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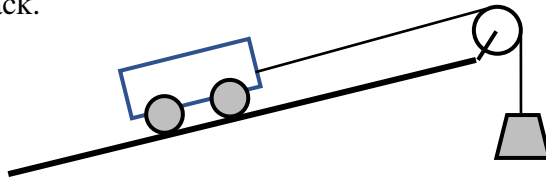
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**PHYS 1110 Group Work Sheet 5**  
**Newton's second law**

With your group, discuss how to answer these questions and write your group answer in the space provided.

1. A 1500-kg car with rubber tires, coefficient of static friction  $\mu_s = 0.80$ , travels on pavement at a speed of 30. m/s.
  - a. What is the car's weight?
  - b. What is the normal force on the car?
  - c. If the car brakes, what is the maximum force of static friction acting on the tires?
  - d. What is the maximum (backwards) acceleration of the car?
  - e. A 20,000-kg truck drives on the same road, also on rubber tires with  $\mu_s = 0.80$ . If it brakes, what is its maximum (backwards) acceleration?

2. A 5.00-kg cart on a frictionless track inclined at an angle of  $\theta = 15^\circ$  above horizontal, is attached by a massless, inextensible cord to a 2.00-kg weight hanging from a pulley at the top of the track.



- a. Draw free body diagrams for the cart and the weight.

- b. Find formulas for the net forces on the cart and the hanging weight.
- c. What is the acceleration of the cart? In what direction is the cart accelerating?
- d. What is the tension in the cord?