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

\[ A(-3,4) \quad B(-1,-4) \quad C(5,1) \]

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.

**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**

$\langle 5, 3 \rangle$

**Initial Point**

Terminal Point

Component of a Vector

**Terminal Point**

Vertical Component

**Horizontal Component**

Vector Notation Examples

$\langle 5, 3 \rangle$

$\langle -3, 4 \rangle$

$\langle -1, -4 \rangle$

**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 $(5, -1)$.

Homework
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**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 $(5, -1)$.

**SOLUTION**

First, graph $\triangle ABC$. Use $(5, -1)$ 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.

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