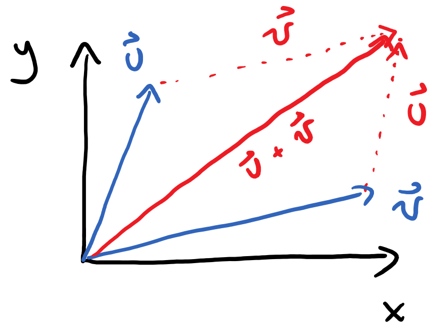
Section 1.1: cont'd

Wednesday, September 5, 2018 11:47 AM

vector addition:



$$\vec{u}+\vec{v} = [u_1 + v_1, \; u_2 + v_2]$$

note: order doesn't matter when adding vectors (commutative)

Scaling a vector:

$\vec{v}$ is a vector
c is a scalar (constant)

if $\vec{v} = [v_1, v_2]$

then $c\vec{v} = [cv_1, cv_2]$

note: $c\vec{v}$ is parallel to $\vec{v}$

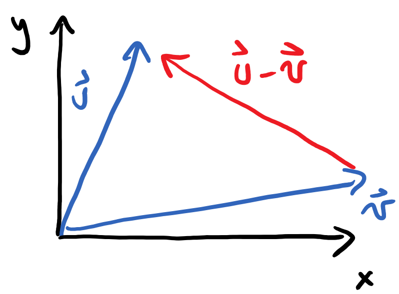
if $c>0$, $c\vec{v}$ and $\vec{v}$ have the same direction if $c < 0$, $c\vec{v}$ and $\vec{v}$ have opposite directions (antiparallel)

example: if $\vec{v} = [1, 3]$, find $2\vec{v}$ and $-\vec{v}$.

$$2\vec{v} = [2, 6]$$

$$-\vec{v} = [-1, -3]$$

<u>vector subtraction:</u>



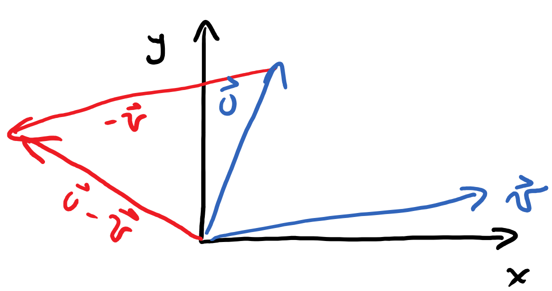
draw in $\vec{u} - \vec{v}$

note: if $\vec{w} = \vec{u} - \vec{v}$

the vector we want

then $\vec{w} + \vec{v} = \vec{u}$

more robust method:



$$\vec{u} - \vec{v} = \vec{u} + (-\vec{v})$$

see handout on properties of vectors

example: simplify:

$$3\vec{a} + (5\vec{b} - 2\vec{a}) + 2(\vec{b} - \vec{a})$$

$$7\vec{b} - \vec{a}$$

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linear combination of vectors: definition is on handout

coefficients

example: $\vec{w} = -3\begin{bmatrix}1\\1\end{bmatrix} + 2\begin{bmatrix}0\\2\end{bmatrix}$

$\vec{w}$ is a linear combination of $\begin{bmatrix}1\\1\end{bmatrix}$ and $\begin{bmatrix}0\\2\end{bmatrix}$