**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**M8-U2/3: Notes #7 – Translations Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**WARM-UP:**

Graph ABCD with vertices *A*(0, 4), *B*(2, 2), *C*(4, 2), and *D*(4, 4).

Graph the image *A’B’C’D’* after a dilation with scale factor 2.

Graph the image *A’B’C’D’*

What are the vertices of the image?

*A’* \_\_\_\_\_\_\_\_\_\_

*B’* \_\_\_\_\_\_\_\_\_\_

*C’* \_\_\_\_\_\_\_\_\_\_

*D’* \_\_\_\_\_\_\_\_\_\_

A **transformation** is a change in the \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a figure.

A **translation** is a transformation which \_\_\_\_\_\_\_\_\_\_\_\_ each point of a figure the same \_\_\_\_\_\_\_\_\_\_\_\_ and in the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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

**EXAMPLE 1:**

Δ*ABC* is translated 1 unit right and 4 units up. Draw the image Δ*A’B’C’*.

What are the coordinates of:

*A* (1, -3) 🡪 *A’* \_\_\_\_\_\_\_\_\_

*B* (3, 0) 🡪 *B’* \_\_\_\_\_\_\_\_\_

*C*  (4, -2) 🡪 *C’*\_\_\_\_\_\_\_\_\_\_

From EXAMPLE 1, *ΔABC* 🡪 *ΔA’B’C’* says… “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”

As a general rule this translation could be written as 

**Try it!**

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

a) Draw Δ*JKL*.

b) Draw the image Δ*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’* \_\_\_\_\_\_\_\_\_

*K* (3, 4) 🡪 *K’* \_\_\_\_\_\_\_\_\_

*L* (5, 1) 🡪 *L’*\_\_\_\_\_\_\_\_\_\_

Rule: (*x*, *y*) 🡪

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

**EXAMPLE 2:**

Write a general rule which describes the translation shown below. Δ*LMN*  is the original triangle.



In words: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Arrow Notation: (*x, y*) 🡪 ( , )

**Try-It:**

In questions a and b below, use arrow notation to write a rule (in words or arrow notation) that describes the translation shown on the graph.

**a)** **b)**

**SUMMARY:**

Translation Location

|  |  |  |
| --- | --- | --- |
|  | **Add** | **Subtract** |
| ***x*-coordinate** | Moves Right. |  |
| ***y*-coordinate** |  | Moves Down. |

**Practice:**

**1.**

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

b) Using the rule (*x, y*) 🡪 (*x* - 3, *y* – 1), in words, describe what the rule is asking you to do.



c) Translate Δ*TUV*

d) Draw the image Δ*T’U’V’*.

e) Identify the coordinates of Δ*T’U’V’*.

*T’*

*U’*

*V’*

f) Using the image of Δ*T’U’V’* perform an additional translation using the rule:

 (*x, y*) 🡪 (*x* + 3, *y* - 3). Draw and Label Δ*T’’U’’V’’*

g) Is this new image (Δ*T’’U’’V’’)* congruent or similar to the original figure (Δ*TUV)* ? Explain.

h) What general rule could have been used to perform the two translations in one step?

In Words: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Arrow Notation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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



 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Graph and label the image after the translation.

c) Name the coordinates of the image.

 *A’* \_\_\_\_\_\_\_\_\_\_\_\_\_

 *B’* \_\_\_\_\_\_\_\_\_\_\_\_\_

 *C’* \_\_\_\_\_\_\_\_\_\_\_\_\_

 *D’* \_\_\_\_\_\_\_\_\_\_\_\_\_

**3.** The circle shown below is centered at (0, 0) and passes through the point *P* located at (2, 0).



 The circle is dilated with the center of dilation at the origin and a scale factor of 0.5 and then translated up 3 units. What are the coordinates of the image of point *P* after this transformation?