Unit 1 Transformations

in the Coordinate Plane

Translations

Follow the rules

Translate $(x - 9, y + 8)$

left 9 up 8

$C(-9,12)$ $C'(-18,20)$

$O(-12,-4)$ $O'(-21,4)$

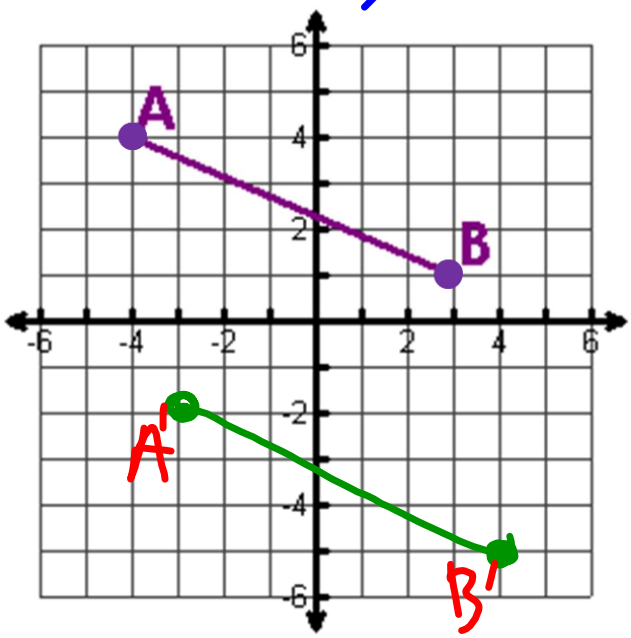
$W(22,-19)$ $W'(13,-11)$

Translate (x + 1, y – 6)

right 1 , down 6

A (-4, 4)

A' (-3, -2)



Reflections

Reflect across the x-axis

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

Change the sign of the y-value

change y

Reflect across the x-axis

$D(-2,4)$ $D'(-2,-4)$

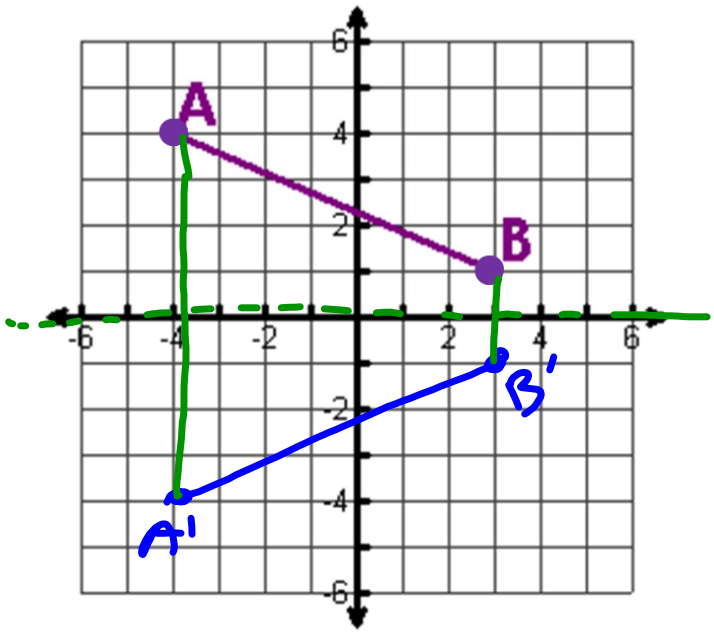
$I(0,-8)$ $I'(0,8)$

$G(-3,5)$ $G'(-3,-5)$

Reflect across the x-axis

A(-4,4)
A'(-4,-4)

B(3,+1)
B'(3,-1)



Reflect across the y-axis

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

Change the sign of the x-value

change x

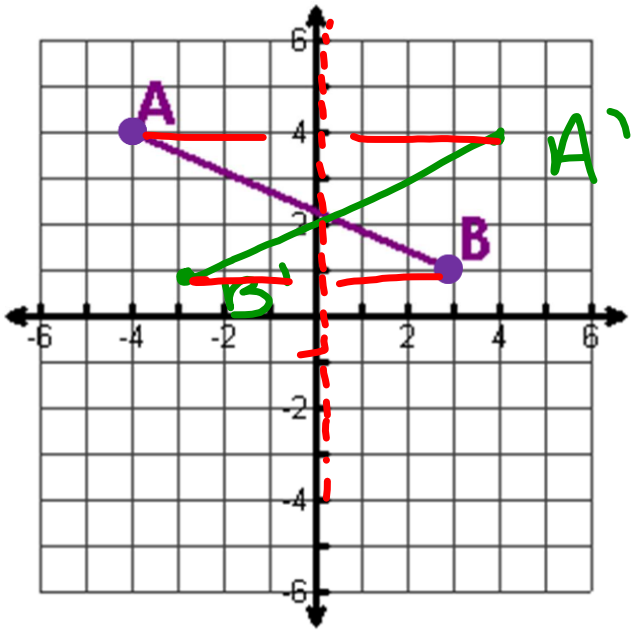
Reflect across the y-axis

$C(1,2)$ $C'(-1,2)$

$A(-3,-5)$ $A'(3,-5)$

$T(4,-1)$ $T'(-4,-1)$

Reflect across the y-axis



Reflect across y = x

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

Swap x and y

Switch x & y

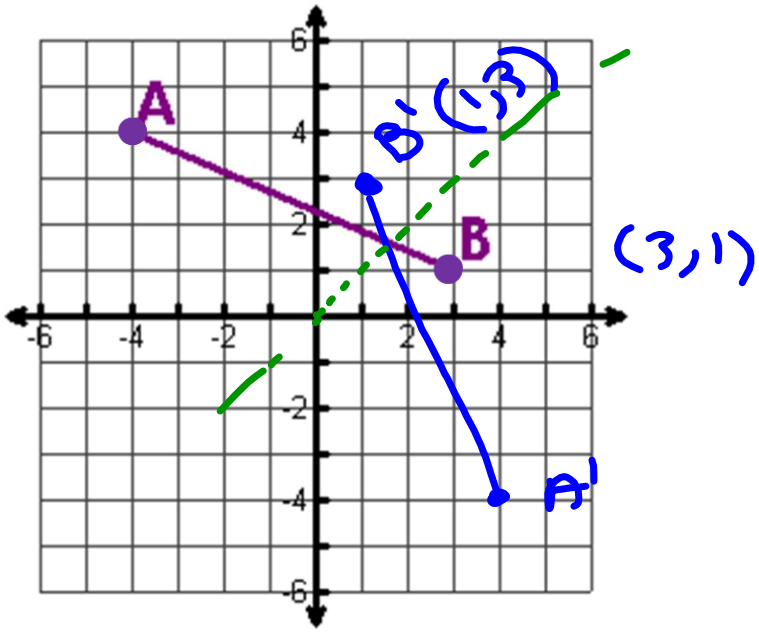
Reflect across y = x

B(–7,–12) B'(–12,–7)

I(8,–2) I'(–2,8)

G(9,13) G'(13,9)

Reflect across the y=x



Reflect across y = -x

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

Swap and change both signs

switch & change

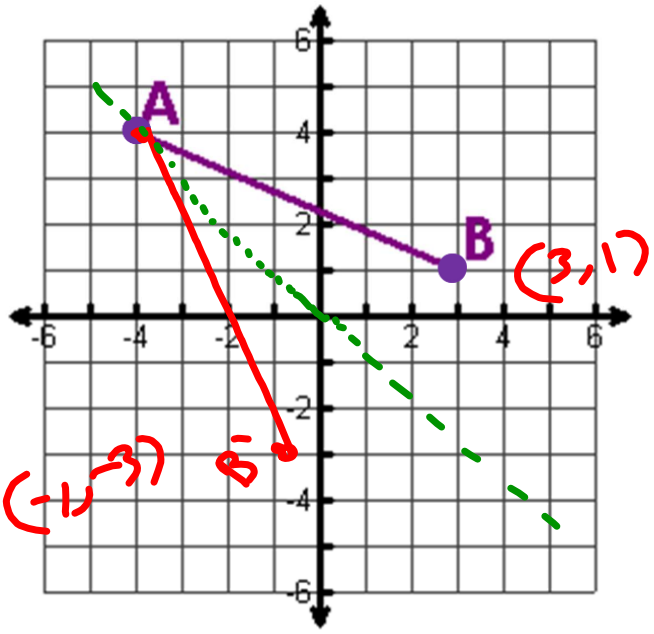
Reflect across y = -x

M(13,21) M'(-21,-13)

A(–2,9) A'(-9,2)

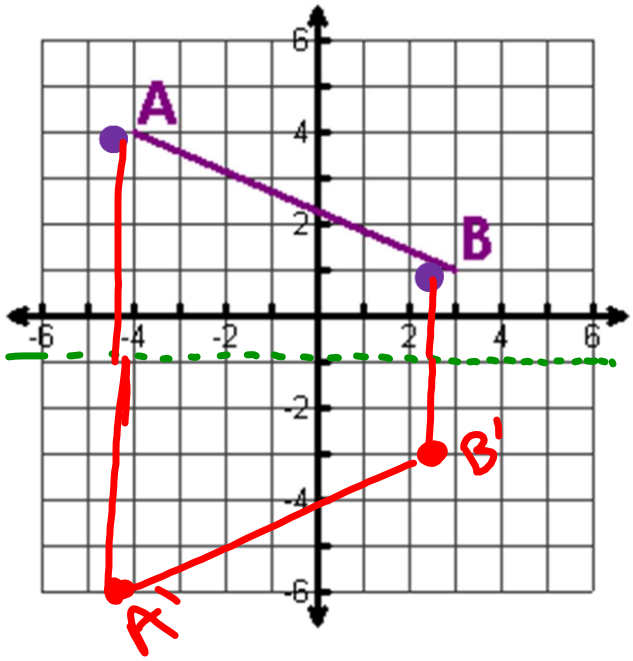
N(17,–24) N'(24,-17)

Reflect across the y=-x

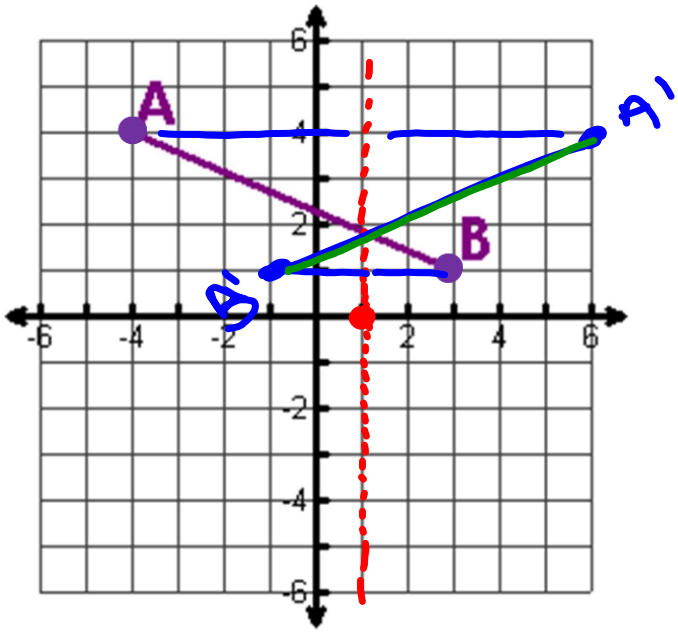


Reflect across the y=-1

$(x, 2r - y)$



Reflect across the x=1



Practice p. 24-27

10 min

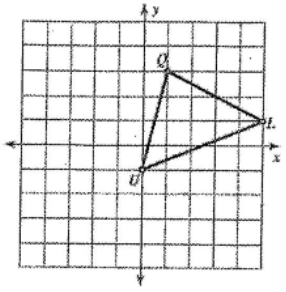
Homework p. 28-29

GSE Geometry Transformations Name_____

Translations Practice Date_____ Block _____

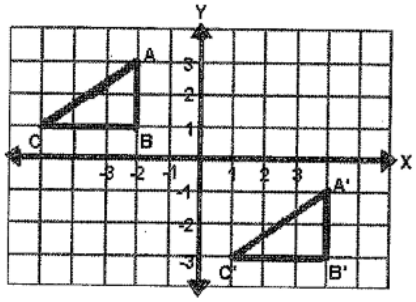
1a. Given the figure ΔQUL shown below, translate the figure according the following rule.

$T(x, y) \rightarrow (x - 2, y)$



1b. Describe in words the rule performed.

Use the following image to answer the questions below.



2a. What are the coordinates of the vertices of the pre-image?

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

2b. What are the coordinates of the vertices of the image?

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

2c. Explain in words how the triangle was transformed?

Shift 4 down, 6 right

2d. Write the function to described how the triangle was transformed.

$T(x+6, y-4)$

Use the translation $T(x, y) \rightarrow (x + 5, y - 9)$ for questions 3-7.

3. What is the image of A(-6, 3)?

A'(-1,-6)

4. What is the image of A', which would be called A''?

A''(4, -15)

5. What is the pre-image of B'(12, 7)?

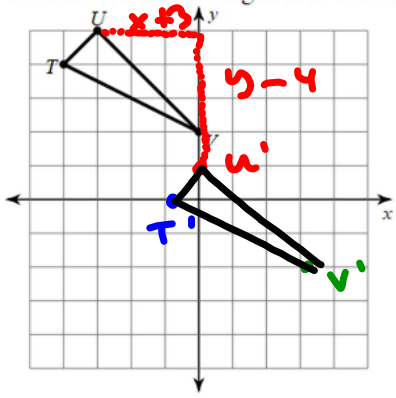
B(7,16)

6. What is the pre-image of C'(-4, -8)

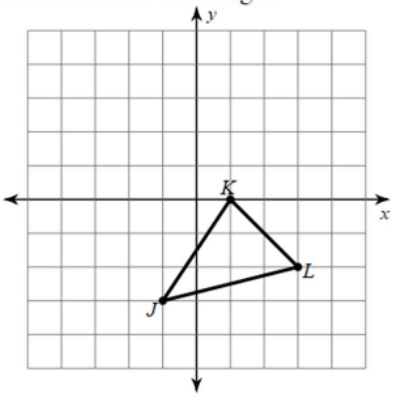
C(1,-1)

Find the coordinates of the vertices of each figure after the given transformation and graph the image.

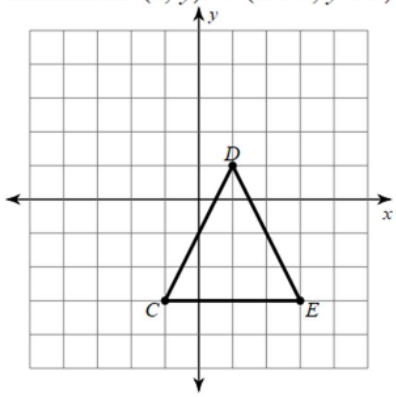
7) translation: 3 units right and 4 units down



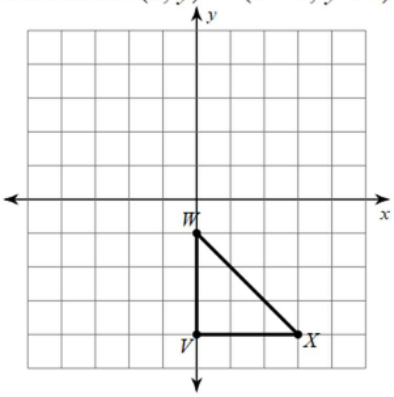
8) translation: 2 units right



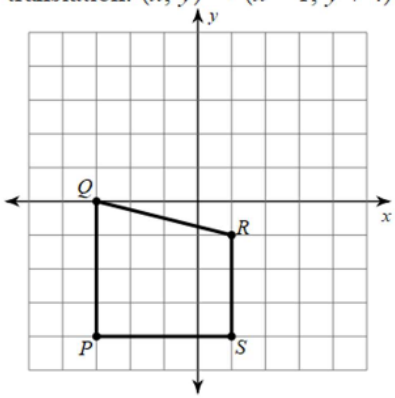
9) translation: $(x, y) \rightarrow (x + 2, y + 2)$



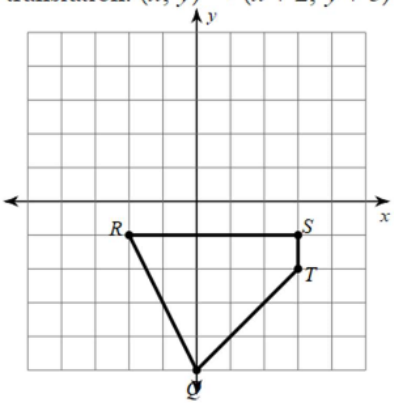
10) translation: $(x, y) \rightarrow (x - 5, y + 1)$



11) translation: $(x, y) \rightarrow (x - 1, y + 4)$



12) translation: $(x, y) \rightarrow (x + 2, y + 5)$



GSE Geometry Name_____

Reflections Practice

Date_____ Block____

Find the coordinates of the vertices of each figure after the given transformation.

1) reflection across the y-axis
$Y(-4, 2), X(-3, 5), W(0, 4), V(-2, 1)$

2) reflection across $y = -x$
$E(0, 0), F(-1, 4), G(1, 5), H(3, 4)$

3) reflection across $y = x$
$T(-4, 0), U(-1, 4), V(-1, 0)$

4) reflection across the x-axis
$E(2, -1), F(1, 3), G(4, 1)$

(x, 2r-y)
2(2)-1

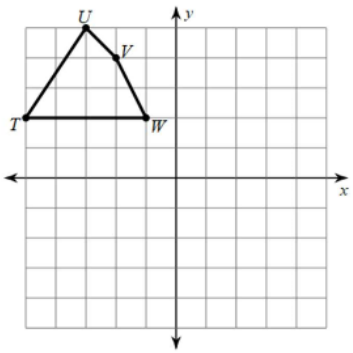
5) reflection across $y = 2$
$K(0, 1), L(0, 3), M(5, 2), N(4, 1)$

6) reflection across $x = -1$
$T(1, 2), U(1, 3), V(3, 3)$

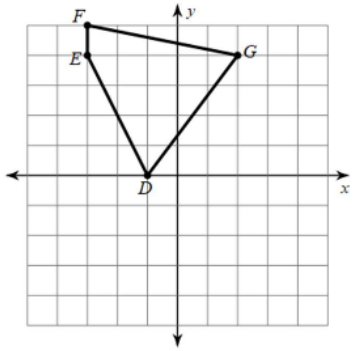
K'(0,3) L'(0,1) M'(5,2) N'(4,3)

Graph the image of the figure using the transformation given.

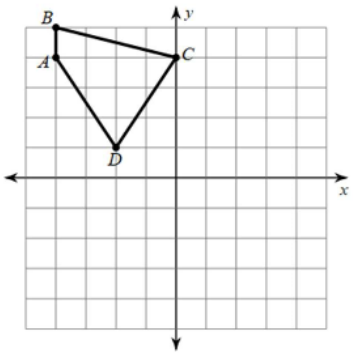
7) reflection across $y = x$



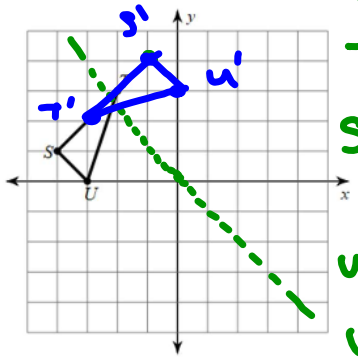
8) reflection across the y-axis



9) reflection across the x-axis

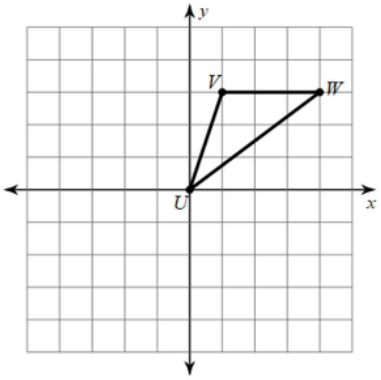


10) reflection across $y = -x$

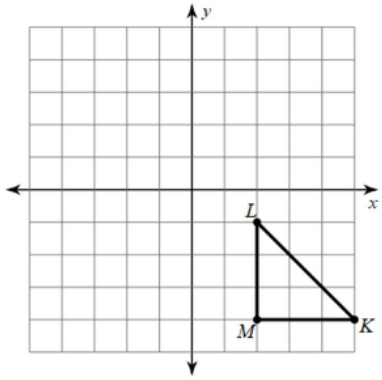


T(-2,3)
T'(-3,2)
S(-4,1)
S'(-1,4)
U(-3,0)
U'(0,3)

11) reflection across $x = 1$

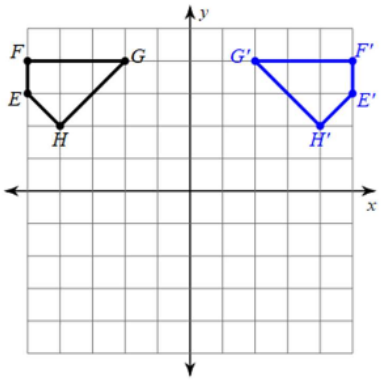


12) reflection across $y = -1$

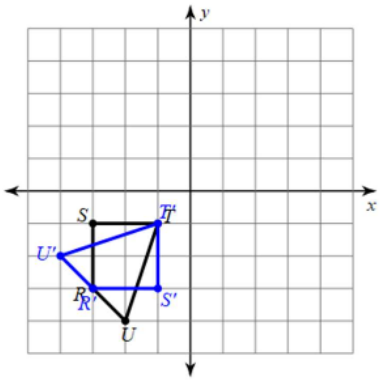


Write a rule to describe each transformation.

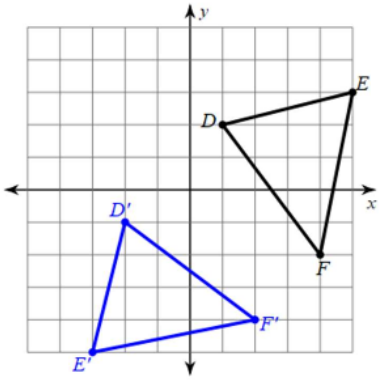
13)



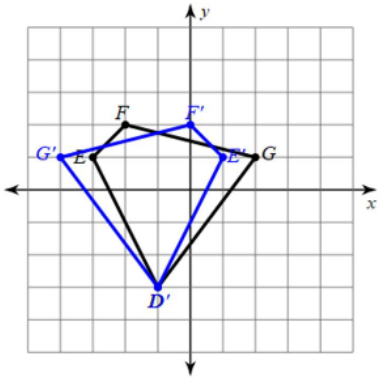
14)



15)



16)



GSE Geometry

Name: _____ Date: _____

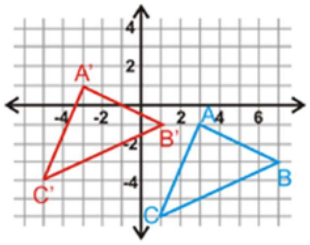
Translations and Reflections Homework

1. **Use the translation (x, y) → (x + 5, y – 9) for questions a-e.**
   a. What is the image of A (-6, 3)?
   b. What is the image of (4, 8)?
   c. What is the image of (5, -3)?
   d. What is the pre-image of D'(12, 7)?

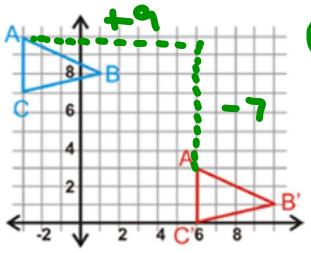
2. **The vertices of $\triangle ABC$ are A(-6, -7), B(-3, -1), and C(-5, 2). Find the vertices of $\triangle A'B'C'$, given the translation rules below.**
   a. (x, y) → (x – 2, y – 7)
   b. (x, y) → (x + 11, y +4) A'(5, -3) B'(8,3) C'(6,6)
   c. (x, y) → (x, y - 3)
   d. (x, y) → (x – 5, y + 8)

3. **$\triangle A'B'C'$ is the image of $\triangle ABC$. Write the translation rule for each of the following.**

a.

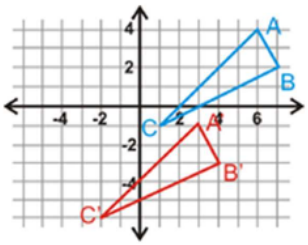


b.

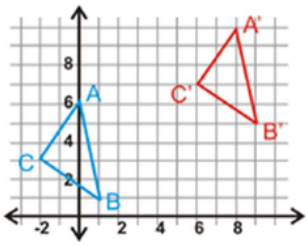


(x+9, y-7)

c.



d.



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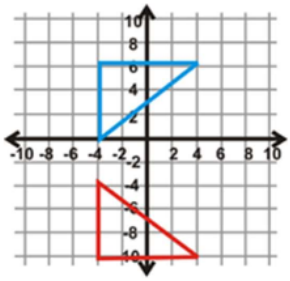
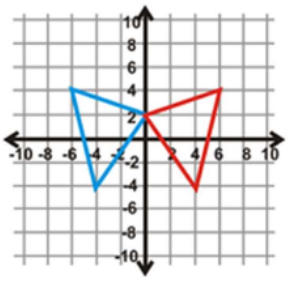
GSE Geometry

4. Find the line of reflection between the pre-image and the image.

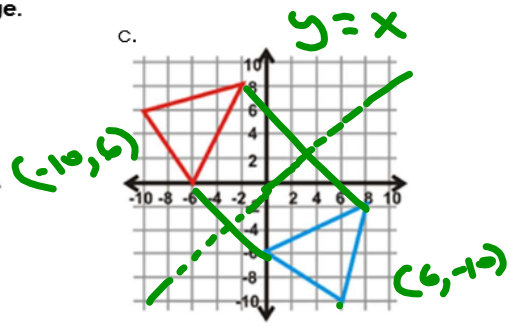
a.



b.

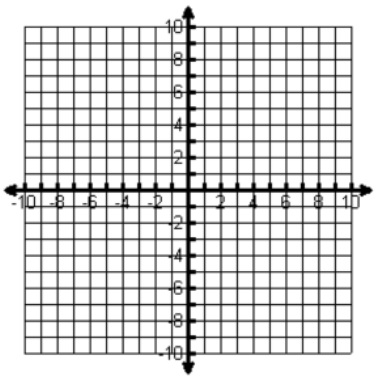


c.



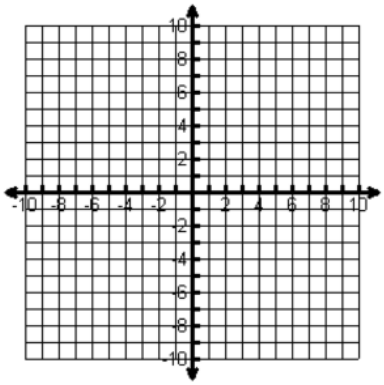
5. Two Reflections The vertices of $\triangle ABC$ are A(-5, 1), B(-3, 6), and C(2, 3). Use this information to answer questions a-d.

a. Plot $\triangle ABC$ on the coordinate plane.
b. Reflect $\triangle ABC$ over y =1. Find the coordinates of $\triangle A'B'C'$.
c. Reflect $\triangle A'B'C'$ over y = -3. Find the coordinates of $\triangle A"B"C"$.
d. What <u>one</u> transformation would be the same as this double reflection?



6. Two Reflections The vertices of $\triangle ABC$ are A(6, -2), B(8, -4), and C(3, -7). Use this information to answer questions a-d.

a. Plot $\triangle ABC$ on the coordinate plane.
b. Reflect $\triangle ABC$ over x = 2. Find the coordinates of $\triangle A'B'C'$.
c. Reflect $\triangle A'B'C'$ over x = -4. Find the coordinates of $\triangle A"B"C"$.
d. What <u>one</u> transformation would be the same as this double reflection?



Adapted from: <u>Mathematics Vision Project</u>