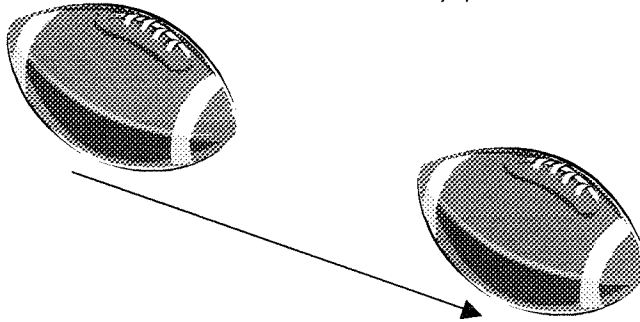


Transformations

Translations

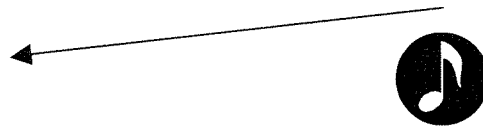
Translation: to translate an object is to simply change its position without changing its orientation or size. In other words, move every piece of the object a certain distance in a given direction.

For example:



The football on the right is a "**translation**" of the football to the left. Noticed that the football was moved in the length and direction of the arrow. This arrow is called the "**direction vector**."

Your turn: Translate the note below according to the given vector.



Let's explore translation further. Open the Geometer's Sketchpad on your computer and follow the directions below.

1. Construct a scalene triangle:
 - (a) select the point icon on the left of the screen and create 3 points
 - (b) select all three points using the arrow tool (be sure they are highlighted) and go the **Construct** menu select **Segments**.
2. Create a separate segment (this will be your direction vector):
 - (a) select the segment icon on the left of the screen
 - (b) click and drag a segment
3. Mark your direction vector:
 - (a) select the endpoints of your vector (the direction of your vector will be determined by the order your points are selected)
 - (b) go to the **transform** menu and select **mark vector**
4. Translate your triangle:
 - (a) select all parts of the triangle
 - (b) go the **transform** menu and select **translate**
5. Label all points (if not already labeled):
 - (a) select the letter icon (A) on the left
 - (b) click on all points to create their label (notice that image points are labeled with ')

After manipulating the triangle for a few minutes, answer the questions below.

Translation Questions...be as descriptive as possible.

1. The direction vector...

(a) What happens when you make the direction vector shorter or longer?
I think... *Actually...*

(b) What happens when you change the angle of the direction vector?
I think... *Actually...*

(c) Change the direction vector so that it is a horizontal segment. Where on the sketch does the image appear? Why does it appear here?
I think... *Actually...*

(d) Change the direction vector so that it is a vertical segment. Where on the sketch does the image appear? Why does it appear here?
I think... *Actually...*

(e) How could we change the direction vector so that the image appears on the exact opposite side of the original triangle as it was in part (d)?
I think... *Actually...*

2. What does the direction vector look like when...

(a) a point is the same as its image
I think... *Actually...*

(b) corresponding segments in the original and image triangle are collinear?
I think... *Actually...*

(c) the image of a point lies in the same place as one of the other two points in the original triangle?
I think... *Actually...*

3. Can you manipulate the vector so that one side of the original triangle is collinear with a non-corresponding side of its image?

I think... *Actually...*

4. What happens when you select the vector as a segment and drag it around the sketch? Why does this happen?

I think...

Actually...