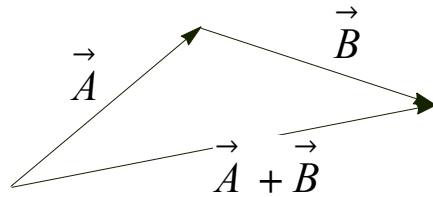# Interlude 1: Exercise 2

Explanation

In this exercise we seek to demonstrate how to extend a definition or rule to similar situations. Here we take the rule of adding vectors by placing the tail of one vector on the head of the other, to subtracting vectors.

Hint

If addition requires us to place the tail of one vector at the head of the second, what would you think the arrangement should be for subtraction?

Answer

We can think of subtracting vectors as a form of adding,

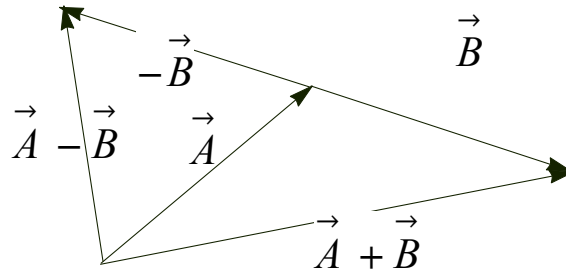$$\vec{A} - \vec{B} = \vec{A} + \left(-\vec{B}\right)$$

or,

Figure 1
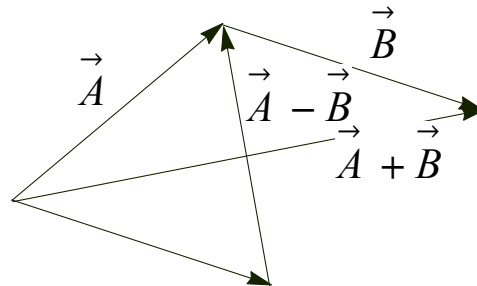
we can also place the tails together.

Figure 2

It is important to note that a vector is an object that remains unchanged as we move it around. Despite the fact that the location of the $\vec{A} - \vec{B}$ vectors in Figures 1 and 2 are different, but they are the same vector. We can think of this as a form of coordinate transformation, a translation (where the coordinate systems slides along either the x axis, the y axis, or both). Thus we say that vectors are translation invariant, they do not change under a coordinate translation.