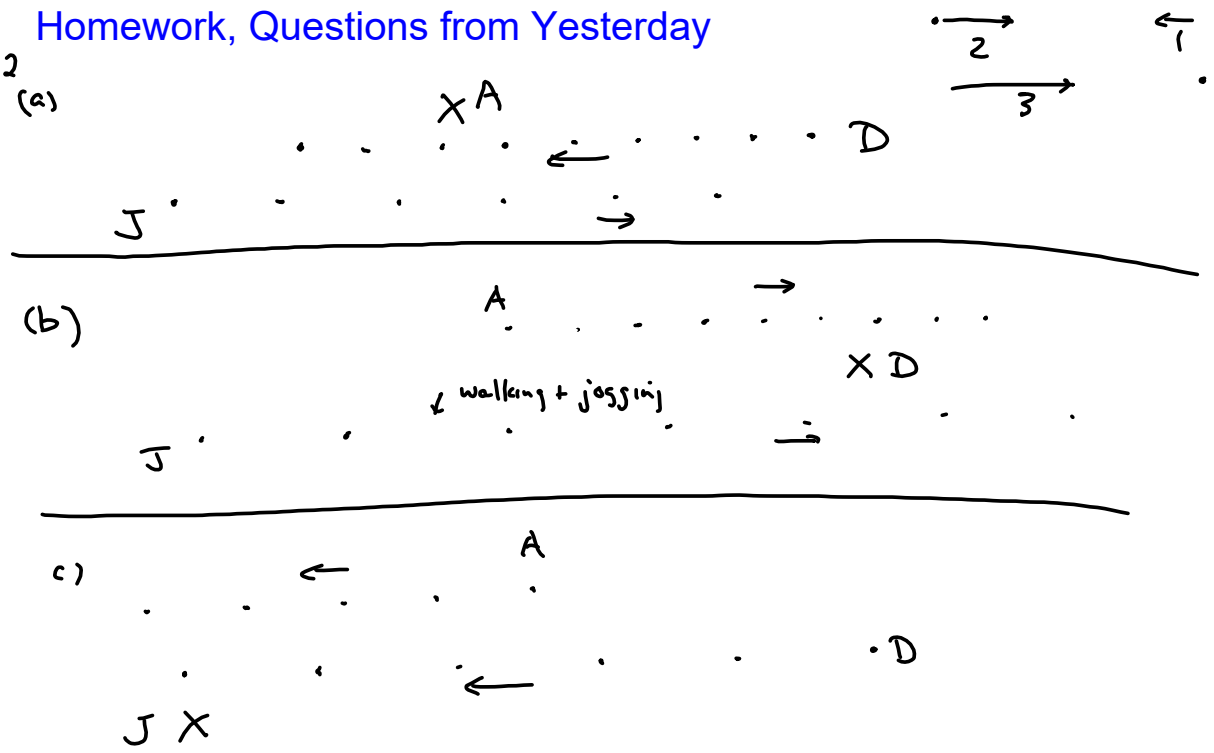
Homework, Questions from Yesterday

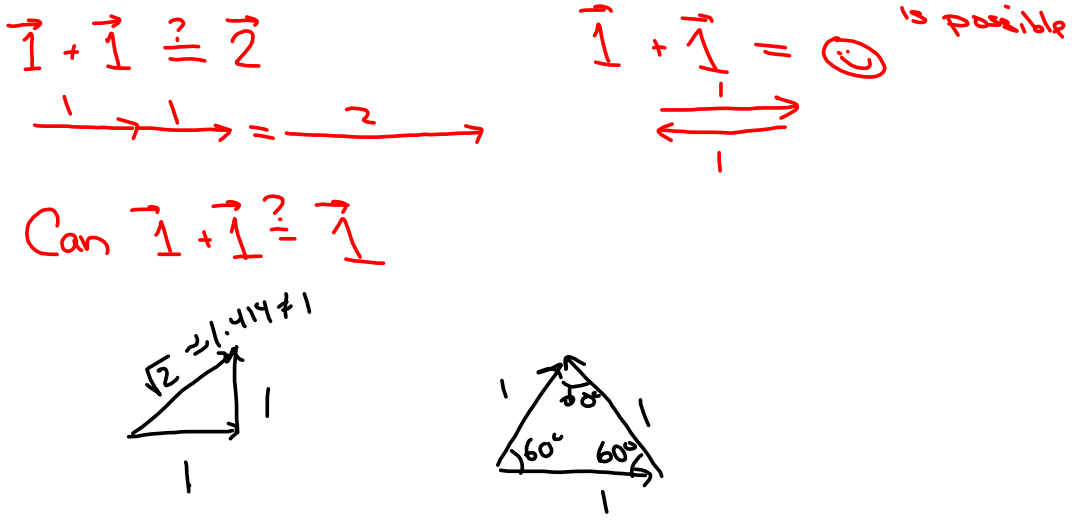
2



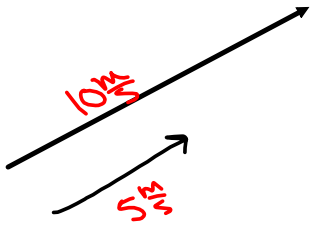
Vector Representation of Motion

We will start with a difficult question

1 + 1 = ??? 2



Using Arrows to Represent Vectors



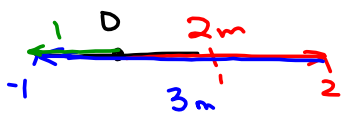
Length of Arrow: size

Direction of Arrow: direction

Adding Vectors in One Dimension

Treat it like a number line

1m left
-1 m



Tip-to-Tail Method of Vector Addition

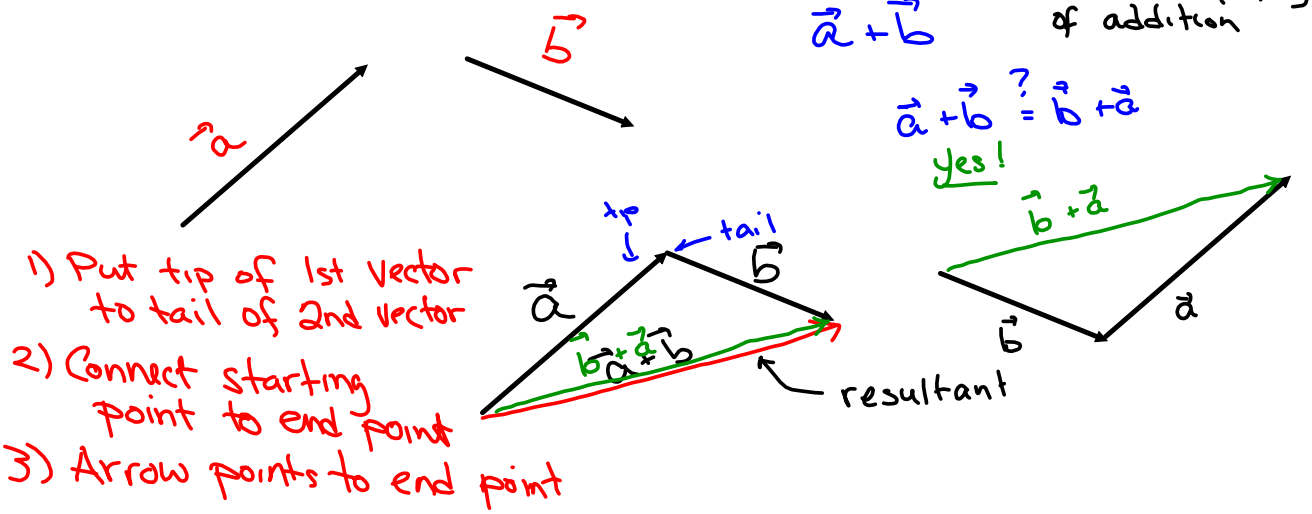
$3+2 \stackrel{?}{=} 2+3$

Commutative property of addition

$\vec{a}+\vec{b}$

$\vec{a}+\vec{b} \stackrel{?}{=} \vec{b}+\vec{a}$

Yes!



The vector representing the sum of vectors is called the resultant.

Order doesn't matter.

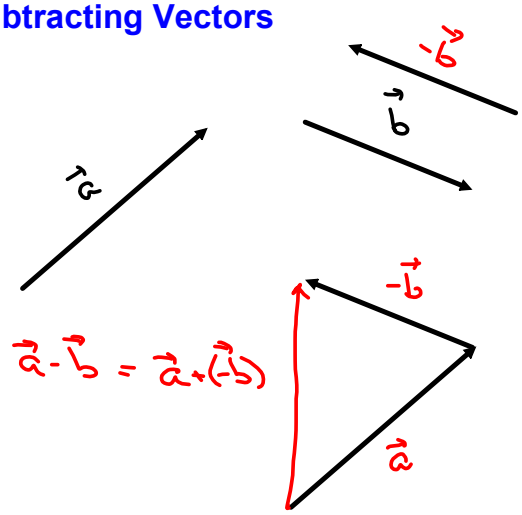
23
34
77
10
84

Subtracting Vectors

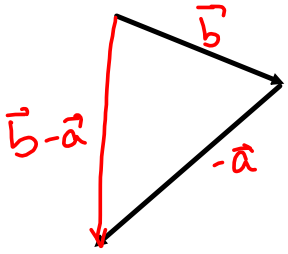
$4-3 = 4+(-3)$

$\vec{a}-\vec{b} = \vec{a}+(-\vec{b})$

What is $-\vec{b}$?
↖ opposite direction



$\vec{a}-\vec{b} \stackrel{?}{=} \vec{b}-\vec{a}$



Same size, opp dir.

$\vec{a}-\vec{b} = -(\vec{b}-\vec{a})$

$4-3 = -(3-4)$

anti-commutative property of subtraction.

Adding Vectors at Right Angles - a Little Bit of Trig

θ = theta

Pythagoras

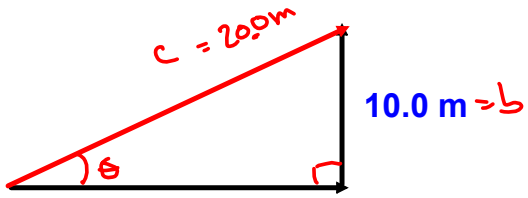
$c^2 = a^2 + b^2$

$= (17.3\,m)^2 + (10.0m)^2$

$= 300\,m^2 + 100m^2$

$= 400\,m^2$

$c = 20m$



$\tan\theta = \frac{10.0m}{17.3m}$

$\theta = \tan^{-1}\left(\frac{10.0}{17.3}\right) = 30.^\circ$

Using calculator for trig in degrees

$\sin 90^\circ = 1$

$\vec{d} = 20m$ (30° above horizontal) ← direction

Homework: Vector Addition Worksheet #1, 2, 5