

An Introduction to Unit 7 - TRANSFORMATIONS

**Key Vocabulary for this unit-**

A **Transformation** is a change in position, shape, or size of a figure.

- Ex: a) Translation  
 b) Reflection  
 c) Rotation  
 d) Dilation

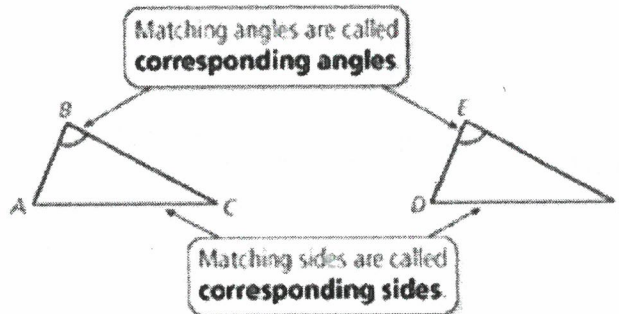
A "**Rigid Motion**": is a transformation that

- preserves length **AND**
- preserves angle measurements

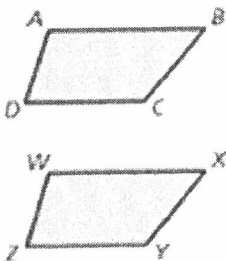
Examples: Translation, Reflection, Rotation.

\*\*\* A Dilation is not a rigid motion.\*\*\*

**Congruent** Figures- Figures that have the same shape and the same size



Exercise 1: The two figures are congruent. Name the corresponding angles and the corresponding sides.



$$\begin{array}{l} \overline{AB} \cong \overline{WX} \\ \overline{DC} \cong \overline{ZY} \\ \overline{AD} \cong \overline{WZ} \\ \overline{BC} \cong \overline{XY} \end{array}$$

$$\begin{array}{l} \angle A \cong \angle W \\ \angle B \cong \angle X \\ \angle C \cong \angle Y \\ \angle D \cong \angle Z \end{array}$$

## 7-1 Translations

Date \_\_\_\_\_

**Learning Target:** *I can translate figures to create congruent images on and off the coordinate plane.*

**Activity:** Given the graph paper, work with your partner:

- (a) Draw a rectangle in the third quadrant of the coordinate plane. Label it ABCD and state the coordinates of each vertex.

$$A(-5, -2)$$

$$B(-3, -2)$$

$$C(-3, -7)$$

$$D(-5, -7)$$

Then, find the dimensions of the rectangle.

$$2 \times 5$$

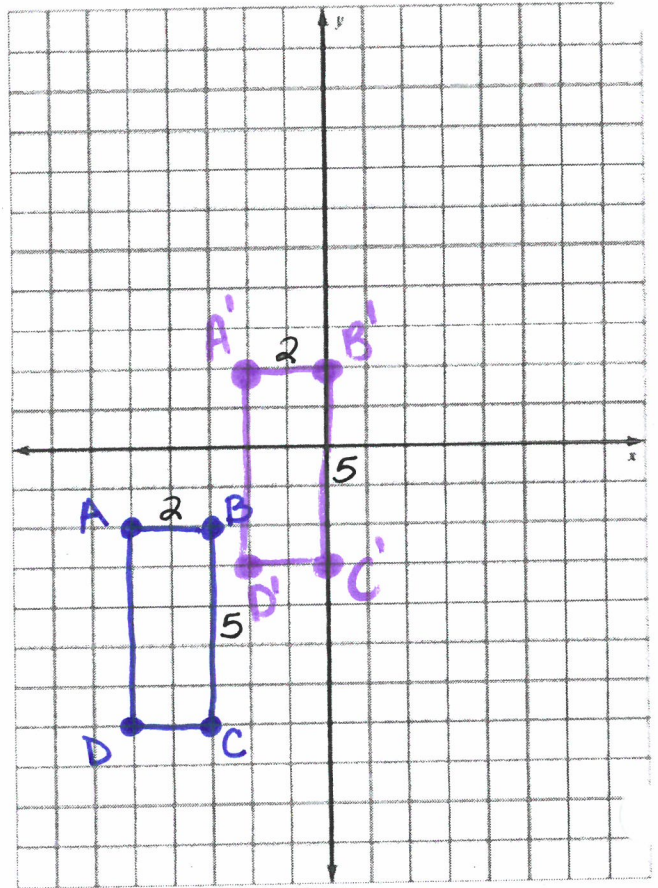
- (b) Move each vertex 3 units right and 4 units up. Draw the new figure and label it A'B'C'D'. List the new vertices.

$$A'(-2, 2)$$

$$B'(0, 2)$$

$$C'(0, -3)$$

$$D'(-2, -3)$$

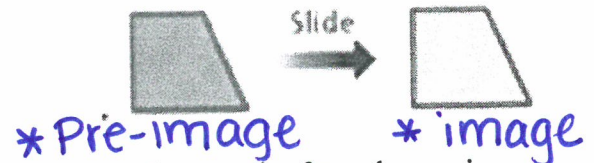


- (c) Compare the dimensions and the angle measures of the new figure to those of the original figure. What conclusions can be made?  $2 \times 5$  still,

Lengths + angles preserved... This is a "rigid motion"

### Guided Practice:

A transformation changes a figure into another figure. The **new figure is called the image.**



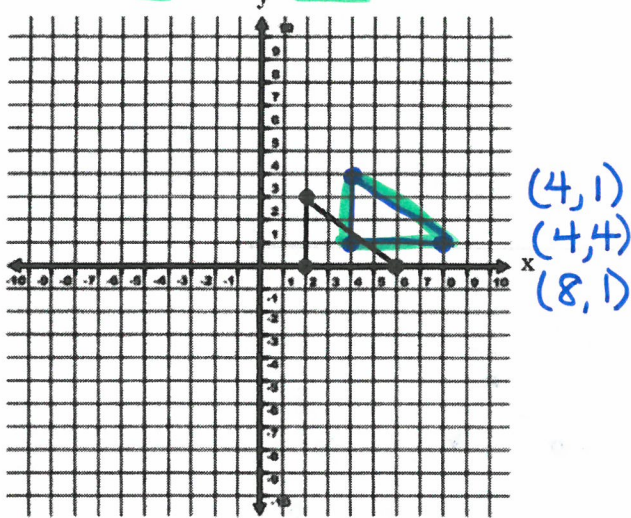
A translation is a transformation in which a figure **SLIDES** but does not turn. Every point from the pre-image (the original) moves the same distance and in the same direction.

$$T_{a,b}(x, y) = (x + a, y + b)$$

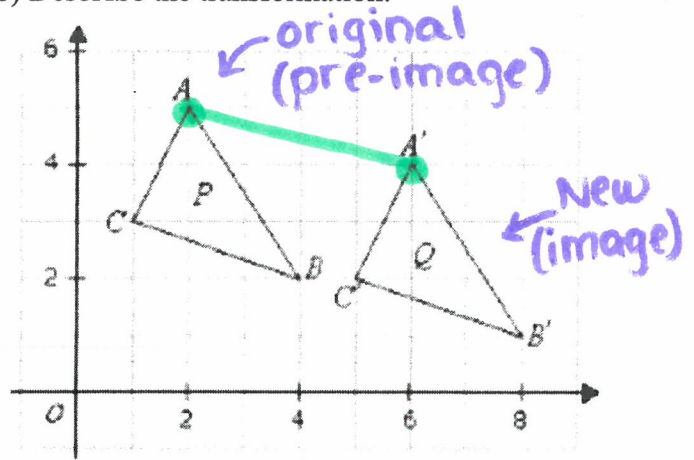


**Exercise 1- Translations on the coordinate plane:**

(a) If you translate the figure, one unit up and two units right, what are the coordinates of the image? (The new figure)



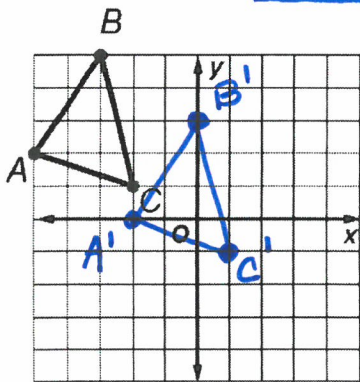
(b) Describe the transformation:



$A \rightarrow A'$   
down 1 unit, right 4 units

$T(4, -1)$

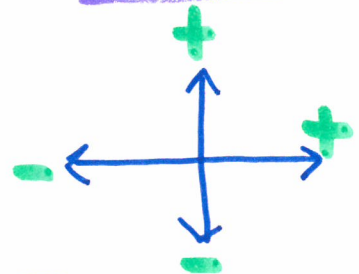
**Exercise 2:**  $\triangle ABC$  is translated 3 units right and 2 units down. Determine the coordinates of  $\triangle A'B'C'$



$T(3, -2)$

- $A'(-2, 0)$
- $B'(0, 3)$
- $C'(1, -1)$

**Remember:**



**Exercise 3-** Describe the translation

$\triangleright (3, -2) \rightarrow (1, 0)$

$x: 1 - 3 = -2$   
 $y: 0 - (-2) = 2$

$T(-2, 2) = \text{Left } 2, \text{ up } 2$

$\triangleright (-8, -4) \rightarrow (-3, 5)$

$x: -3 - (-8) = 5$   
 $y: 5 - (-4) = 9$

$T(5, 9) = \text{Right } 5, \text{ up } 9$

**Exercise 4-** A school of fish translates from point F to point D.

(a) Describe the translation of the school of fish.

Right 5, up 1  $T(5, 1)$

(b) Describe a translation the boat could make to get to point D.

Right 4, up 4  $T(4, 4)$

