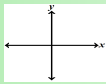


4.1 - Translations and Intro to Vectors

Mental Floss: Thursday Oct 26th

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Triangle ABC has vertices located at the points listed below. Find the length of each side to the nearest tenth.



$A(-3,4)$ $B(-1,-4)$ $C(5,1)$

$$AB = \sqrt{2^2 + 8^2} = \sqrt{4 + 64} = \sqrt{68} = 8.246... \approx \boxed{8.2}$$

$$AC = \sqrt{8^2 + 3^2} = \sqrt{64 + 9} = \sqrt{73} = 8.544... \approx \boxed{8.5}$$

$$BC = \sqrt{6^2 + 5^2} = \sqrt{36 + 25} = \sqrt{61} = 7.810 \approx \boxed{7.8}$$

4.1 - Translations

Lesson Objectives

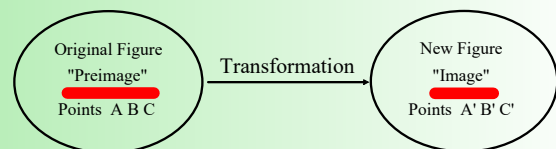
- Perform translations on points and figures
- Perform composition transformations
- Solve real-life problems involving compositions

4 Types of Transformations

- 1.) Translation (Translate)
 - Move or slide
- 2.) Reflection (Reflect)
 - Mirror image over a line
- 3.) Rotation (Rotate)
 - Turn or spin around a point
- 4.) Dilation (Dilate)
 - Increase or decrease scale/size

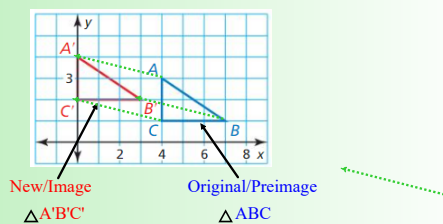
Transformation

- Transform = to change or alter
- Transformation = A function that moves or changes a figure in some way to produce a new figure.



1. Translation (Translate)

- Moves every point the same distance in the same direction.



Vector = A quantity with:

1. Magnitude (or size)
2. Direction

Examples:

Wind Speed - "Wind blowing 15 mph out of the west"

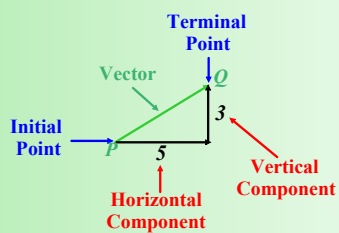
Velocity - "Traveling north on University at 35 mph"

Displacement - "Move 5 units to the northeast"

4.1 - Translations and Intro to Vectors

Vector Algebra

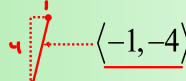
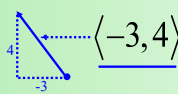
Vectors are usually shown in the coordinate plane by an arrow (looks similar to a ray).



Component Form of a Vector

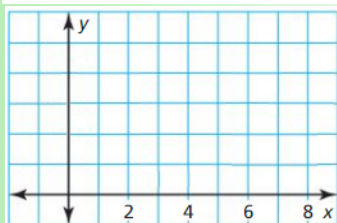
$$\langle 5, 3 \rangle$$

Vector Notation Examples



EXAMPLE Translating a Figure Using a Vector

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

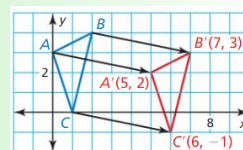


EXAMPLE Translating a Figure Using a Vector

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

SOLUTION

First, graph $\triangle ABC$. Use $\langle 5, -1 \rangle$ to move each vertex 5 units right and 1 unit down. Label the image vertices. Draw $\triangle A'B'C'$.



You can also write a **translation rule** to describe the changes you are making to the figure.

$$(x, y) \rightarrow (x + 5, y - 1)$$

Homework

4.1 p.178 #3,4,7-12,14,15