Name: Key **Date:** _____

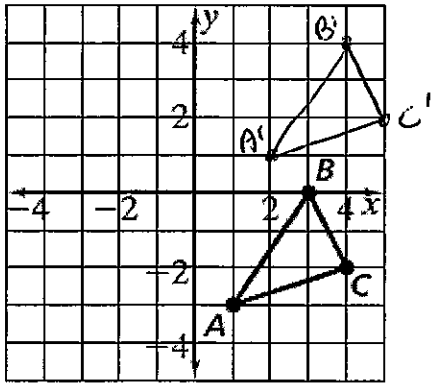
M8-U3: Notes #1 – Transformational Geometry -Translations **Class:** _____

A **transformation** is a change in the size, location, or orientation of a figure. – the way it appears

A **translation** is a transformation which slides each point of a figure the same distance and in the same direction.

The resulting figure after a transformation is called the image of the original figure.

EXAMPLE 1:
ΔABC is translated 1 unit right and 4 units up. Draw the image $\Delta A'B'C'$.



What are the coordinates of:

A (1, -3) → A' (2, 1)

B (3, 0) → B' (4, 4)

C (4, -2) → C' (5, 2)

From EXAMPLE 1, $\Delta ABC \rightarrow \Delta A'B'C'$

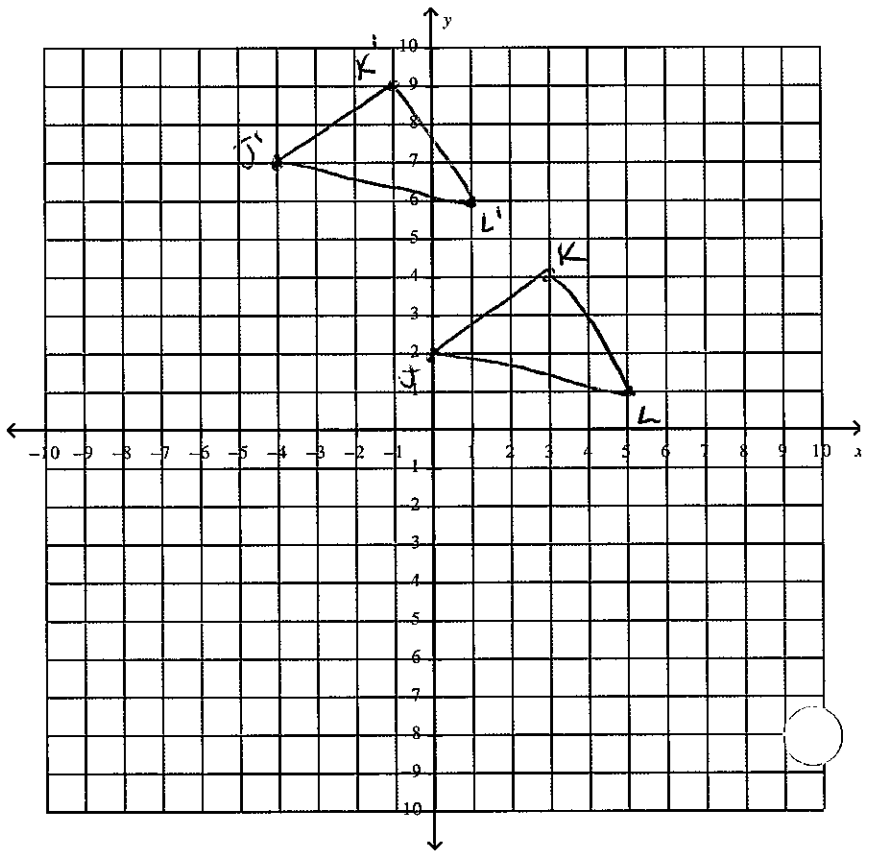
As a general rule this translation could be written as $(x, y) \rightarrow (x + 1, y + 4)$.

EXAMPLE 2:

ΔJKL has coordinates J (0,2), K (3,4), and L (5,1).

a) Draw ΔJKL.

b) Draw the image $\Delta J'K'L'$ after a translation of 4 units to the left and 5 units up. Label the triangle.



What are the coordinates of:

J (0, 2) → J' (-4, 7)

K (3, 4) → K' (-1, 9)

L (5, 1) → L' (1, 6)

Rule: $(x, y) \rightarrow (x-4, y+5)$

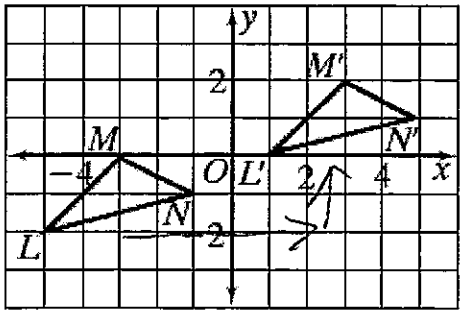
Tell me more about this figure, is it congruent or similar? Explain how you know.

Translation Location

	Add	Subtract
x coordinate	goes to the right →	goes to the left ←
y coordinate	goes up ↑	goes down ↓

EXAMPLE 3:

Write a general rule which describes the translation shown below. ΔLMN is the original triangle.



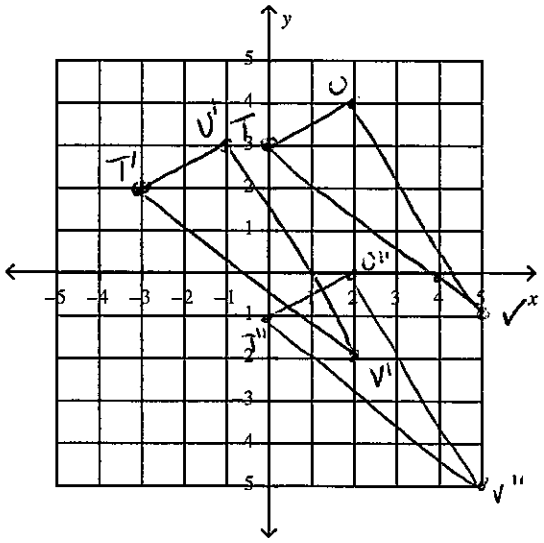
$(x, y) \rightarrow (x+6, y+2)$

EXAMPLE 4:

a) Graph points $T(0,3)$, $U(2, 4)$ and $V(5, -1)$ and connect the points to make a triangle.

b) Translate ΔTUV using the rule $(x, y) \rightarrow (x - 3, y - 1)$.

c) In words, describe what the rule is asking you to do.



d) Draw the image $\Delta T'U'V'$.

e) Identify the coordinates of $\Delta T'U'V'$.

T' $(-3, 2)$
U' $(-1, 3)$
V' $(2, -2)$

f) Using the image of $\Delta T'U'V'$ perform an additional translation using the rule $(x, y) \rightarrow (x + 3, y - 3)$. State the new coordinates of $\Delta T''U''V''$. Is this new image congruent or similar to the original figure?

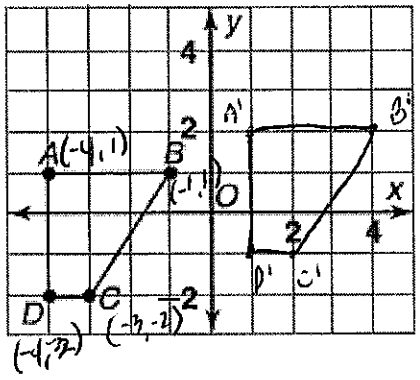
$T''(0, -1)$
$U''(3, 0)$
$V''(5, -5)$

Practice:

1) a) Use arrow notation to write a rule for the given translation.

$(x, y) \rightarrow (x+5, y+1)$

right 5 units, up 1 unit



b) Graph and label the image after the translation.

c) Name the coordinates of the image.

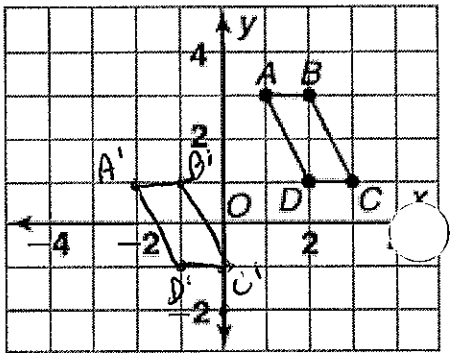
A' $(1, 2)$ B' $(4, 2)$

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

2) a) Use arrow notation to write a rule for the given translation.

$(x, y) \rightarrow (x-3, y-2)$

left 3 units, down 2 units



b) Graph and label the image after the translation.

c) Name the coordinates of the image.

$A(1,3) \rightarrow$ A' $(-2, 1)$

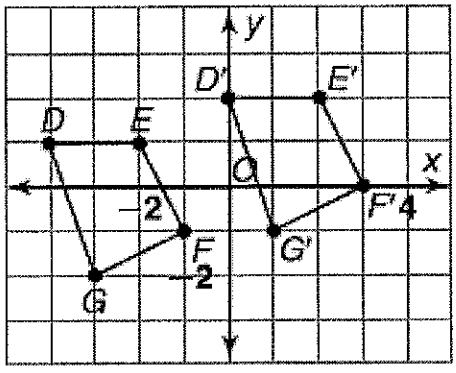
$B(2,3) \rightarrow$ B' $(-1, 1)$

$C(3,1) \rightarrow$ C' $(0, -1)$

$D(2,1) \rightarrow$ D' $(-1, -1)$

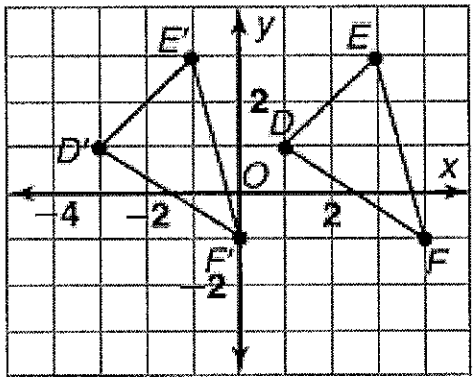
In questions 3 and 4 below, use arrow notation to write a rule that describes the translation shown on the graph.

3)



$(x, y) \rightarrow (x+4, y+1)$

4)



$(x, y) \rightarrow (x-4, y)$

5) MULTIPLE CHOICE:

Write a description of the rule $(x, y) \rightarrow (x-7, y+4)$.

(a) translation 7 units to the right and 4 units up
(b) translation 7 units to the left and 4 units down
(c) translation 7 units to the right and 4 units down
(d) translation 7 units to the left and 4 units up