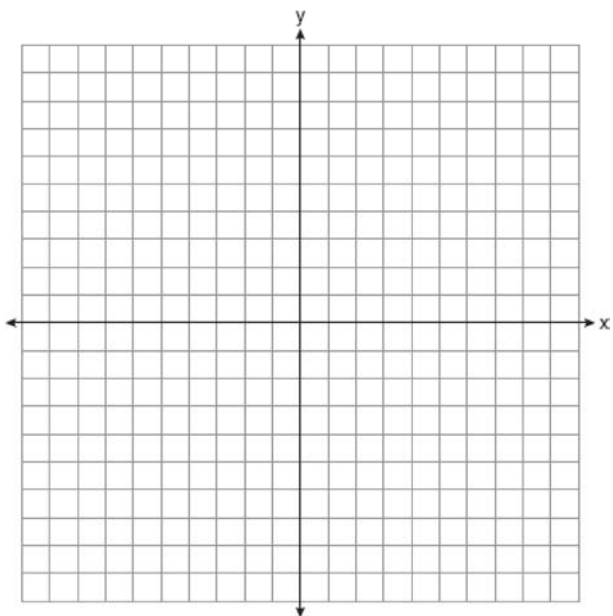
- 1 Triangle ABC has coordinates $A(1,1)$, $B(5,1)$, and $C(4,3)$. Given the transformations T , U , and W described below:

$$T: (x,y) \rightarrow (x,-y)$$

$$U: (x,y) \rightarrow (x-6,y+6)$$

$$W: (x,y) \rightarrow (-2x,-2y)$$

- Graph $\triangle ABC$ and graph and state the coordinates of its image $\triangle A'B'C'$, after transformation T .
- Graph and state the coordinates of $\triangle A''B''C''$, the image of $\triangle ABC$ after transformation U .
- Graph and state the coordinates of $\triangle A'''B'''C'''$, the image of $\triangle ABC$ after transformation W .
- Which transformation, T , U , or W , is *not* an isometry?
- Which transformation, T , U , or W , does *not* preserve orientation?



- 2 Triangle ABC has vertices $A(2,-2)$, $B(5,-2)$, and $C(3,-4)$.

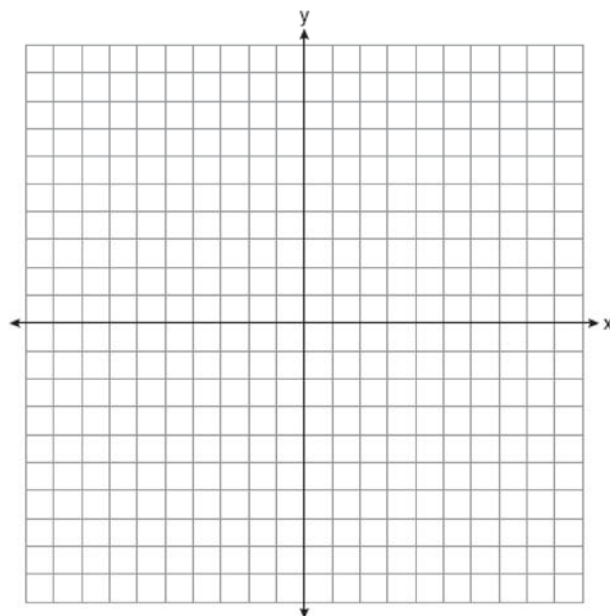
- On the set of axes below, graph and label $\triangle ABC$ and its image under each of the following transformations. State the coordinates of the vertices for each image of $\triangle ABC$.

$$(1) T: (x,y) \rightarrow (-x,y)$$

$$(2) U: (x,y) \rightarrow (x-4,y+4)$$

$$W: (x,y) \rightarrow (2x,2y)$$

- Which transformation, T , U , or W , is *not* an isometry?
- Which transformation, T , U , or W , does *not* preserve orientation?



- 3 Given: Points $A(3,0)$ and $B(-4,6)$.

Next to *each* letter below, write the coordinates of the images of points A and B after each transformation described.

- a* the images of points A and B after a reflection in the line $y = x$
- b* the images of points A and B after a rotation of 90° counterclockwise about the origin
- c* the images of points A and B after a reflection in the line $x = 2$
- d* the images of points A and B after a reflection through the origin
- e* the images of points A and B after a dilation $D_{\frac{1}{2}}$

a

b

c

d

e

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Answer Section

1 ANS:

a $A'(1, -1), B'(5, -1), C'(4, -3)$

b $A''(-5, 7), B''(-1, 7), C''(-2, 9)$

c $A'''(-2, -2), B'''(-10, -2), C'''(-8, -6)$

d W

e T

PTS: 10

REF: 018440siii

2 ANS:

a (1) $(-2, -2), (-5, -2), (-3, -4)$

(2) $(-2, 2), (1, 2), (-1, 0)$

(3) $(4, -4), (10, -4), (6, -8)$

b W

c T

PTS: 10

REF: 018639siii

3 ANS:

a $A'(0, 3), B'(6, -4), b$ $A'(0, 3), B'(-6, -4), c$ $A'(1, 0), B'(8, 6), d$ $A'(-3, 0), B'(4, -6), e$ $A'(\frac{3}{2}, 0), B'(-2, 3)$

PTS: 10

REF: 068841siii