## General Physics: FORCES WS 4

Show ALL WORK NEATLY (given information, equation(s), algebra, substitution, and unit analysis for full credit. Don’t forget significant figures. The first step for Forces problems is to draw a free body diagram. Use additional sheets as necessary in order to show all work neatly! Box the final answer. Correct in red pen during class.

## Forces Worksheet 4

1. If the block to the right is sliding down the inclined plane, label each of the forces and explain what each is.
2. If we increase the angle in the diagram shown, what will happen to the normal force? What will happen to the force of gravity? The components of the force of gravity?

3. The law of inertia states that no force is required to maintain motion. Why, then, do you have to keep pedaling your bicycle to maintain motion?
4. If forces of 15.0 N and 10.0 N act in opposite directions on a 5.00 kg object, what is the acceleration of the object? If the object was initially at rest when the forces were applied, how far has the object traveled after 5.0 seconds?
5. In what direction does the force due to drag point? How does this relate to summing forces and terminal velocity?
6. A child pulls a 30 N red wagon with a force of 15 N . What is the magnitude of the force that the wagon exerts on the child? Why?
7. Use the pulley shown to answer the following questions.
a. Draw the Free Body Diagrams(FBD) for both masses.
b. Which object will accelerate downward?
c. What should happen to the acceleration if $\mathrm{m}_{1}=18 \mathrm{~kg}$ and $\mathrm{m}_{2}=20 \mathrm{~kg}$ ?
d. What if both masses were 20 kg ? What would the acceleration be? What would the motion of the masses look like in this case? What could you say about the sum of the forces in this case?

8. A car slides down the shown incline. The coefficient of friction between the car and the surface is 0.38 . The car has a mass of 1100 kg .
a. Draw a FBD
b. Find the normal force on the car (tilted $y$-axis)
c. Find the Force of friction on the car
d. Find the acceleration of the car down the incline. (Sum the forces in the tilted $x-$ axis and set equal to ma)
