

Name: \_\_\_\_\_

### Pre-lab #3: Force and Newton's Second Law

1. **Predict** what the velocity, acceleration, and force vs. time graphs look like for the following situation. You hold the hook on the force probe and pull the cart away from the motion detector and then quickly stop it. After a short pause, you push the cart towards the motion detector and again quickly stop it.

- a) Make sketches of your predicted graphs.
- b) Predict whether the velocity or the acceleration will change like the force.

2. Draw a force diagram for the cart shown in Figure 3 of the lab instructions. (Note that there are three forces acting on the cart). Defining your x-axis to be down the incline, write equations for the net force in the x-direction ( $F_x^{net}$ ) and y-direction ( $F_y^{net}$ ). Using your equation for  $F_x^{net}$ , write an expression for the tension in the string in terms of the cart mass and the angle of inclination of the track.