

## UNIT 1 LESSON 2 TRANSLATIONS

**TRANSFORMATION** = change to the position, shape, or size of a figure/function

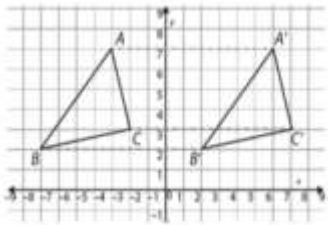
**PRE IMAGE** = the original figure  $P(x, y)$  = point  $(x, y)$  on the plane

**IMAGE** = the resulting figure  $T(x, y) = T(P)$  = transformation on point  $P$ . We label new points  $P'$  (prime)

Today's TRANSFORMATION we will learn is called a **TRANSLATION**.

Translations  $T_{a,b}(x, y) = (x \pm a, y \pm b)$

Translations = slide/moves in same direction



$x + a$  = moves right

$x - a$  = moves left

$y + b$  = moves up

$y - b$  = moves down

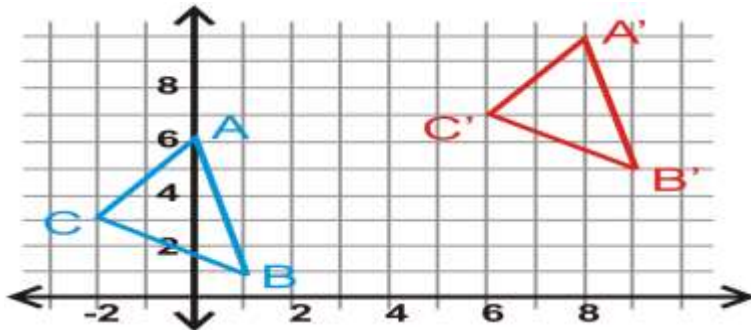
**Ex 1** Given the point  $P(5, 3)$  and  $T_{2,2}(x, y) = (x + 2, y + 2)$ , what are the coordinates of  $T(P)$ ?

For the point  $P(5, 3)$ ,  $x = 5$  and  $y = 3$ . Plug the values into the translation rule.

$$T_{2,2}(x, y) = (x + 2, y + 2) \longrightarrow 5 + 2 = 7 = x; 3 + 2 = 5 = y$$

So  $P'$  will be  $(7, 5)$  after the translation

**Ex 2** The figure labeled prime is a translation image of the pre-image figure. Write a rule to describe each translation.



Start at one of the points of the pre-image. Count the number of units in the direction of the image.

8 units right, 4 units up

So the rule for the translation is:

$$T_{8,4}(x, y) = (x + 8, y + 4)$$

**YOU TRY!**

**Ex 3** Given the point  $P(-2, 6)$  and  $T_{2,-5}(x, y) = (x + 2, y - 5)$ , what are the coordinates of  $T(P)$ ?

**Ex 4** The figure labeled prime is a translation image of the pre-image figure. Write a rule to describe each translation.

