Worksheet - Equilibrium Applications of Newton's 2nd Law

Date	Hr

EQUILIBRIUM: a state in which there is no net force on a body (accel. = 0)

Problem Solving Method:

1. Isolate the object to be analyzed.
2. Draw a Free Body Diagram of that object.
3. Choose **convenient** x,y axes.
4. Make sure all measurements are in SI.
5. Write $\sum F = 0$ for each direction (horizontal, vertical).
6. Solve the equations to find unknown(s).

(Read pp. 110-116 in textbook;
See Conceptual Example #15 on
page 116)

1. A 20.0 kg book slides across a wooden shelf with constant velocity. The pulling force is 100 N. Find μ_k.

2. A wagon is to be pulled horizontally with constant velocity. If the handle is held at a 30° angle with the ground ($\mu_k = 0.55$) what is the force of the pull? The wagon weighs 80.0 N.

3. An 89.0 kg skier is being pulled at a constant speed. The horizontal pulling force is 350 N. Find the magnitude of the total resistive force on the skier (F_r), and the upward force of the water on the skier.

4. Find the tension in the strings that hold up the sign to the right.
The mass of the sign is 55 lbs. If the string has a 100 N tensile limit,
will it break?

45°

Eat at
Joe's
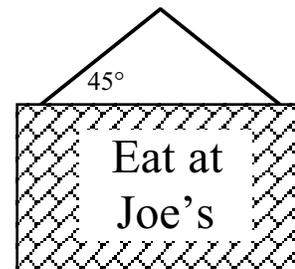
5. The two objects in the figure below are connected by a string with a massless, friction less pulley. The coefficient of friction is 0.298. What must the mass of the hanging block be so that the block on the table will move with constant speed?

4.00 kg

m=?