

Physics

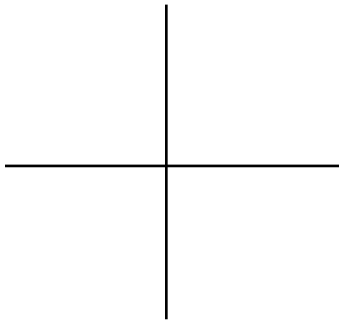
name _____ period _____

Inv-7 Expan Part VII MORE ΣF & angles

sheet# _____

Show your work on the problems box in answers No Naked Numbers !

1.) One man is pulling on a rope (call it rope A) with a force of **534.00 N** of force in a direction **35° N of E**. The other end of his rope is tied to two other ropes. One man is pulling on each of the other two ropes. Rope B is oriented **45° S of W**; rope C is oriented **18° N of W**. The man pulling on rope B is pulling with a force of **250.00 N**. The man pulling on rope C is pulling with a force of **430.00 N**. Assuming all men keep pulling on the ropes with a steady force, what will be the resultant direction and acceleration of the three men and their ropes? The combined mass of the men and ropes is **250 kg**. Sketch a FBD of the ropes in the space below and solve by using the 2nd law. My suggestion: Find the resultant then find the equilibrant of the resultant.

Required sketch:Stack & Rack Area:

A:

B:

C:

2.) A **150 kg** cruise missile is fired from a battleship at an angle to the horizontal of **60°**. The force of propulsion of the missile is **4429 N**. The rockets last for **9.0 secs** and then accidentally shut off. (uh oh a.) What is the magnitude and direction of the acceleration vector of the cruise missile when the rockets are on? (neglect air resistance)

HINT: You will need to find a_x and a_y and then determine magnitude of the vector \mathbf{a} and its orientation.

Remember:

$$\|\vec{a}\| = \sqrt{a_x^2 + a_y^2} ; \theta = \tan^{-1} \frac{|a_y|}{|a_x|}$$

b.) EXTRA CREDIT: What will be the maximum altitude of the cruise missile? (You must do this in two parts.)

3.) A **40.0 kg** wagon is towed up a hill which is inclined at **18.5°** with respect to the horizontal. The tow rope is parallel to the incline and has a tension of **170 N** in it. There is a **15 N** friction force from the road on the wagon wheels. Assume that the wagon starts from rest at the bottom of the hill. How fast is the wagon going after it moves **80.0 m** up the hill?

required F.B.D.