

Chapter 4: Transformation

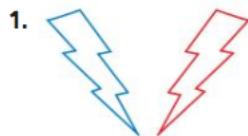
What is a transformation?

A function that moves or changes a figure in some way to produce a new figure called an *image*.

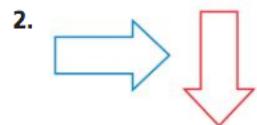
What are 4 types of transformations?

4.1: Translations

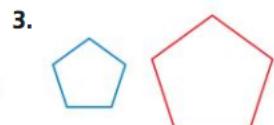
Tell whether the red figure is a translation, reflection, rotation, or dilation of the blue figure.



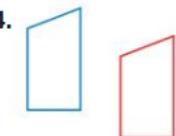
1)



2)



3)



4)

What is a vector?

A vector is a quantity that has both *magnitude* and *direction*. Represented in the coordinate plane by an arrow drawn from one point to another.

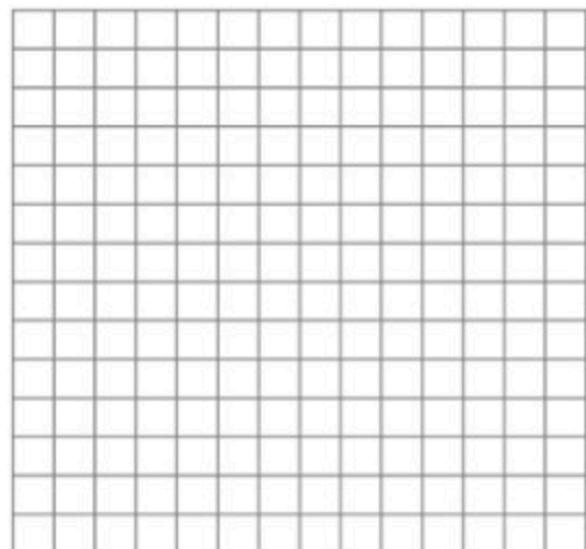
A vector has a starting point known as: _____

And an end point known as: _____

Horizontal component:

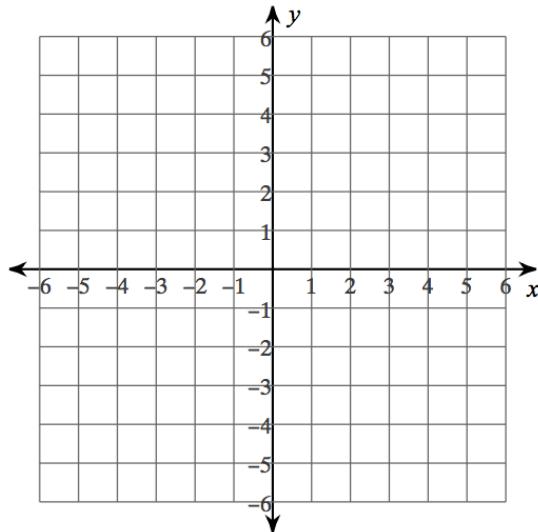
Vertical component:

Component form:

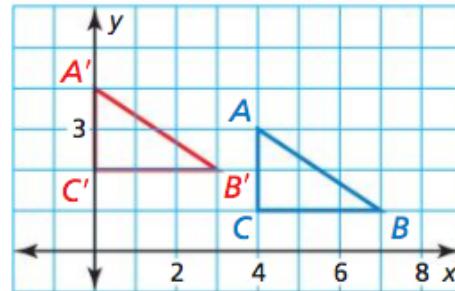


Example 1:

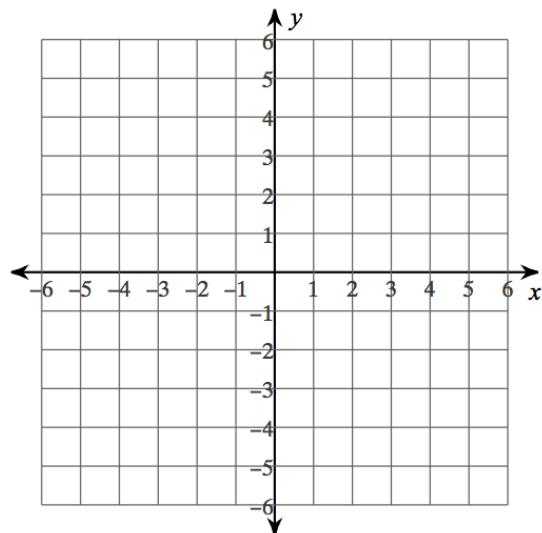
The vertices of ΔABC are $A(0, 3)$, $B(2, 4)$, and $C(1, 0)$. Translate ΔABC using the vector $\langle -5, 1 \rangle$

**Example 2:**

Write a rule for the translation of ΔABC to $\Delta A'B'C'$

**Example 3:**

Graph the quadrilateral ABCD with the vertices $A(-1, 2)$, $B(-1, 5)$, $C(4, 6)$, and $D(4, 2)$ and its image after the translation $(x, y) \rightarrow (x + 3, y - 1)$



Rigid motion

What does it mean to be rigid?

Rigid motion is a transformation that **preserves** length and angle measure.

Postulate

Postulate 4.1 Translation Postulate

A translation is a rigid motion.

When two or more transformations are combined to form a single transformation, the result is **Composition of transformation**

Theorem

Theorem 4.1 Composition Theorem

The composition of two (or more) rigid motions is a rigid motion.

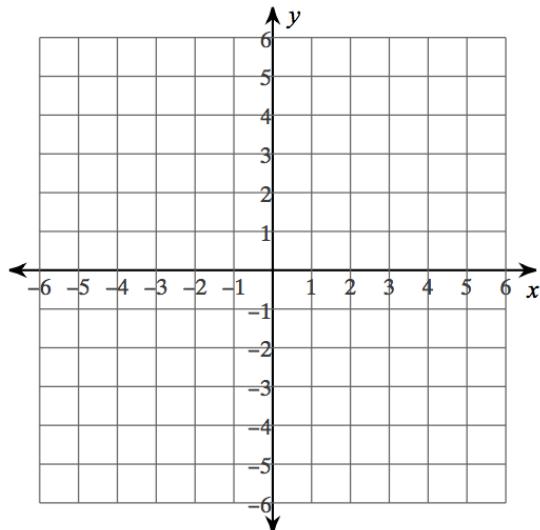
Proof Ex. 35, p. 180

Example 4:

Graph segment RS with endpoints R(-4, 1), and S(-2 , 5) and its image after the compositions.

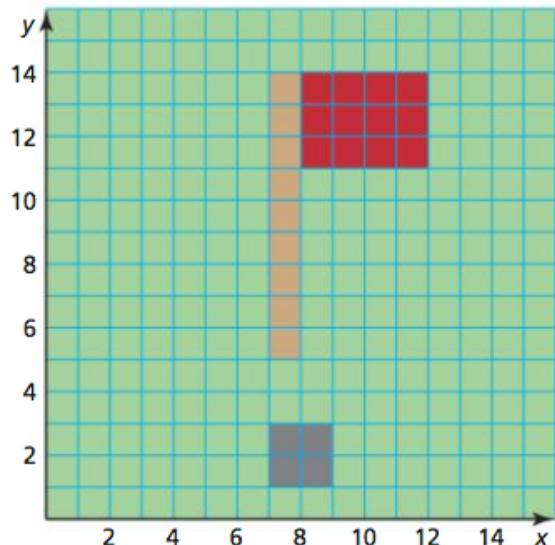
Translation 1: $(x, y) \rightarrow (x + 6, y - 2)$

Translation 2: $(x, y) \rightarrow (x - 3, y - 4)$



Example 5:

You are designing a favicon for a golf website. In an image-editing program, you move the red rectangle 2 units left and 3 units down. Then you move the red rectangle 1 unit right and 1 unit up. Rewrite the composition as a single translation.



Homework / Classwork
5, 7, 9, 11, 12, 13, 15, 17, 19, 21, 26, 27