Math 21C
Vogler

Vectors

Defn A **vector** is a symbol representing a direction and magnitude (i.e. length or size)

Note: Two vectors are equal if they have same direction and magnitude.

Notation: Vector $\overrightarrow{AB}$ is a vector with initial point A & terminal point B.

Defn Let $\overrightarrow{AB}$ be a vector. Then the magnitude of $\overrightarrow{AB}$, denoted $|\overrightarrow{AB}|$, is

2D) $\overrightarrow{AB} = \langle a,b \rangle \Rightarrow |\overrightarrow{AB}| = \sqrt{a^2+b^2}$

3D) $\overrightarrow{AB} = \langle a,b,c \rangle \Rightarrow |\overrightarrow{AB}| = \sqrt{a^2+b^2+c^2}$

Algebra of Vectors Let k be constant

2D) Let $\vec{w} = \langle a,b \rangle$ & $\vec{v} = \langle c,d \rangle$

a) $\vec{w} + \vec{v} = \langle a+c, b+d \rangle$

b) $k\vec{w} = \langle ka, kb \rangle$

3D) Let $\vec{w} = \langle a,b,c \rangle$ & $\vec{v} = \langle d,e,f \rangle$

a) $\vec{w}+\vec{v} = \langle a+d, b+e, c+f \rangle$ b) $k\vec{w} = \langle ka, kb, kc \rangle$

Defn If $\vec{u}$ is a vector with $|\vec{u}|=1$, we call it a **unit vector**

Fact: Let $\vec{v}$ be any vector. Then $\vec{u} = \frac{1}{|\vec{v}|}\vec{v}$ is a unit vector in the same direction as $\vec{v}$. We say $\vec{u}$ is the **direction** of $\vec{v}$.