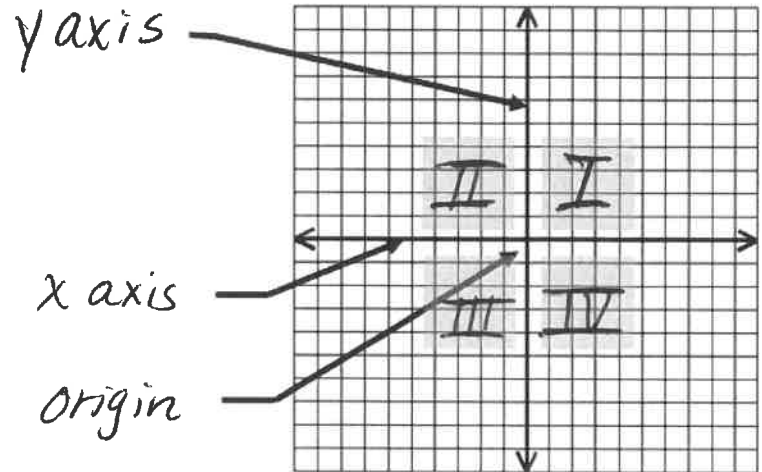


Notes: TRANSLATIONS

Content Objective: *I will be able to apply rules to the coordinates of the pre-image to create congruence transformations such as translations.*

For items a. – d. label the following parts of the coordinate plane:

- a. x-axis
- b. y-axis
- c. origin
- d. quadrants I, II, III, IV



An ordered pair (x, y) describes a location on the coordinate plane in which the x -value represents the horizontal distance from the origin $(0, 0)$ and the y -value represents the vertical distance from the origin.

EXAMPLE 1: Write the ordered pair for each point and tell in which quadrant it is located.

A (6 , 5); Quadrant I

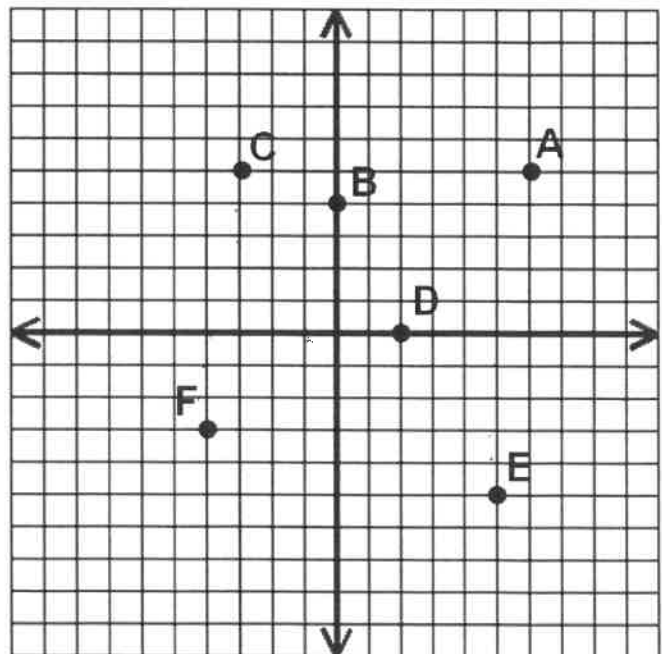
B (0 , 4); ~~Quadrant~~ y-axis

C (-3 , 5); Quadrant II

D (2 , 0); ~~Quadrant~~ x-axis

E (5 , -5); Quadrant IV

F (-4 , -3); Quadrant III



EXAMPLE 2: Plot and label the following points.

M (2, -1)

N (-3, -3)

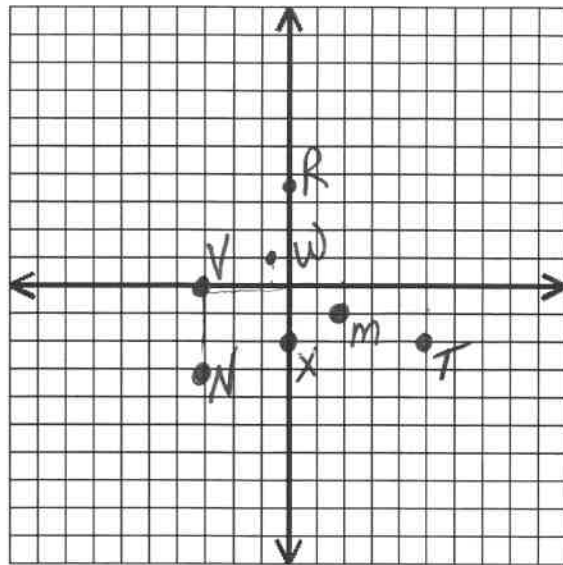
R (0, 3.5)

T (5, -2)

V (-3, 0)

W (-1/2, 1)

X (0, -2)



TERM	DESCRIPTION	EXAMPLE
<i>Translation</i>	A transformation that moves the preimage to a new position by moving up or down and/ or left or right on the coordinate plane.	
<i>image</i>	The new figure produced in a transformation.	
<i>pre image</i>	The original figure in a transformation.	

COORDINATE RULES FOR TRANSLATIONS

When a point $A(x, y)$, called the **preimage**, moves to a new location a units right or left and b units up or down, the new point is named "**a-prime**" written A' . It has coordinates $(x + a, y + b)$ and is called the **image**.

EXAMPLE 3: If each point is shifted $\overset{+3}{\text{3 units up}}$ and $\overset{-2}{\text{2 units left}}$, what would be the new coordinates of the image? y x

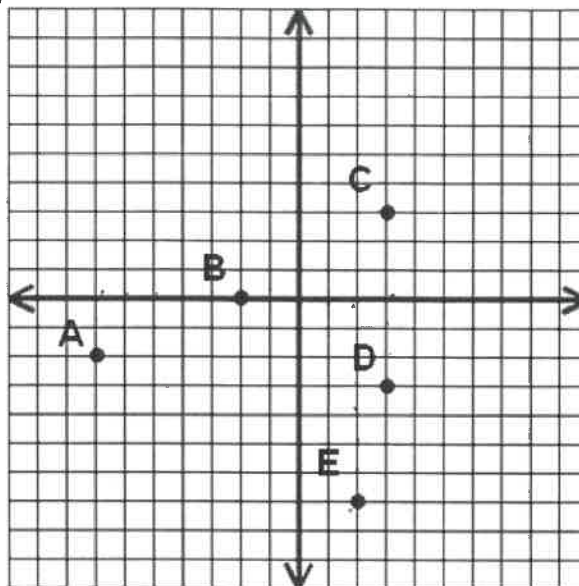
A $(\underline{-7}, \underline{-2})$ translates to A' $(\underline{-9}, \underline{1})$

B $(\underline{-2}, \underline{0})$ translates to B' $(\underline{-4}, \underline{3})$

C $(\underline{3}, \underline{3})$ translates to C' $(\underline{1}, \underline{6})$

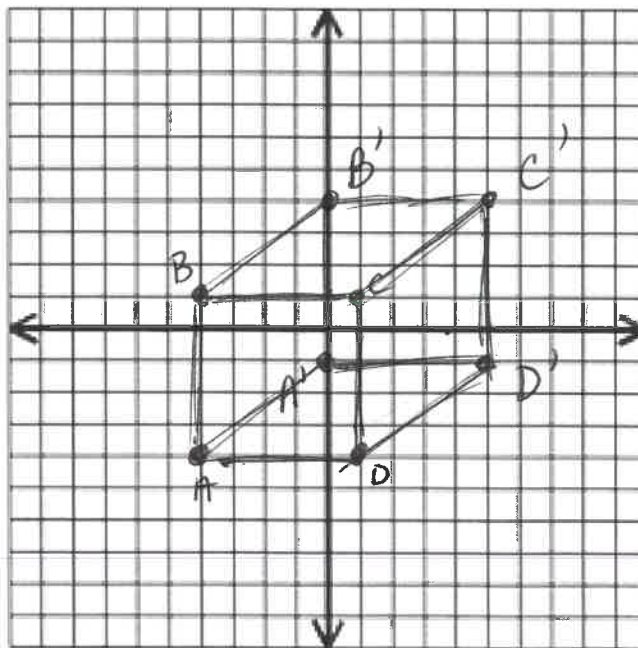
D $(\underline{3}, \underline{-3})$ translates to D' $(\underline{1}, \underline{0})$

E $(\underline{2}, \underline{-7})$ translates to E' $(\underline{0}, \underline{-4})$



EXAMPLE 4: Plot the points A (-4, -4), B (-4, 1), C (1, 1), and D (1, -4).

- 1ST Connect the points in order to create quadrilateral ABCD.
- 2ND Translate the figure 4 units right and 3 units up. $(x+4, y+3)$
- 3RD Connect the new points in order to create quadrilateral A'B'C'D'.
- 4th Draw segments $\overline{AA'}$, $\overline{BB'}$, $\overline{CC'}$, and $\overline{DD'}$.



A' $(-4+4, -4+3) \rightarrow (0, -1)$

B' $(-4+4, 1+3) \rightarrow (0, 4)$

C' $(\underline{1+4}, \underline{1+3}) \rightarrow (5, 4)$

D' $(\underline{1+4}, \underline{-4+3}) \rightarrow (5, -1)$

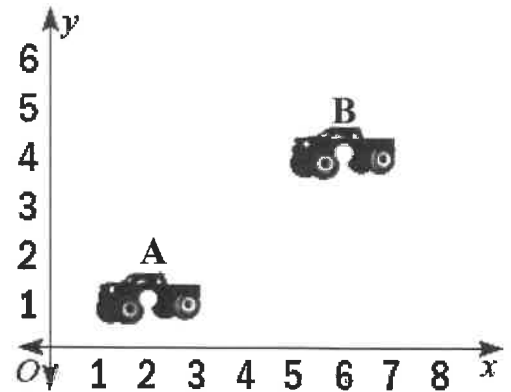
What type of figure have you made? rectangular prism

EXAMPLE 5: Use coordinate notation to describe each translation.

A to B: $(x+4, y+3)$

B to A: $(x-4, y-3)$

$A(2, 1)$ $B(6, 4)$

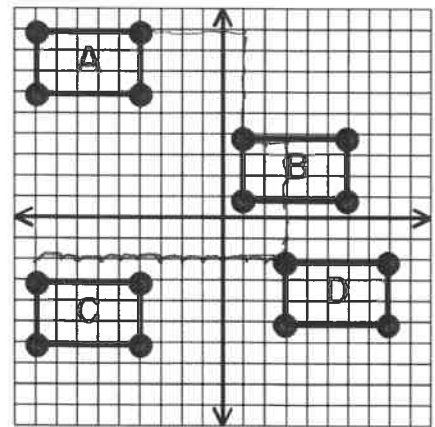
**QUICK CHECK:** Use coordinate notation to describe each translation.

A to B: $(x+10, y-5)$

B to D: $(x+2, y-6)$

D to C: $(x-12, y-1)$

* I moved the top left corner on each box.

**EXAMPLE 6:** Find the coordinates of the image without graphing.What are the coordinates of G (6, -3) after the translation defined by $(x, y) \rightarrow (x - 5, y + 6)$?

$G' = (1, 3)$

QUICK CHECK: Find the coordinates of the image without graphing.Use the translation $(x, y) \rightarrow (x + 2, y - 1)$ to find what point G (-2, -10) translates to:

$G' = (0, -11)$

Independent Practice: **TRANSLATIONS**

NAME: _____

DATE: _____

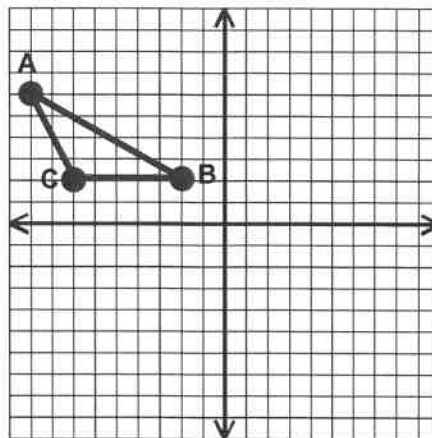
PERIOD: _____

For # 1 – 3, graph the translation as described, then state the new coordinates of each vertex.

1. $A'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$ $(x, y) \rightarrow (x + 8, y - 8):$

$B'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

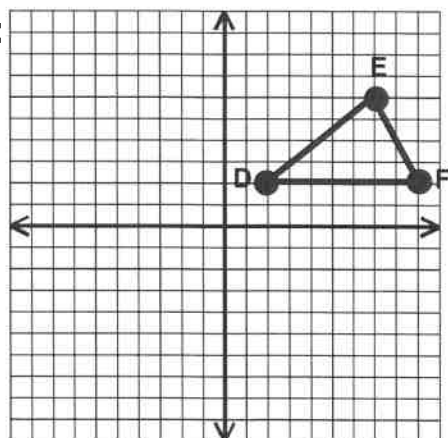
$C'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$



2. $D'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$ $(x, y) \rightarrow (x - 6, y + 2):$

$E'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

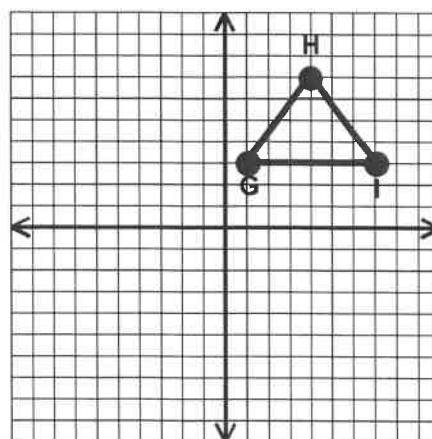
$F'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$



3. $G'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$ $(x, y) \rightarrow (x - 3, y - 5):$

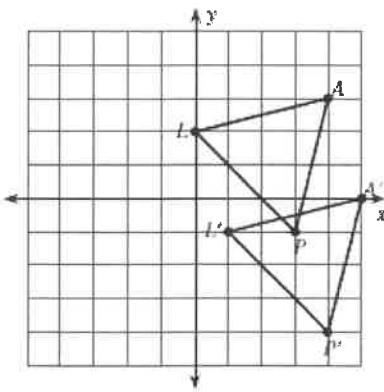
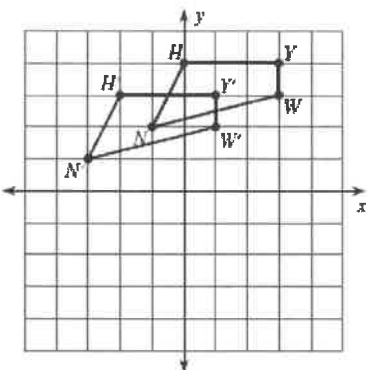
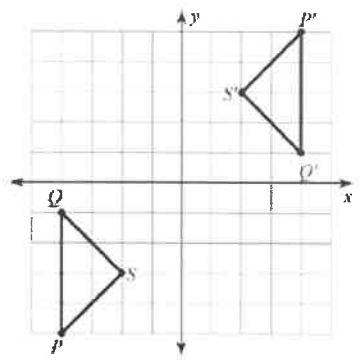
$H'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$

$I'(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$



Independent Practice: **TRANSLATIONS**

For # 4 – 6, describe the translations, if the problem is not a translation write – “not a translation”

<p>4.</p> 	<p>5.</p> 	<p>6.</p> 

For # 7 – 8, rewrite the translation using coordinate notation.

7. left 4 units; up 5 units

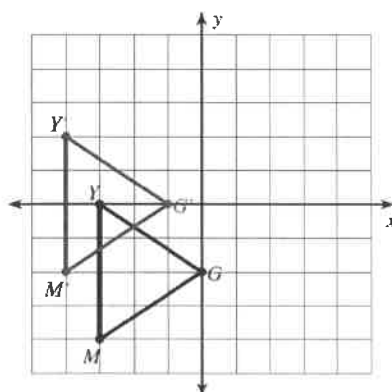
$$(x, y) \rightarrow (x \underline{\hspace{1cm}}, y \underline{\hspace{1cm}})$$

8. right 8 units; down 3 units

$$(x, y) \rightarrow (x \underline{\hspace{1cm}}, y \underline{\hspace{1cm}})$$

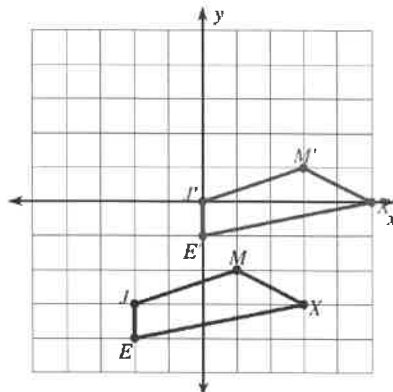
For # 9 – 10, describe the translation using coordinate notation.

9.



$$(x, y) \rightarrow (x \underline{\hspace{1cm}}, y \underline{\hspace{1cm}})$$

10.



$$(x, y) \rightarrow (x \underline{\hspace{1cm}}, y \underline{\hspace{1cm}})$$