PHYS 201 Hwk on Friction & Drag Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Due 10/1 in BB

Show your work here and turn in your answers in BB.

1-2. A Mercedes-Benz 300SL, mass = 1700 kg, is parked on a road that rises above the horizontal 15 degrees. What are the magnitudes of **(a)** the normal force and **(b)** the static frictional force that the ground exerts on the tires?

3-5. A student presses a book between his hands, as the drawing indicates. The forces that he exerts on the front and back covers of the book are perpendicular to the book and are horizontal. The book’s mass = 2.9 kg. The coefficient of static friction between his hands and the book is 0.40. To keep the book from falling, what is the magnitude of the minimum pressing force that each hand must exert? with 3 significant figures. (Assume acceleration due to gravity = g = 9.80 m/s2, down).



6-8. A child on a sled (total mass = 35.0-kg) is pushed by another child along a horizontal surface at a constant velocity. The pushing force has a magnitude 45.0-N, which is applied at, θ = 26.00 angle as shown below. Frictional force is also present.

1. Draw a free-body diagram for the child-sled system.

1. Determine the normal force.
2. Determine the frictional force.
3. Determine the coefficient of kinetic friction between the sled and ground.

9. To maintain a constant speed, the force provided by a car’s engine must equal the drag force plus the force of friction of the road (the rolling resistance).
(a) What is the drag force at 65 MPH for a Toyota Camry? (Drag area is 0.70 m2 )
(b) What is the drag force at 65 MPH for a Hummer H2? (Drag area is 2.44 m2 )
Assume all values are accurate to three significant digits. Obtain the drag coefficient from Table 5.2, Chapter 5.

10. Calculate the terminal velocity a spherical rain drop, diameter 4 mm. Assume a drag coefficient, C=1. Density of air = 1.21 kg/m3 and Density of water = 1000 kg/m3