

Multiplication of a Vector by a Scalar (6.3)

Math Learning Target:

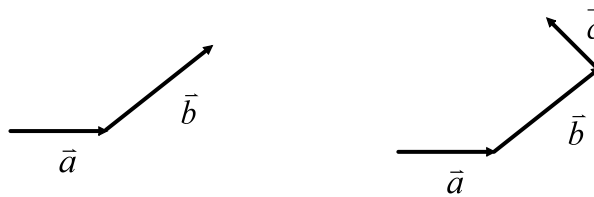


"I understand the geometric significance of the unit vector, zero vector and multiplying a vector by a scalar. I can determine if vectors considered are collinear or not. I can solve problems involving the unit and zero vectors, and vectors multiplied by a scalar. I can apply what I have learned in familiar and unfamiliar settings."

Recall:

Scalar, Vector, Equal Vector, Opposite Vector

Vector Addition



What is the effect of multiplying a vector \vec{a} by a scalar k ?



Theorem

For the vector $k\vec{a}$, where k is a scalar and \vec{a} is a non-zero vector:

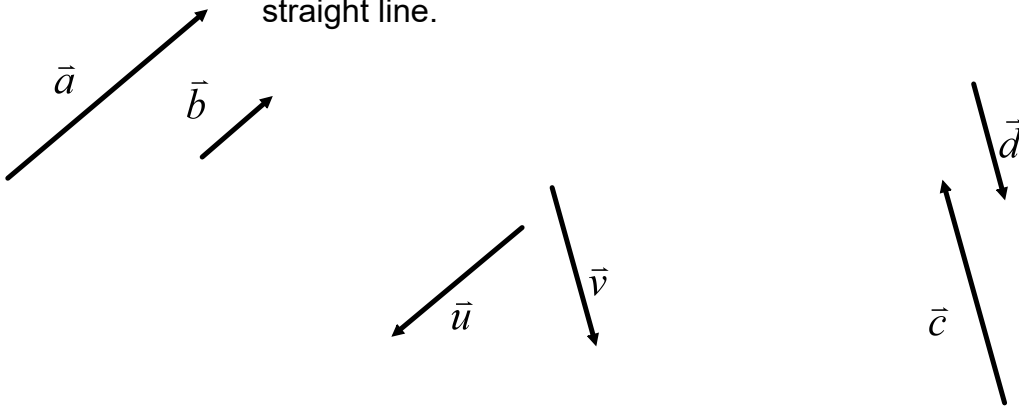
Zero Vector

The **zero vector** is a vector of magnitude 0, with an undefined direction. We write

There are several ways to create it, such as:

Collinearity

Any two vectors are **collinear** when they are parallel or lie on the same straight line. They can be described as collinear because vectors are allowed to be translated to lie on the same straight line.



Collinearity

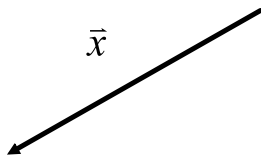
Theorem

Unit Vector

(loosely stated)

Example

Given \vec{x} where $|\vec{x}| = 4$, interpret $\frac{1}{4}\vec{x}$.



Unit Vector

(formally stated)

Rationalize all denominators. Do not round any scalar values and magnitudes.

Entertainment: Page 298...#1, 2bd, 6e, 7a*, 10, 13, 15, 17, 20, 21

*answer in back of text is partially incorrect