VECTORS QUIZ 6.0

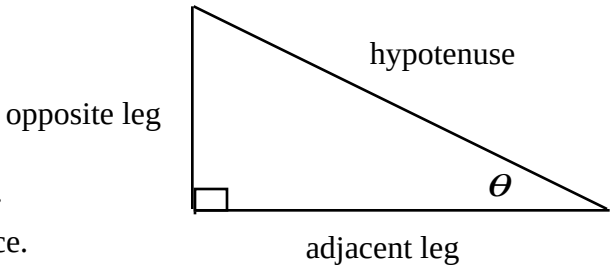
1. Three people pull on a stubborn mule with forces,

$\vec{F}_1 = (1,7), \vec{F}_2 = (-2,5), \vec{F}_3 = (-3,6).$

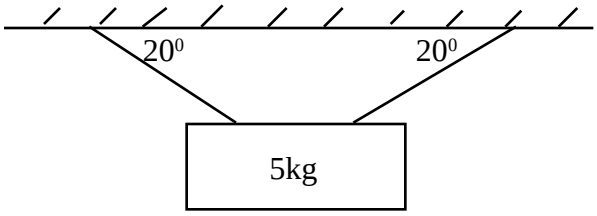
(a) Find the net force ($\vec{F}_{Net}$).

(b) Find the magnitude (F_{Net}) of the net force.

(c) Find the direction angle (θ) of the net force.



2.



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

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

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

Two ropes are holding up a heavy sign.

(a) Draw a force diagram for the sign, labeling all forces.

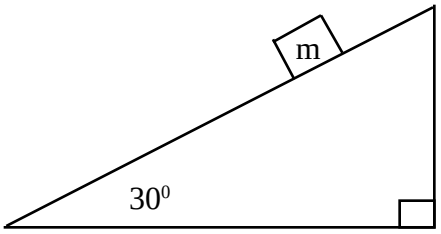
(b) Find the tension(T) in each rope.

3. Assume no friction on this inclined plane. m = 3kg.

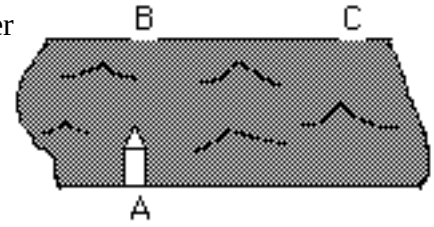
(a) Draw your own force diagram, labeling all forces.

(b) Write the force equation(s) for the block.

(c) Find the acceleration of the block.



4. A boat maintains a heading due North and has a still water speed of 10 m/s. The river runs East with a speed of 6 m/s.



(a) What is the resultant velocity of the boat in the earth's reference frame? $\vec{v}_{Net} = (?,?)\,m/s$

(b) What is the speed of the boat in the earth's reference frame? $\|\vec{v}_{Net}\|$ *or* $v_{Net} = ?$

(c) If the river is 50m wide, how long does it take to get across?

(d) How far downstream (from B to C) does the boat eventually land?

(e) What is the distance traveled by the boat? (earth reference frame)

5. A block is being pulled along a rough floor with a kinetic coefficient of friction of μ_k =.4. The tension(T) in the towrope is 12N.

(a) Draw a force diagram labeling all forces.

(b) Write the force equation(s) for the vector forces.

(c) Find the acceleration of the block. (You will need to use $\mathcal{F}_k = \mu_k \mathcal{N}$.)