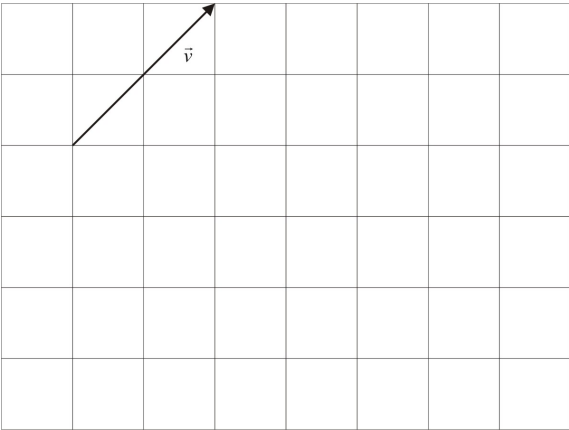


6.3 Multiplication of a Vector by a Scalar

<p>A Multiplication of a Vector by a Scalar By multiplying a vector \vec{v} by a scalar k we obtain a new vector noted $k\vec{v}$ with the following properties: a) $k\vec{v}$ has the same direction as \vec{v} if $k > 0$ and the opposite direction if $k < 0$ b) $\ k\vec{v}\ = k \times \ \vec{v}\$</p>	<p>B Properties The following properties apply for <i>multiplication</i> of a vector by a scalar:</p> $k(\vec{a} + \vec{b}) = k\vec{a} + k\vec{b}$ $k(m\vec{a}) = (km)\vec{a} = km\vec{a}$ $(k + m)\vec{a} = k\vec{a} + m\vec{a}$
<p>Ex 1. Given the vector \vec{v}, draw the following vectors:</p> <p>a) $2\vec{v}$ b) $-3\vec{v}$ d) $\frac{1}{2}\vec{v}$ e) $-\frac{1}{4}\vec{v}$</p> 	
<p>Ex 2. Given $\vec{a} = 2\vec{i} - 3\vec{j} + \vec{k}$, $\vec{b} = -\vec{i} + \vec{j} + 2\vec{k}$, write the following expressions in terms of the vectors \vec{i}, \vec{j}, and \vec{k}.</p> <p>a) $\vec{a} + \vec{b}$</p> <p>b) $2\vec{a} - 3\vec{b}$</p>	<p>C Vector Unit An <i>unit vector</i> is a vector having a magnitude of 1. For any vector \vec{v}, a unit vector parallel to \vec{v} is given by:</p> $\vec{u} = \frac{\vec{v}}{\ \vec{v}\ }$
<p>Ex 3. If \vec{x} and \vec{y} are two unit vectors with an angle of 30° between them, find the magnitude and direction of the vector $3\vec{x} - 5\vec{y}$.</p>	

Ex 4. Given $\|\vec{u}\| = 8m$ and $\|\vec{v}\| = 12m$, $\|\vec{u} + \vec{v}\| = 16$,
determine the magnitude and the direction of the
vector $2\vec{u} - 3\vec{v}$.

Reading: Nelson Textbook, Pages 293-298

Homework: Nelson Textbook: Page 298 #4, 9, 13, 15, 17, 18, 21, 22