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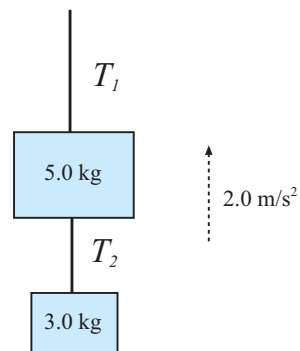
Phys 2010 (NSCC), Fall 2005
Problem Set #5

1. 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 on the surface of Titan.

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

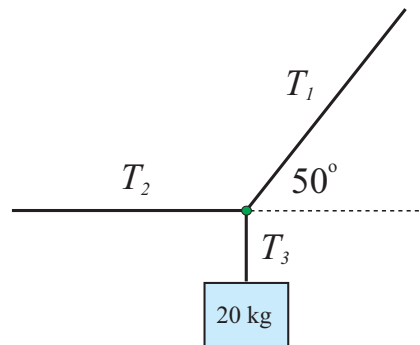
3. A 5.0 kg mass and a 3.00 kg mass are joined by a string and the two are pulled upward by means of a string attached to the upper (5.0 kg) mass.

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



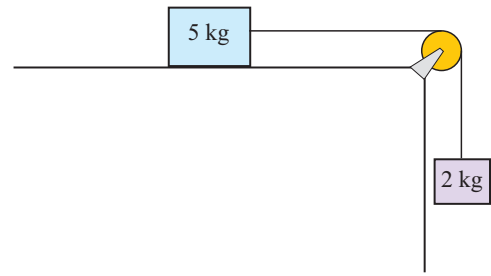
4. A 20.0 kg mass is suspended from a system of ropes as shown at the right. String 1 is horizontal; string 2 is sloped at 50.0° from the horizontal and string 3 (connected to the mass) is vertical.

Find the tensions in all the strings.



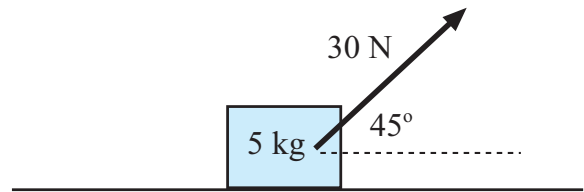
5. A 5.0 kg mass and a 2.0 kg mass are connected by a string which runs over an ideal pulley; the 5.0 kg mass slides on a frictionless horizontal surface and the 2.0 kg mass hangs freely. (This is the same arrangement that we worked out in class.)

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



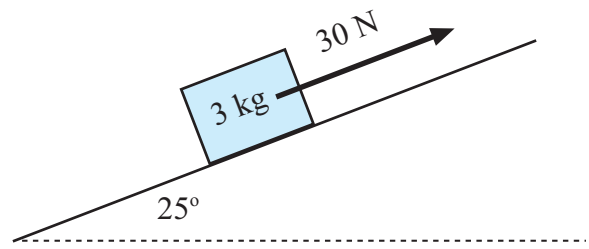
6. A 5.0 kg mass slides on a *rough* surface. It is pulled along by an applied force of 30 N directed at 45° above the horizontal. There is also a constant force of friction with magnitude 3.0 N which opposes the motion of the mass.

Find the acceleration of the mass.



7. A 3.0 kg mass moves on a frictionless surface inclined at 25° above the horizontal. A force of 30 N applied parallel to the incline pulls the mass up the slope.

What is the acceleration of the mass?



8. A 20.0 kg mass slides on a horizontal *rough* surface which has a coefficient of kinetic friction of 0.15. A force of 100.0 N (directed horizontally) is applied to the mass.

What is the acceleration of the mass?

