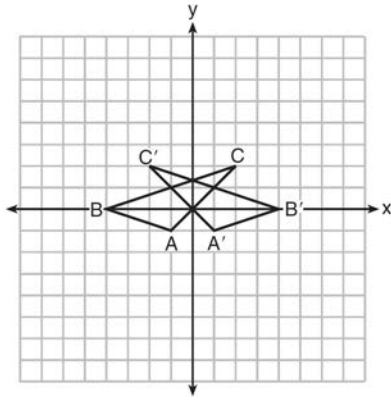
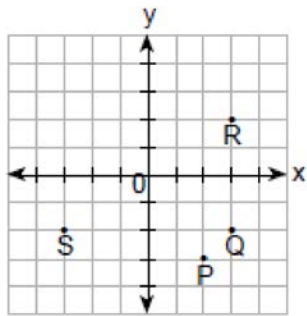


G.CO.A.2: Analytical Representations of Transformations 2

- 1 In the diagram below, under which transformation is $\triangle A'B'C'$ the image of $\triangle ABC$?

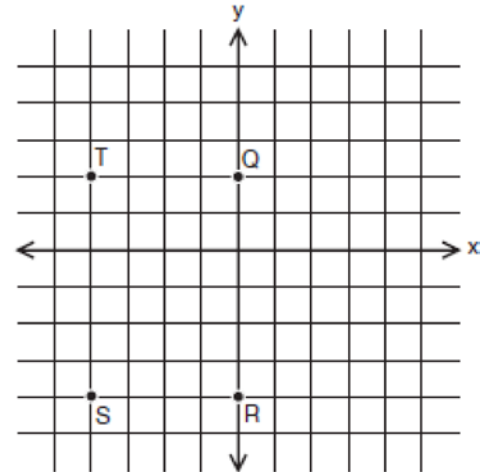


- 1) D_2
 - 2) $r_{x\text{-axis}}$
 - 3) $r_{y\text{-axis}}$
 - 4) $(x,y) \rightarrow (x-2,y)$
- 2 If $x = -3$ and $y = 2$, which point on the accompanying graph represents $(-x, -y)$?

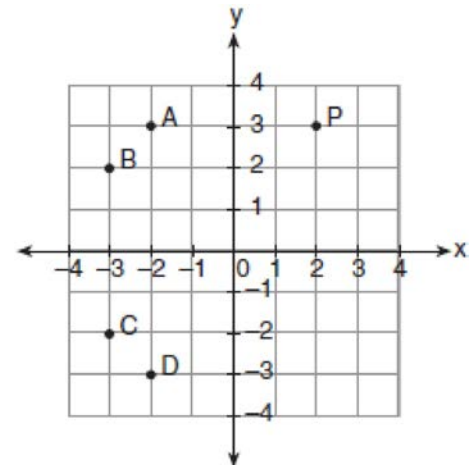


- 1) P
- 2) Q
- 3) R
- 4) S

- 3 If $x = -2$ and $y = -1$, which point on the accompanying set of axes represents the translation $(x,y) \rightarrow (x+2,y-3)$?

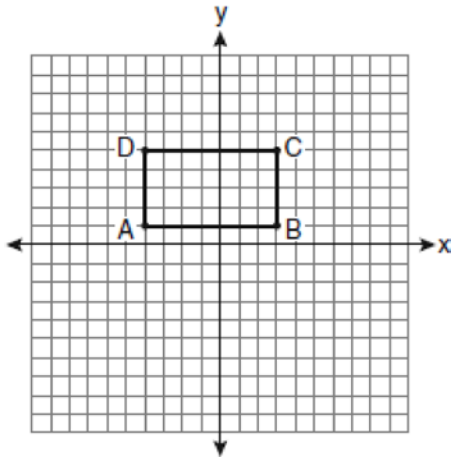


- 1) Q
 - 2) R
 - 3) S
 - 4) T
- 4 In the accompanying graph, if point P has coordinates (a,b) , which point has coordinates $(-b,a)$?



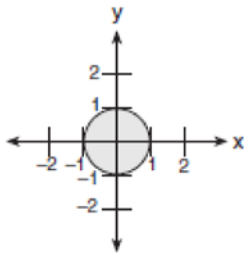
- 1) A
- 2) B
- 3) C
- 4) D

- 5 On the set of axes below, Geoff drew rectangle $ABCD$. He will transform the rectangle by using the translation $(x,y) \rightarrow (x+2,y+1)$ and then will reflect the translated rectangle over the x -axis.

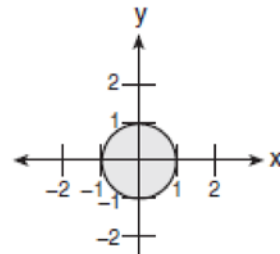


What will be the area of the rectangle after these transformations?

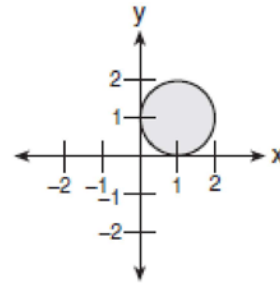
- 1) exactly 28 square units
 - 2) less than 28 square units
 - 3) greater than 28 square units
 - 4) It cannot be determined from the information given.
- 6 In the accompanying graph, the shaded region represents set A of all points (x,y) such that $x^2 + y^2 \leq 1$. The transformation T maps point (x,y) to point $(2x,4y)$.



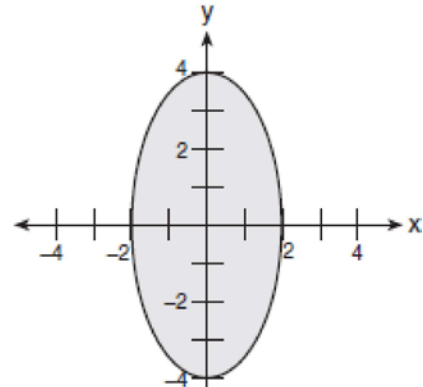
Which graph shows the mapping of set A by the transformation T ?



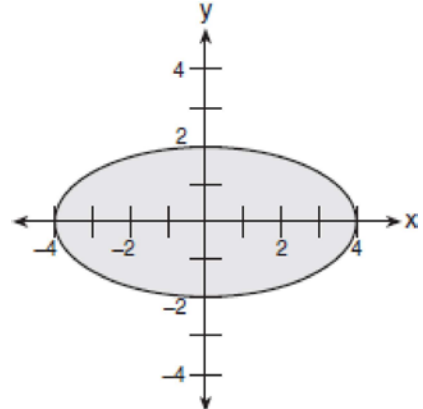
1)



2)

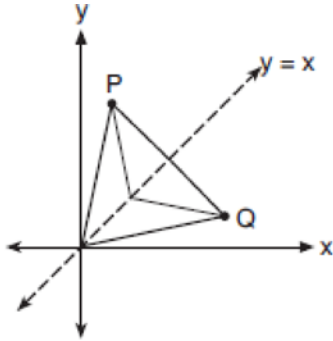


3)



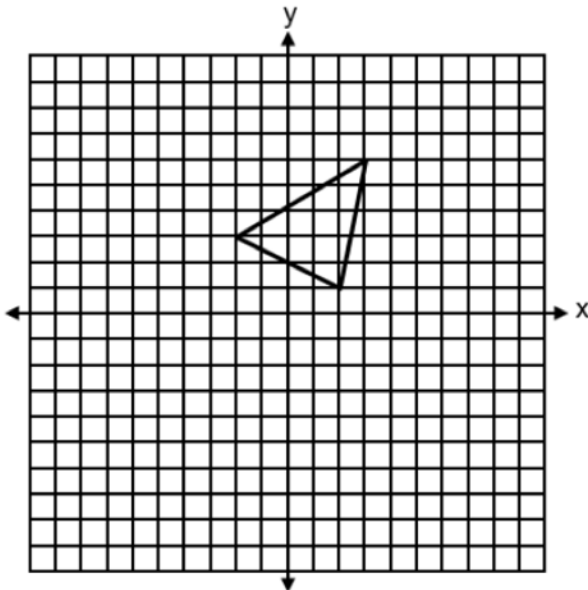
4)

- 7 Matthew is a fan of the Air Force's Thunderbirds flying team and is designing a jacket patch for the team, as shown in the accompanying diagram.

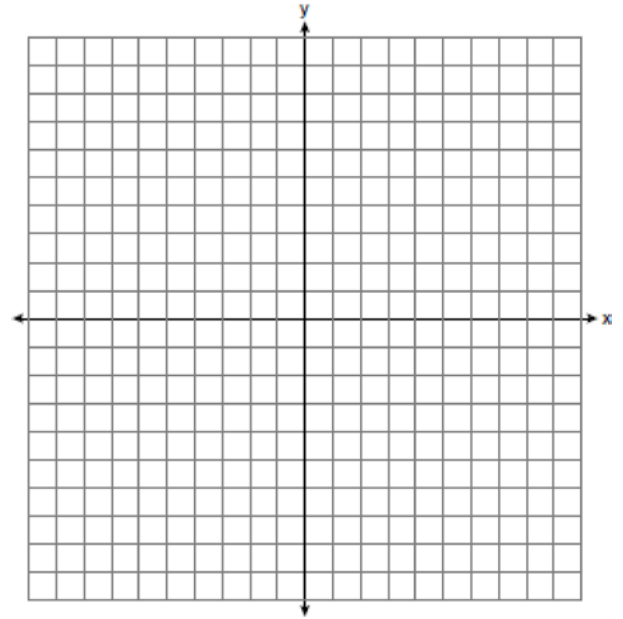


If P has the coordinates (a, b) , what are the coordinates of Q , the reflection of P in the line $y = x$?

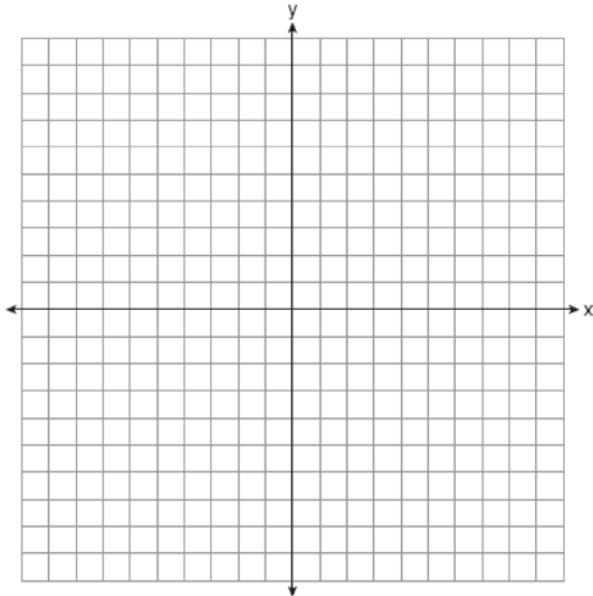
- 1) (a, b)
 - 2) (b, a)
 - 3) $(-a, b)$
 - 4) (y, x)
- 8 A triangle with vertices at $(-2, 3)$, $(3, 6)$, and $(2, 1)$, is graphed on the set of axes below. A horizontal stretch of scale factor 2 with respect to $x = 0$, is represented by $(x, y) \rightarrow (2x, y)$. Graph the image of this triangle, after the horizontal stretch on the same set of axes.



- 9 On the accompanying set of axes, draw $\triangle ABC$, whose coordinates are $A(-7, 9)$, $B(-2, 8)$, and $C(-3, 4)$. Then draw, label, and state the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$ after the transformation that maps (x, y) to $(-x, -y)$. Based on your diagram, identify the type of transformation that was performed.



- 10 Triangle TAP has coordinates $T(-1,4)$, $A(2,4)$, and $P(2,0)$. On the set of axes below, graph and label $\triangle T'A'P'$, the image of $\triangle TAP$ after the translation $(x,y) \rightarrow (x-5,y-1)$.



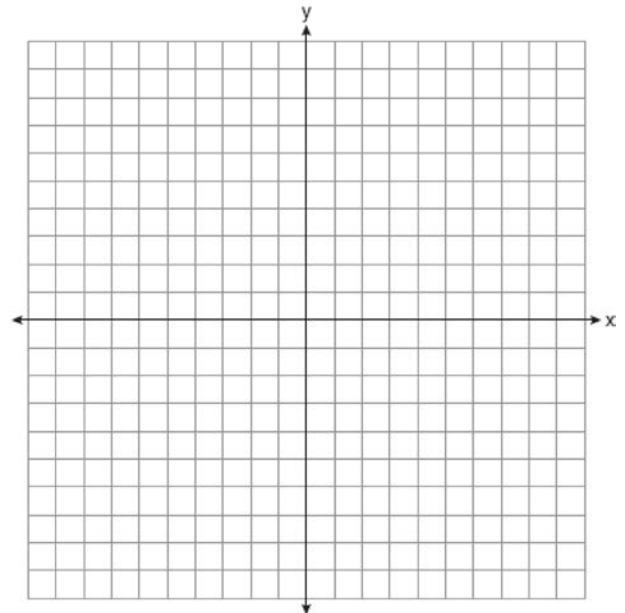
- 11 Given $A(8,5)$ and $B(6,1)$ and the transformations T , R , and S described below:

$$T: (x,y) \rightarrow (x+1,y-5)$$

$$R: (x,y) \rightarrow (y,x)$$

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

- Graph \overline{AB} and its image $\overline{A'B'}$ after the transformation T .
- Graph $\overline{A''B''}$, the image of \overline{AB} after the transformation R .
- Graph $\overline{A'''B'''}$, the image of \overline{AB} after the transformation S .
- Compare the slopes of the pairs of segments listed below and indicate whether these slopes are *equal*, *reciprocals*, *additive inverses*, or *negative reciprocals*.
 - \overline{AB} and $\overline{A'B'}$
 - \overline{AB} and $\overline{A''B''}$
 - \overline{AB} and $\overline{A'''B'''}$



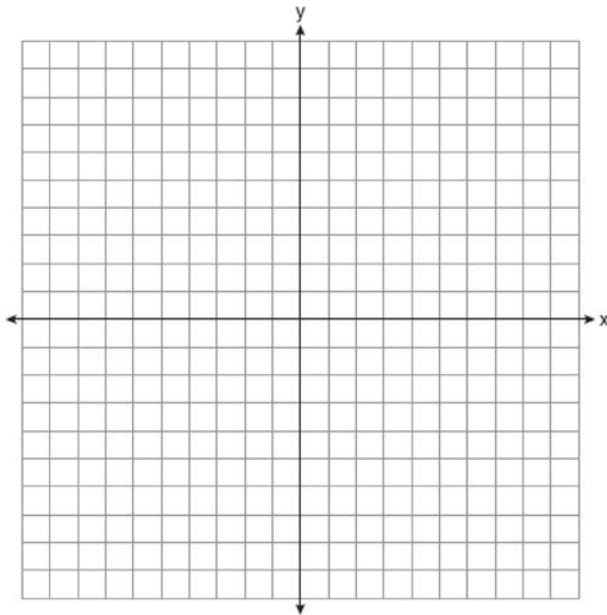
- 12 Triangle ABC has coordinates $A(1,1)$, $B(5,1)$, and $C(4,3)$. Given the transformations T , U , and W described below:

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

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

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

- 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?



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

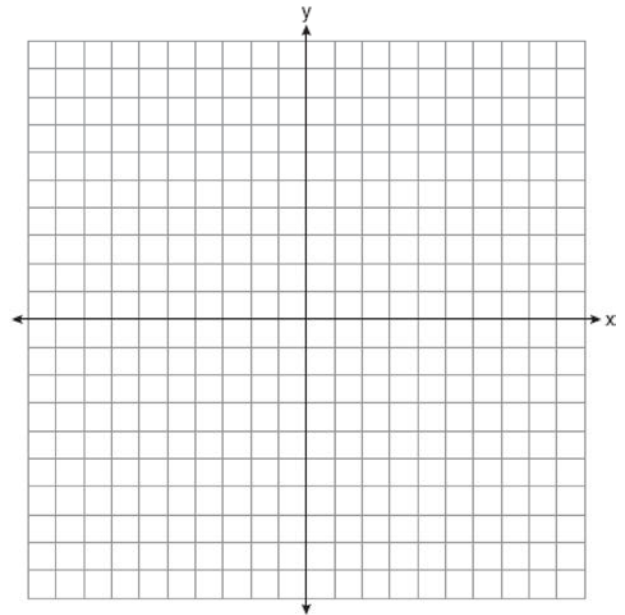
- On the set of axes below, graph and label $\triangle ABC$ and its image under each of the following transformations. State the coordinates of the vertices for each image of $\triangle ABC$.

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

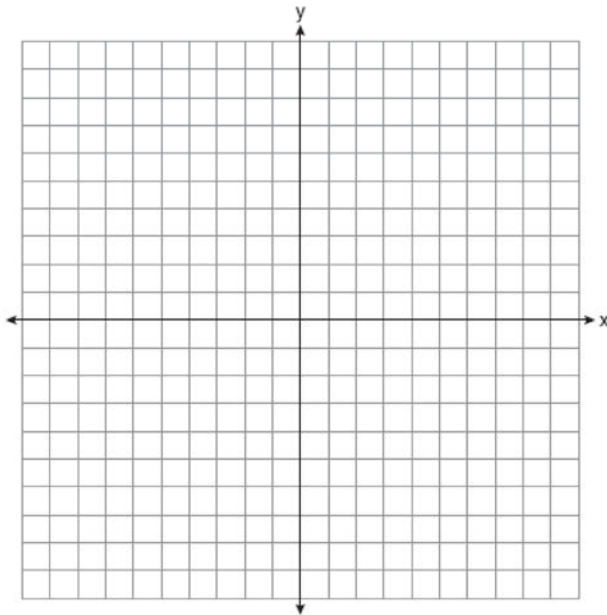
- $U: (x,y) \rightarrow (x-4,y+4)$

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

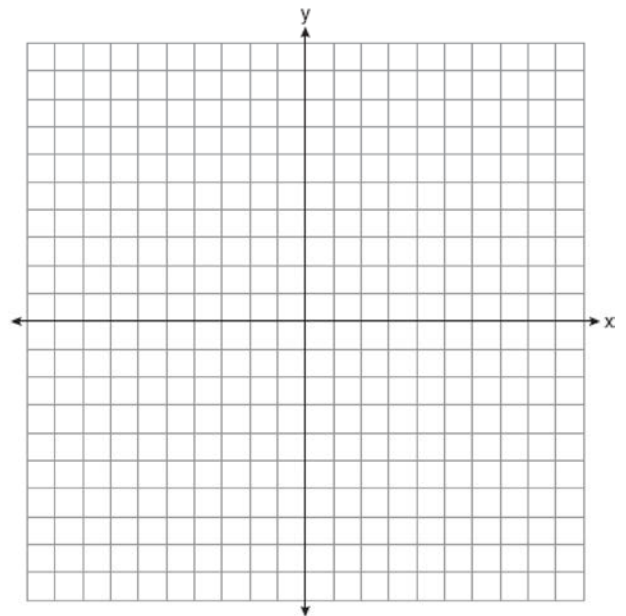
- Which transformation, T , U , or W , is *not* an isometry?
- Which transformation, T , U , or W , does *not* preserve orientation?



- 14 Given: F is the transformation $(x,y) \rightarrow (-y,-x)$
 U is the transformation $(x,y) \rightarrow (x-2,y+4)$
 N is the transformation $(x,y) \rightarrow (2x,2y)$
 The coordinates of $\triangle ABC$ are $A(1,2)$, $B(4,0)$, and $C(3,-2)$.
- Sketch $\triangle ABC$ and its image $\triangle A'B'C'$ after the transformation F .
 - Sketch $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after the transformation U .
 - Sketch $\triangle A'''B'''C'''$, the image of $\triangle A''B''C''$ after the transformation N .
 - Which transformation, F , U , or N , is a dilation?



- 15 The coordinates of the vertices of $\triangle ABC$ are $A(1,6)$, $B(2,9)$, and $C(7,10)$.
- On the graph below, draw and label $\triangle ABC$.
 - Graph and state the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$ after a reflection over the line $y = x$.
 - Graph and state the coordinates of $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after a reflection in the x -axis.
 - Graph and state the coordinates of $\triangle A'''B'''C'''$, the image of $\triangle A''B''C''$ after the transformation $(x,y) \rightarrow (x-5,y+3)$.



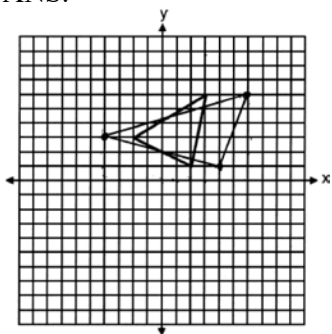
G.CO.A.2: Analytical Representations of Transformations 2 Answer Section

- 1 ANS: 3 REF: 011304ge
- 2 ANS: 2 REF: 069908a
- 3 ANS: 2 REF: 080211a
- 4 ANS: 2 REF: 010418a
- 5 ANS: 1

Translations and reflections do not affect distance.

REF: 080908ge

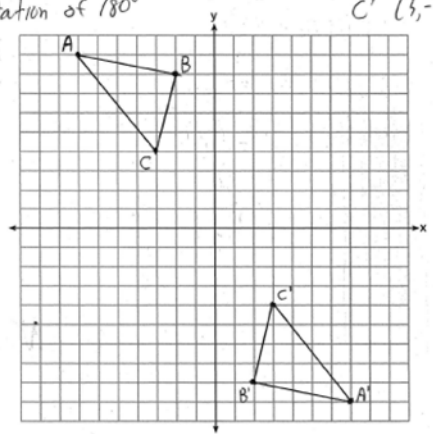
- 6 ANS: 3 REF: 060405b
- 7 ANS: 2 REF: 010804b
- 8 ANS:



REF: spr2405geo

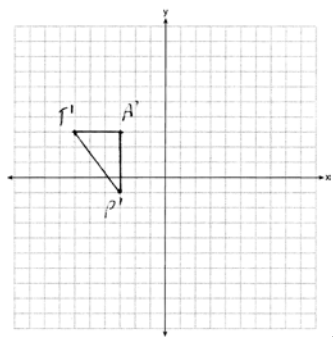
- 9 ANS:
transformation that was performed.
point reflection
dilation of -1
rotation of 180°

$A' (7, -9)$
 $B' (2, -8)$
 $C' (3, -4)$



REF: 080838a

10 ANS:


 $T'(-6,3), A'(-3,3), P'(-3,-1)$

REF: 061229ge

11 ANS:

d (1) equal; (2) reciprocals; (3) additive inverses

REF: 068139siii

12 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

REF: 018440siii

13 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

REF: 018639siii

14 ANS:

N

REF: 068041siii

15 ANS:

$A'(6,1), B'(9,2), C'(10,7); A''(6,-1), B''(9,-2), C''(10,-7); A'''(1,2), B'''(4,1), C'''(5,-4)$

REF: 088440siii