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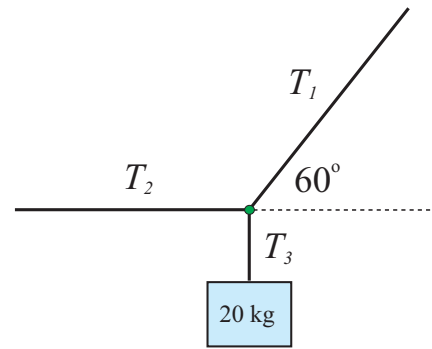
Phys 2010 (NSCC), Spring 2007
Problem Set #4

1. A small 2.0 kg mass and a 3.0 kg mass are separated by a distance of 30.0 cm. Find the force of gravitational attraction between the two masses.

2. Titan (a moon of Saturn) has a mass of 1.345×10^{23} kg and a radius of 2.575×10^6 m. Find g (the acceleration of gravity) on the surface of Titan.

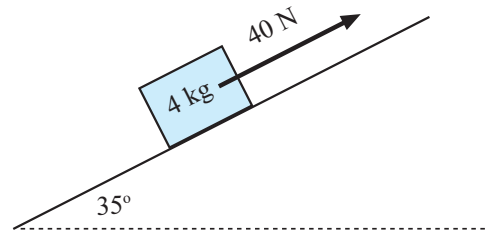
3. A 20.0 kg mass is suspended from a system of strings as shown at the right. String 2 is horizontal; string 1 is sloped at 60.0° from the horizontal and string 3 (connected to the mass) is vertical.

Find the tensions in all the strings.



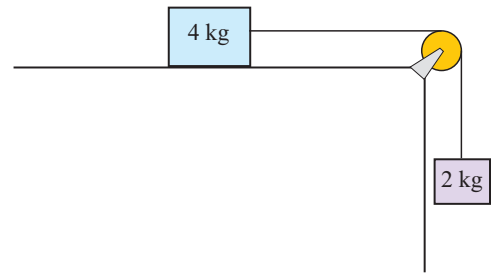
4. A 4.0 kg mass moves on a frictionless surface inclined at 35° above the horizontal. A force of 40 N applied parallel to the incline pulls the mass up the slope.

What is the acceleration of the mass?



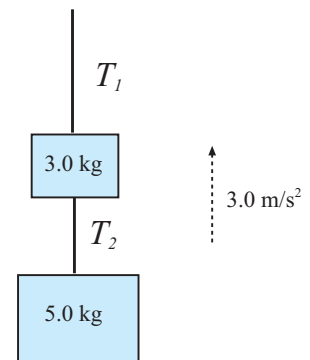
5. A 4.0 kg mass and a 2.0 kg mass are connected by a string which runs over an ideal pulley; the 4.0 kg mass slides on a frictionless horizontal surface and the 2.0 kg mass hangs freely. (This is the same arrangement that we worked out in class.)

Find the acceleration of the masses and the tension in the string.



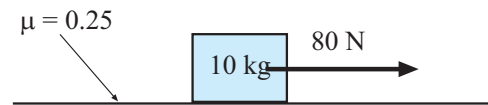
6. A 3.0 kg mass and a 3.00 kg mass are joined by a string and the two are pulled upward by means of a string attached to the upper (3.0 kg) mass.

The acceleration of the masses is $3.00 \frac{\text{m}}{\text{s}^2}$ upward. Find the tensions in both strings.



7. A 10.0 kg mass slides on a horizontal *rough* surface which has a coefficient of kinetic friction of 0.25. A force of 80.0 N (directed horizontally) is applied to the mass.

What is the acceleration of the mass?



8. A 2.0-kg mass slides down a *rough* inclined plane which is sloped at 40° above the horizontal. A student measures its acceleration down the slope and finds it to be $4.95 \frac{\text{m}}{\text{s}^2}$.

What is the coefficient of kinetic friction for the block and this surface?

