Trajectories – Physics
Winter – Quiz 2 Make-up

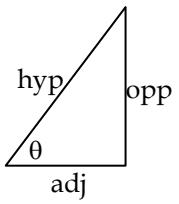
Name:_____

$\vec{p} = m\vec{v}$ $\vec{L} = I\vec{\omega}$

$\sin\theta = \text{opp}/\text{hyp}$

$\cos\theta = \text{adj}/\text{hyp}$

$\text{opp}^2 + \text{adj}^2 = \text{hyp}^2$



1) A 20.0 g ball of clay moves east at 2.0 m/s. It collides with a 30.0 g ball of clay moving at 1.0 m/s in a direction 30^o south of west. The balls stick together after the collision. What is the speed and direction of the resulting 50.0 g blob of clay?

2) An astronaut (mass 120 kg) doing a space walk is about to grab onto a spinning satellite of mass 500 kg and moment of inertia 300 kg-m^2. Before grabbing the satellite, she is not rotating at all, and the satellite is rotating with an angular speed of 5.0 rad/s. She then grabs the satellite and the two rotate together. After grabbing the satellite, she and satellite together have a moment of inertia of 400 kg-m^2.

a) Calculate the new angular speed of the satellite/astronaut.

b) She then lets go of the satellite. What is the angular speed of the satellite after she lets go?

3) You are sitting in a chair that is free to rotate without friction, similar to one used in lab and lecture.

a) Your lab partner hands you a bicycle wheel spinning clockwise as viewed from above, and makes sure you and your chair are at rest. You now put your hand on the edge of the wheel and let friction bring it to a stop. Predict YOUR motion after you bringing the wheel to a stop. (circle one)

You turn to your left You turn to your right You remain stationary not enough information to tell

b) Briefly explain your reasoning.