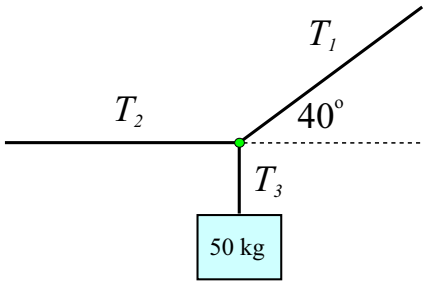
Name_____

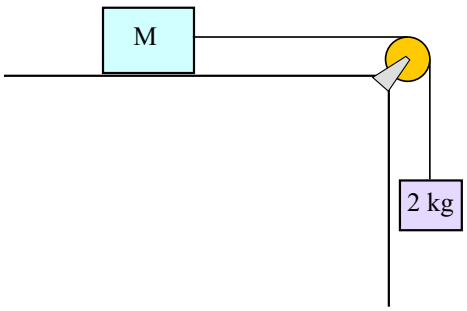
Phys 2010 (NSCC), Fall 2007
Problem Set #4

1. Europa (a moon of Jupiter) has a mass of 4.80×10^{22} kg and a radius of 1.569×10^{6} m. Find g (the acceleration of gravity) on the surface of Europa.

2. A 50.0 kg mass is suspended from a system of strings as shown at the right. String 2 is horizontal; string 1 is sloped at 40.0° from the horizontal and string 3 (connected to the mass) is vertical.



3. A mass M and a 2.0 kg mass are connected by a string which runs over an ideal pulley; the mass M slides on a frictionless horizontal surface and the 2.0 kg mass hangs freely. (This is the same arrangement that we worked out in class.)



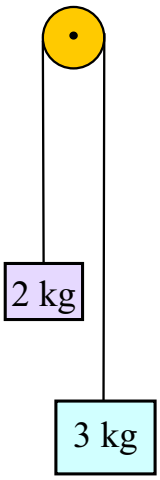
When the masses are released, the 2.0 kg mass accelerates (downward) at $3.00\,\frac{\mathrm{m}}{\mathrm{s}^2}$.

What is the tension in the string?

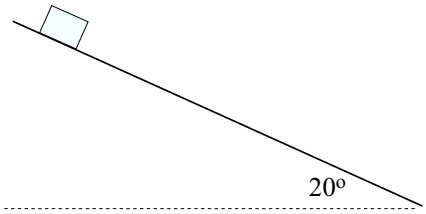
4. What is the value of the mass M?

5. An Attwood machine is made from a 3.0 kg mass and a 2.0 kg mass. When released the masses have an acceleration of 1.8 $\frac{\text{m}}{\text{s}^2}$.

Find the value of *g as determined by this experiment*.

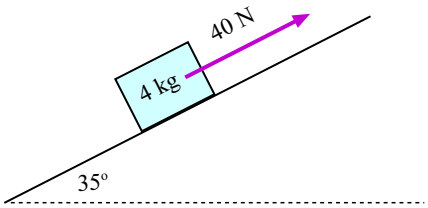


6. A mass slides down a frictionless slope of length 2.0 m inclined at 20.0°. If the mass starts from rest, how long does it take to slide down the slope?



7. A 4.0 kg mass moves on a frictionless surface inclined at 35° above the horizontal. A force of 40 N applied parallel to the incline pulls the mass up the slope.

What is the acceleration of the mass?



8. A 3.0 kg mass and a 6.00 kg mass are joined by a string and the two are pulled upward by means of a string attached to the upper (3.0 kg) mass.

The acceleration of the masses is 2.00 $\frac{\text{m}}{\text{s}^2}$ upward. Find the tensions in both strings.