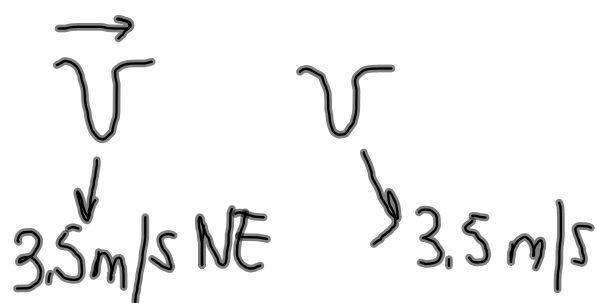# Intro to Ch. 3 - Dimensional Motion and Vectors

Vector - quantities described using magnitude and direction.
(ie: velocity, displacement , accel.)

Scalar - quantities described using magnitude ONLY (just #, no direction).
(ie: speed, distance, time, temperature)

Oct 3-10:31 AM

Heininger

v = bold v for vector

v = italics v for scalar

$\vec{v}$ v

3.5 m/s NE   3.5 m/s

$\vec{v}$ = Velocity

v = speed

Heininger

Vectors

$\vec{v}$
$\vec{x}$
$\vec{a}$

Scalar

v
x
a

Resultant - sum of 2 or more vectors

Heininger

$\vec{X}$ east   + $\vec{X}$ North

Heininger

SOH CAH TOA

i   o   a
n   s   n
    i   g
    n   e
    e   n
        t

Hyp.
(c)

Opp.
(b)

θ

Adj.
(a)

Heininger

$$\sin \theta = \frac{opp}{hyp}$$

$$\cos \theta = \frac{adj}{hyp}$$

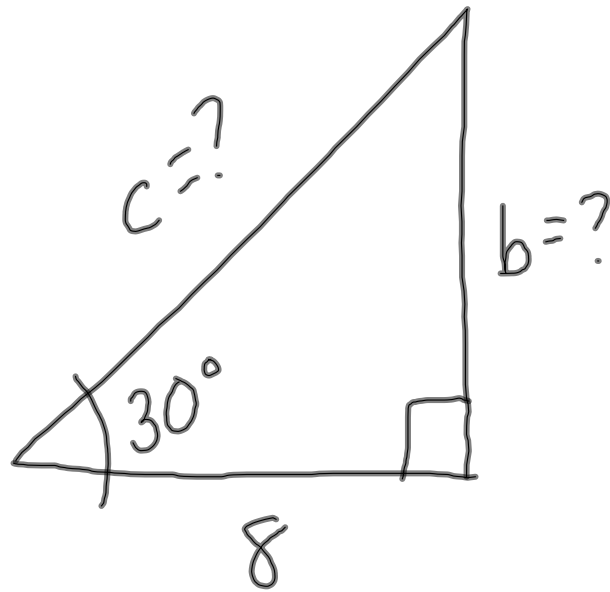$$\tan \theta = \frac{opp}{adj}$$

Oct 8-1:40 PM

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

Heininger

$\theta = ?$

$\sin\theta = \dfrac{OPP}{hyp}$

$\sin\theta = \dfrac{5}{10}$

$\theta = \sin^{-1}\left(5/10\right)$

$\theta = 30°$

Oct 8-1:42 PM

Heininger
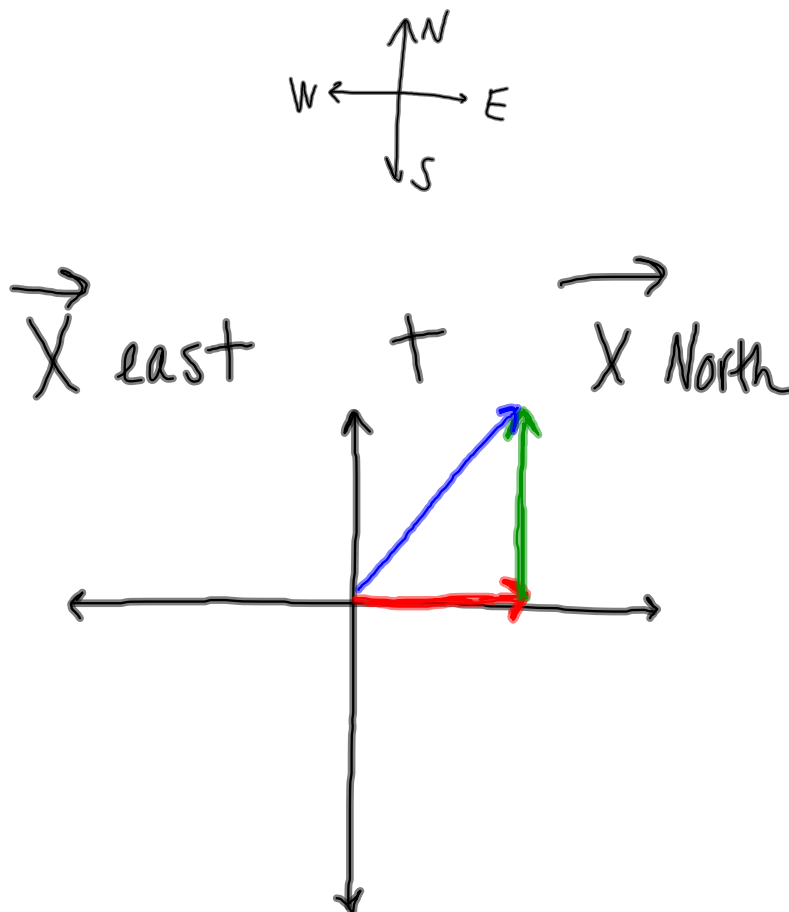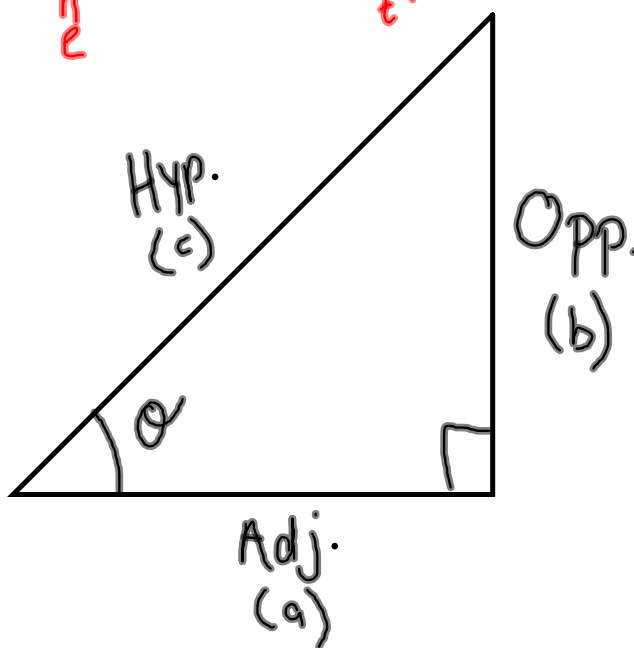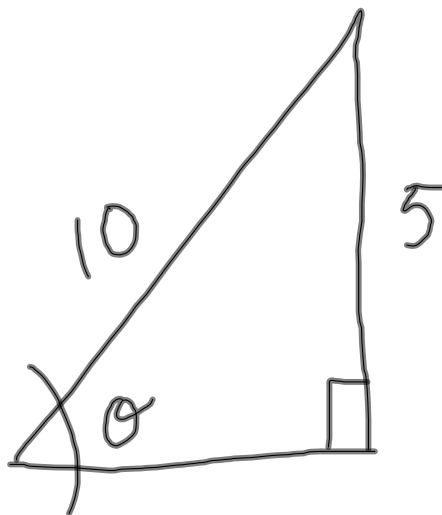
$$\cos\theta \quad \frac{adj}{hyp}$$

$$\cos\theta = \frac{8}{h}$$

$$h = \frac{8}{\cos 30}$$

$$\boxed{c = \boxed{h = 9.24}}$$

$$\tan 30 = \frac{opp}{8}$$

$$\boxed{b = 4.6}$$

Oct 8-1:46 PM

Heininger

Resolving Vectors into Components

y

* Component - horizontal & vertical parts that add up to give the projection along the axis of the coordinate system

v

v_y

α

v_x

x

Heininger

v 95 $\frac{Km}{h}$

v_y

20.

v_x

Oct 8-1:08 PM