Chapter 4 Transformations

4.1 - Translations

Vocabulary

Transformation	a change in the size, shape, or position of a figure
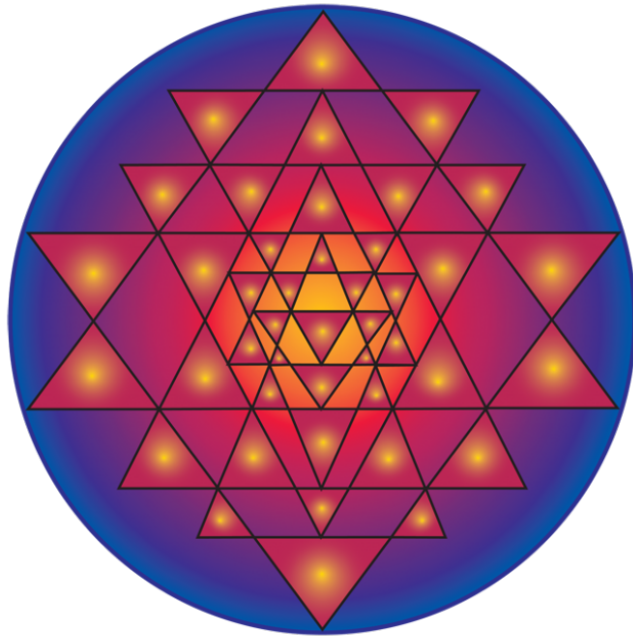
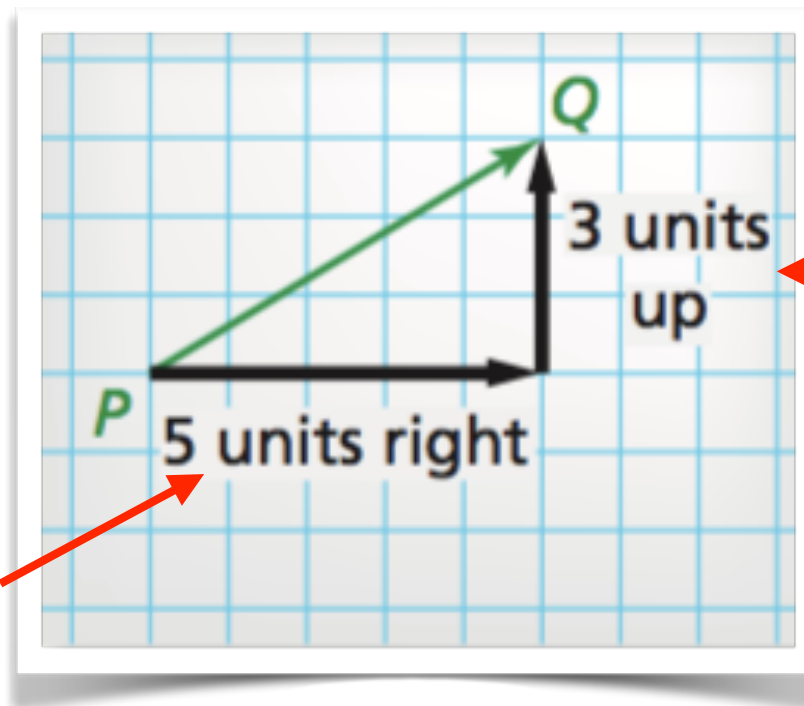# 4.1 - Translations

Vocabulary

Vector	a quantity that has a direction and *magnitude*, or size

"vector PQ"
or
$$\overrightarrow{PQ}$$

Q

3 units up

Vertical component

P

5 units right

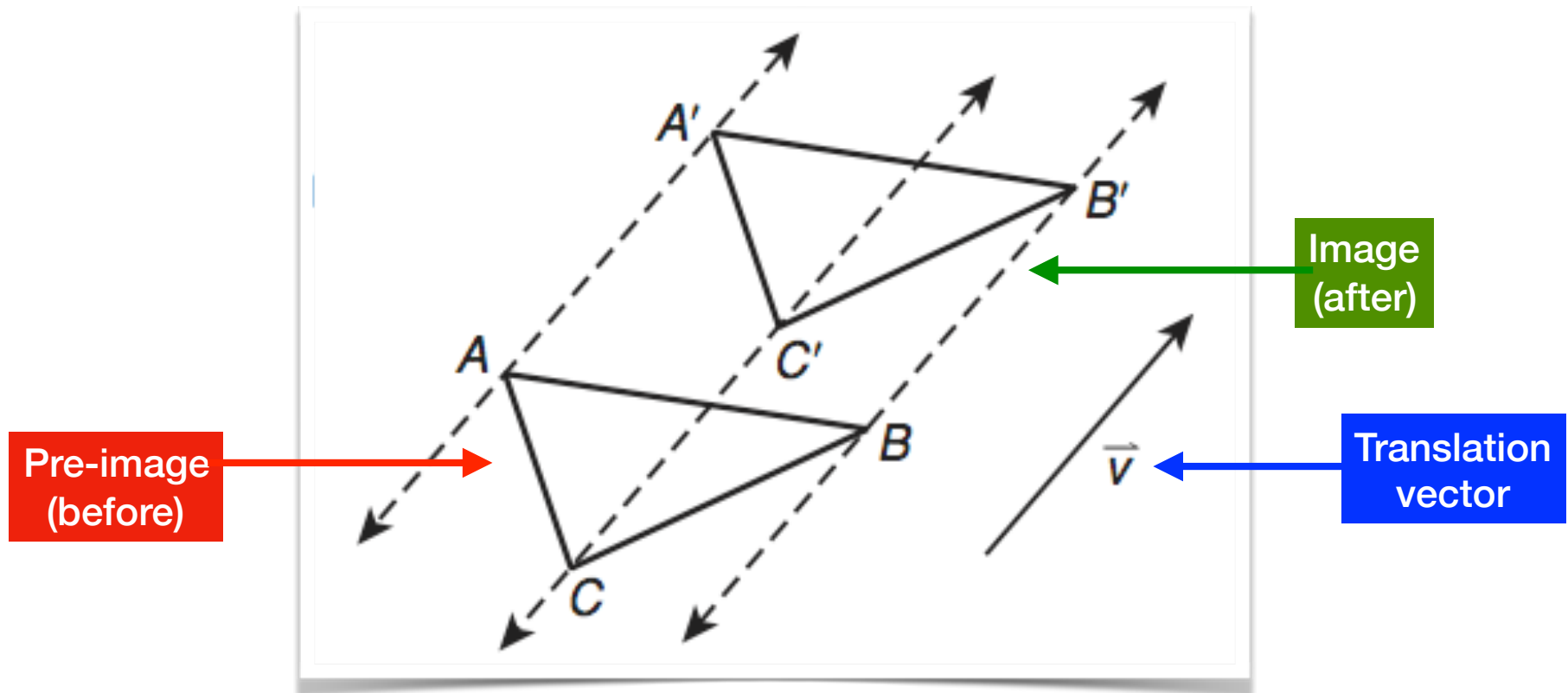**Horizontal component**

Component Form = <5, 3>

4.1 - Translations

Vocabulary

Translation	to move every point in a figure the same distance in the same direction
Isometry	a transformation that preserves length and angle measure ("rigid motion")

Image (after)

Pre-image (before)

Translation vector

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Definition:

A translation moves every point of a figure the same distance in the same direction. More specifically, a translation maps, or moves, the points P and Q of a plane figure along a vector $\langle a, b \rangle$ to the points P' and Q', so that one of the following statements is true.
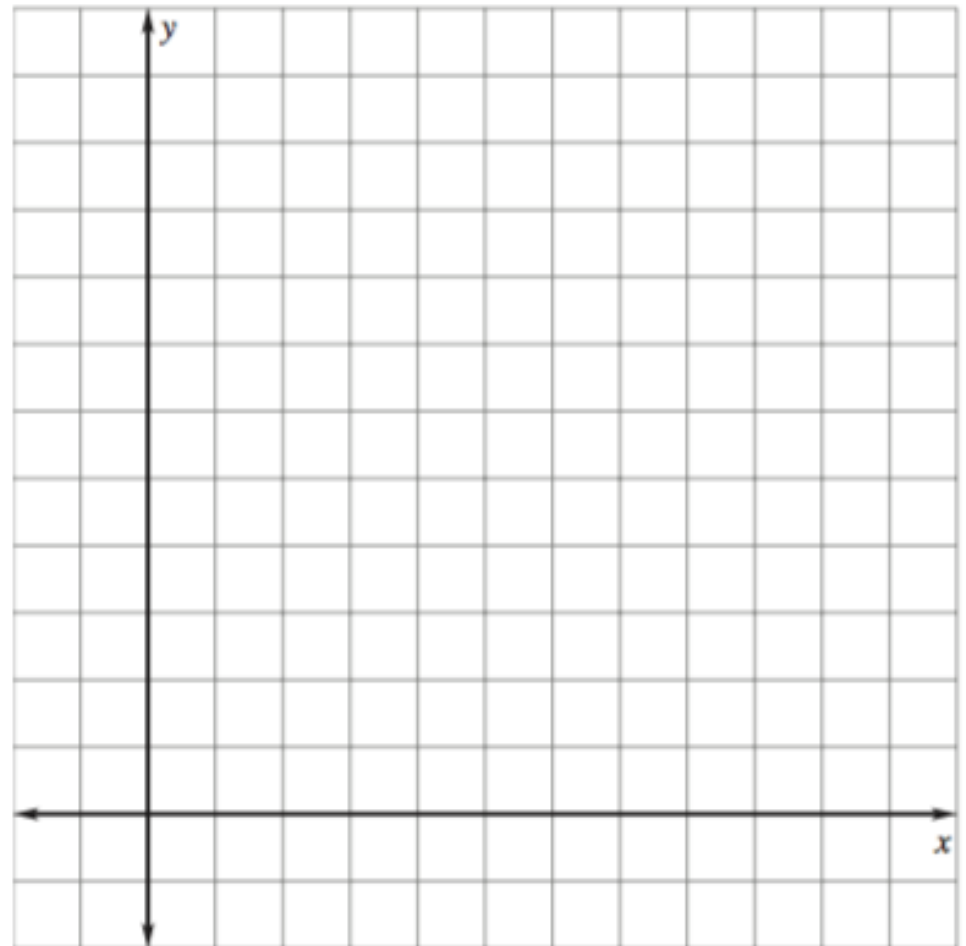
- $PP' = QQ'$ and $\overline{PP'} \parallel \overline{QQ'}$, or
- $PP' = QQ'$ and $\overline{PP'}$ and $\overline{QQ'}$ are collinear.
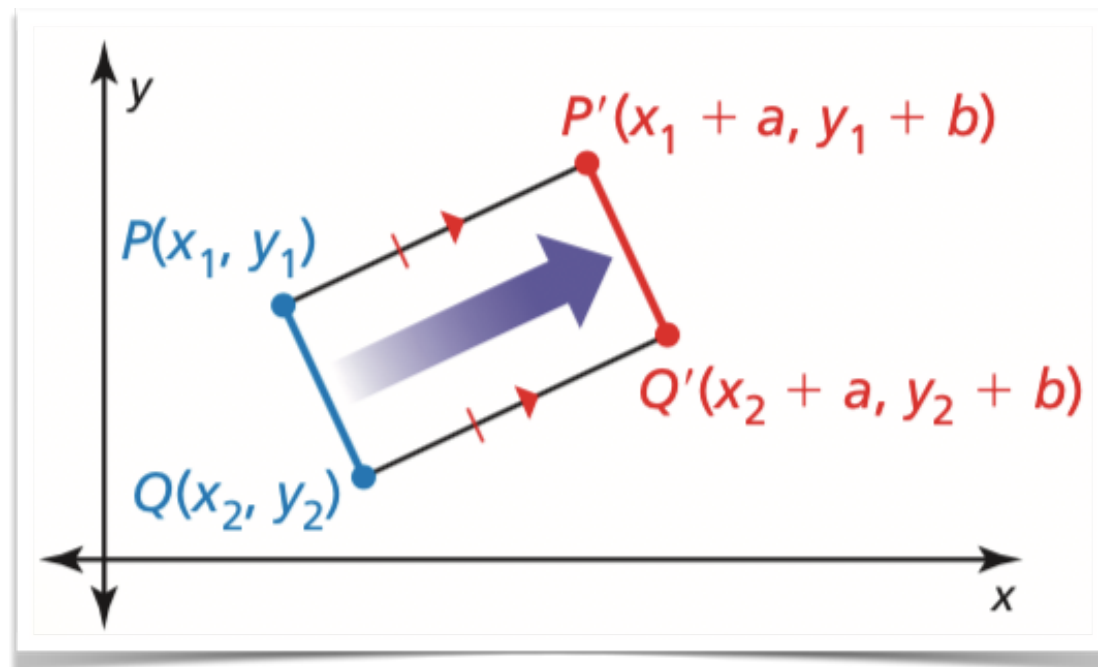
4.1 - Translations

Graph:

The vertices of $\triangle ABC$ are A(0, 3), B(2, 4), and C(1, 0). Translate $\triangle ABC$ using vector <5, -1>.

4.1 - Translations

Translation Vector

Component Form	Translation Rule
$<a,b>$	$(x,y) \longrightarrow (x+a, y+b)$

Convert these:

Component Form	Translation Rule
$< 4, 3 >$	
$< -3.2, 5.9 >$	
$< t - 1, 2t^2 >$	

4.1 - Translations

Graph:

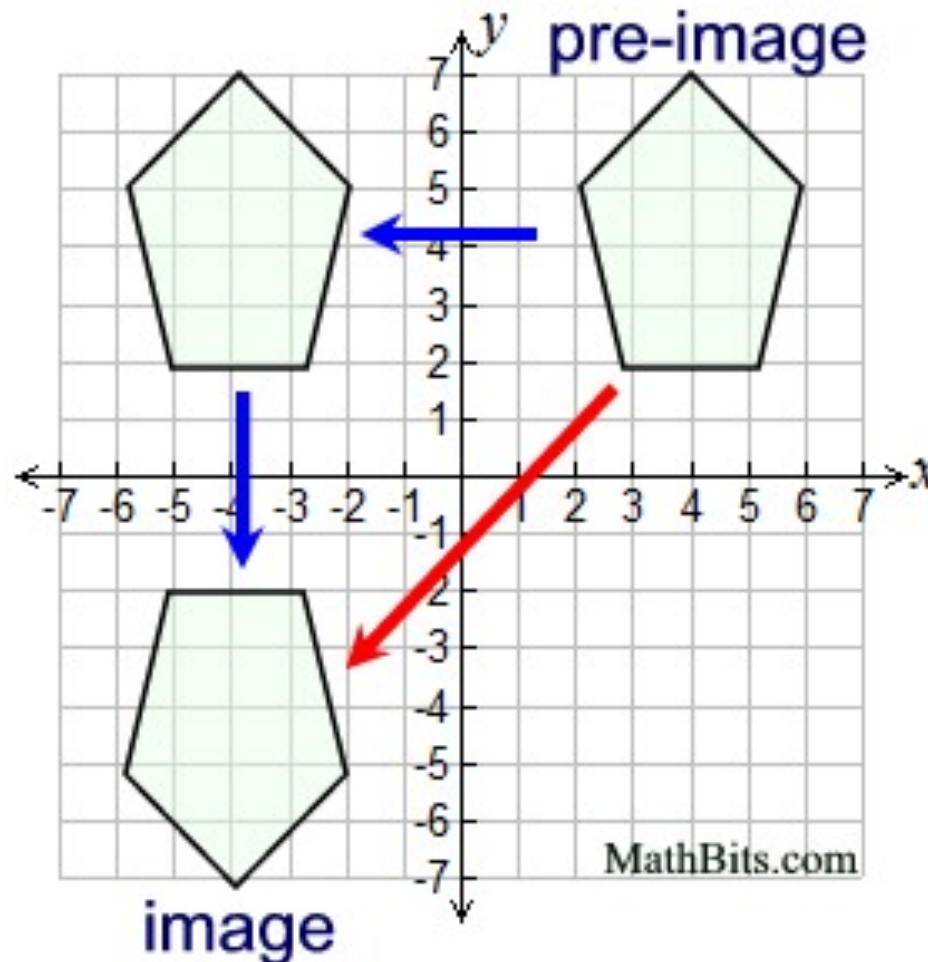Pre-image: A(1, -2), B(1, 0), C(3, 1), D(4, -3)

Rule: (x, y) -> (x-5, y+3)
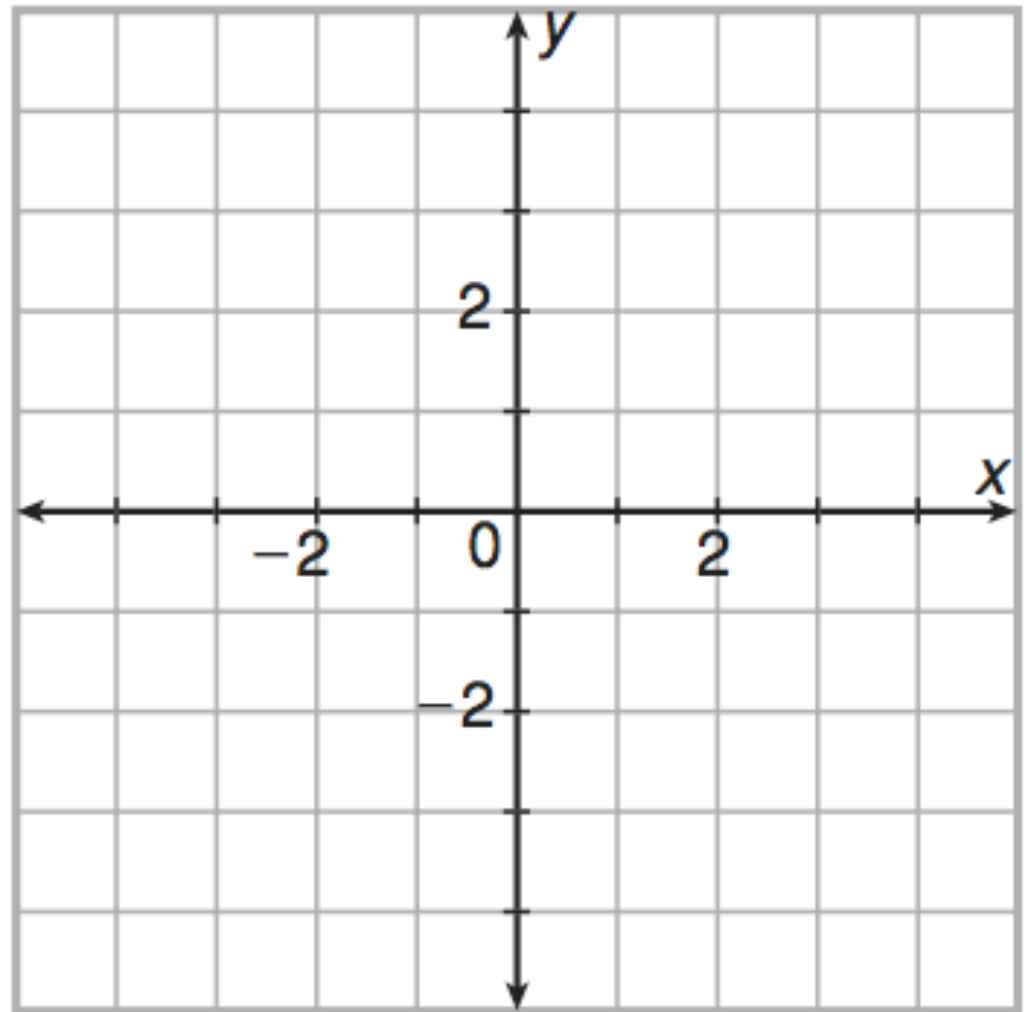
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Vocabulary

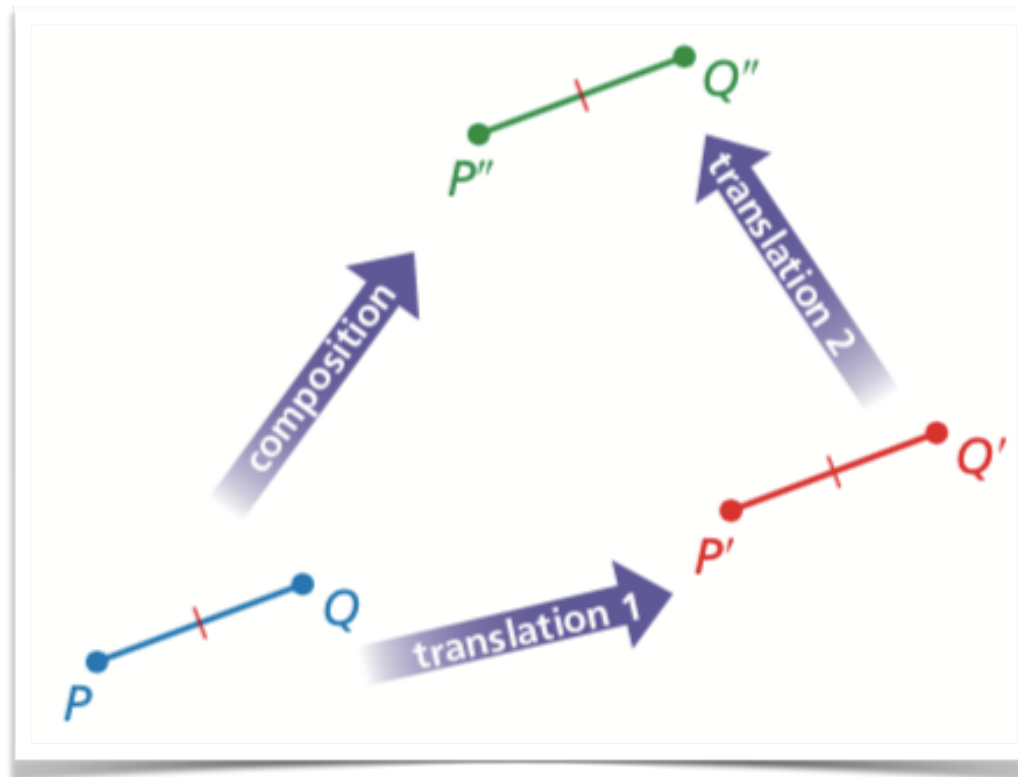| Composition of Transformations	two or more transformations are combined to form a single transformation

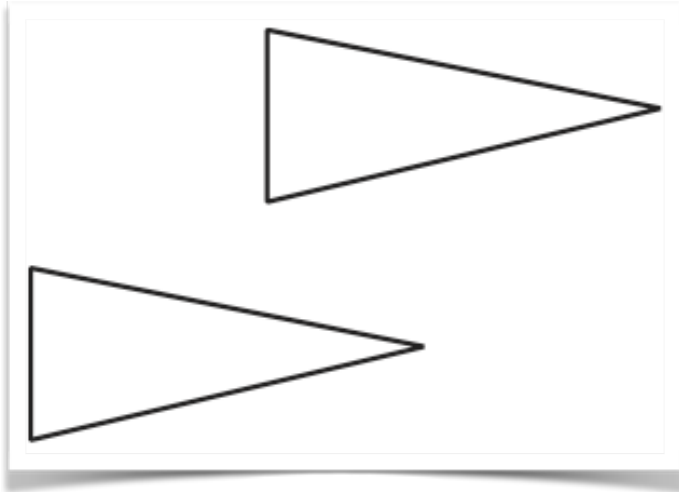# 4.1 - Translations

Theorem

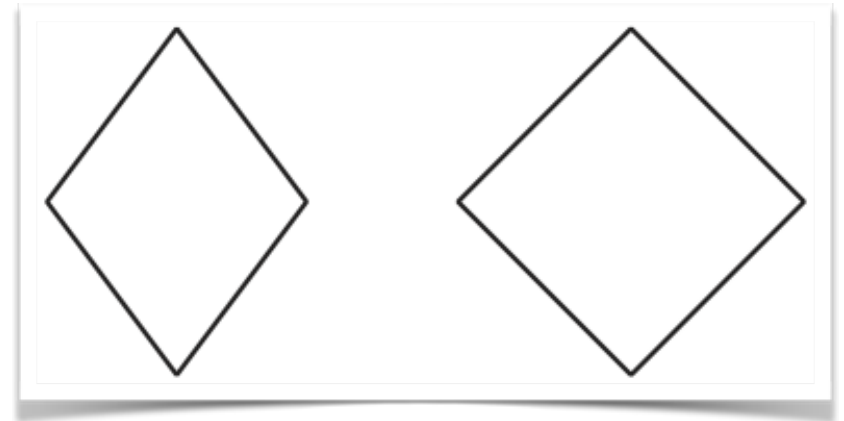| **Composition Theorem** | The composition of two (or more) rigid motions is a rigid motion. |

4.1 - Translations

Is this a translation?

A)

B)

C)