Due date: Wed May 30 08:00:00 pm 2018 (EDT)

A long uniform board weighs 54.9 N (11.0 lbs) rests on a support at its mid point. Two children weighing 347.0 N (69.4 lbs) and 356.0 N (71.2 lbs) stand on the board so that the board is balanced. What is the upward force exerted on the board by the support?

Tries 0/20

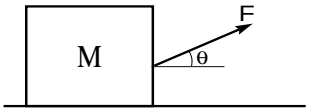
Two forces $\mathbf{F_1}$ = -9.10**i** + 4.40**j** and $\mathbf{F_2}$ = 8.50**i** + 4.00**j** are acting on an object with a mass of m = 2.30 kg. The forces are measured in newtons, **i** and **j** are the unit vectors. What is the magnitude of the object's acceleration?

Tries 0/20

A 35.9 kg boy and a 56.6 kg girl are on the surface of a frozen lake, 15.0 m apart. Using a rope, the boy exerts a horizontal 5.40 N force on the girl, pulling her toward him. Calculate the magnitude of the boy's acceleration.

Tries 0/20

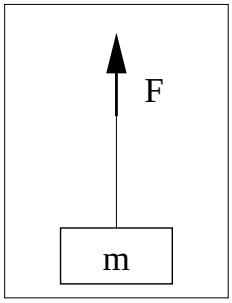
A 4.82 kg block located on a horizontal frictionless floor is pulled by a cord that exerts a force F=11.7 N at an angle θ= 34.0° above the horizontal, as shown.



What is the speed of the block 3.10 seconds after it starts moving?

Tries 0/20

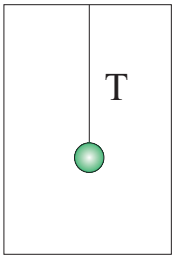
An m = 7.75 kg mass is suspended on a string which is pulled upward by a force of F = 80.2 N as shown in the figure.



If the upward velocity of the mass is 4.25 m/s right now, then what is the velocity 4.50 s later?

Tries 0/20

A ball of mass M is suspended by a thin string (of negligible mass) from the ceiling of an elevator.



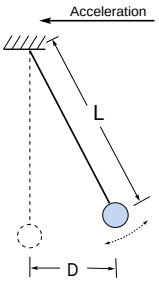
The vertical motion of the elevator as it travels up and down is described in the statements below. Indicate for each of the situations described the relation between value of the tension in the cable, T, and the weight of the ball, Mg, or whether one Cannot tell. (Assume that there is no air, i.e., neglect the buoyancy effect of the air.)

Choices: **T > Mg**, **T < Mg**, **T = Mg**, **Cannot tell**.

- The elevator is traveling downward and its downward velocity is decreasing as it nears a stop at a lower floor.
- The elevator is traveling upward and its upward velocity is increasing as it begins its journey towards a higher floor.
- The elevator is traveling upward and its upward velocity is decreasing as it nears a stop at a higher floor.
- The elevator is stationary and remains at rest.
- The elevator is traveling downward and its downnward velocity is increasing
- The elevator is traveling downward at a constant velocity

Tries 0/20

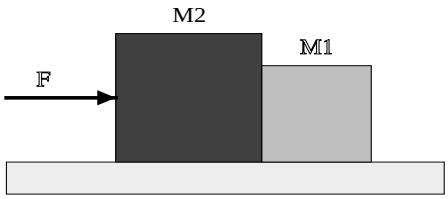
A pendulum has a length L = 1.27 m. It hangs straight down in a jet plane about to take off as shown by the dotted line in the figure.



As the jet accelerates uniformly during take-off, the pendulum deflects horizontally by D = 0.310 m to a new equilibrum postion. Calculate the magnitude of the plane's acceleration.

Tries 0/20

Two blocks are in contact on a frictionless table. A horizontal force **F** is applied to M_2, as shown. If M_1 = 1.69 kg, M_2 = 3.68 kg, and **F** = 5.30 N, find the size of the contact force between the two blocks.

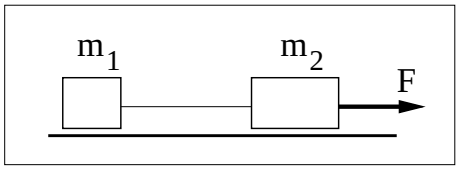


Tries 0/20

If instead an equal but oppositely directed force is applied to M_1 rather than M_2, find the size of the contact force between the two blocks.

Tries 0/20

Two masses, m_1 = 1.26 kg and m_2 = 6.49 kg are on a horizontal frictionless surface and they are connected together with a rope as shown in the figure.



The rope will snap if the tension in it exceeds 75.0 N. What is the maximum value of the force **F** which can be applied?

Tries 0/20

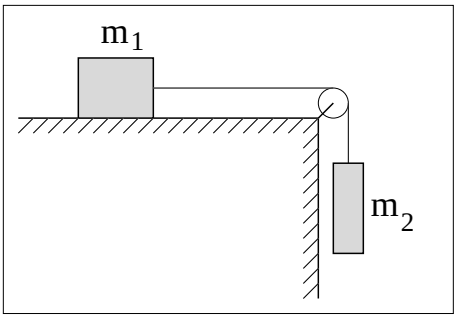
What is the acceleration of the whole system, when this maximum force is applied?

Tries 0/20

The coefficent of static friction between the floor of a truck and a box resting on it is 0.40. The truck is traveling at 69.8 km/hr. What is the least distance in which the truck can stop and ensure that the box does not slide?

Tries 0/20

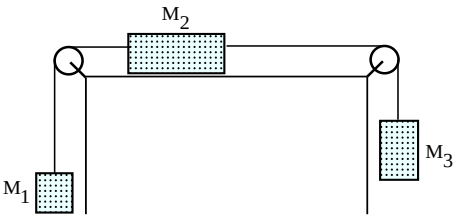
Mass m_1 is on a horizontal, frictionless surface. Mass m_2 = 6.83 kg hangs on a rope which is attached to the first mass. (See figure.)



The whole system is observed to be accelerating with an acceleration of a = 2.70 m/s^2. Determine the mass m_1. Consider the pulley to be massless and frictionless.

Tries 0/20

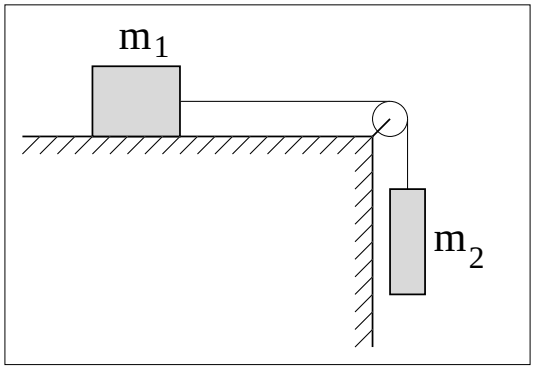
The three blocks shown are relased at t=0 from the position shown in the figure. Assume that there is no friction between the table and M_2, and that the two pulleys are massless and frictionless. The masses are: M_1 = 1.0 kg, M_2 = 9.0 kg, M_3 = 3.0 kg.



Calculate the speed of M_2 at a time 1.75 s after the system is released from rest.

Tries 0/20

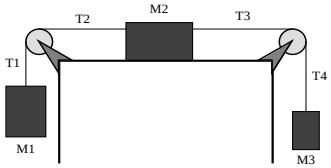
Mass $m_1 = 11.1$ kg is on a horizontal table. Mass $m_2 = 5.87$ kg hangs on a rope which is attached to the first mass using a pulley. (See figure.)



The pulley is massless and frictionless. The system is observed to move with constant speed. Determine μ_k, the coefficient of kinetic friction between mass m_1 and the surface of the table.

Tries 0/20

In the figure, M_2 has more mass than M_1 and M_1 has more mass than M_3. The questions refer to the magnitudes of tensions and weights.



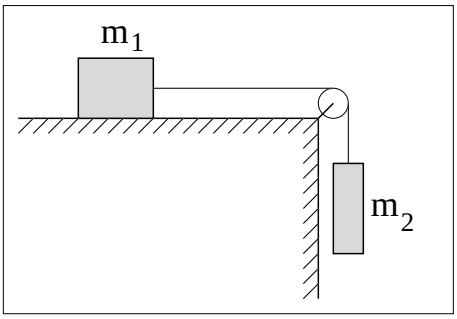
There is friction between the horizontal plane and M_2 ($\mu_k \neq 0$). M_2 is observed to travel at a constant speed. Assume that the pulleys are frictionless and have negligible mass. Select the appropriate statements to complete the following sentences.

Choices: **True**, **False**, **Greater than**, **Less than**, **Equal to**.

- $M_1 g$ is ... T_1.
- The magnitude of the net force on M_2 is T_2 - T_3.
- M_3 accelerates upwards.
- T_2 is ... T_3.
- T_4 is ... $M_3 g$
- T_2 is ... T_1.

Tries 0/20

Mass $m_1 = 14.3$ kg is on a horizontal surface. Mass $m_2 = 6.33$ kg hangs freely on a rope which is attached to the first mass. The coefficient of static friction between m_1 and the horizontal surface is $\mu_s = 0.604$, while the coefficient of kinetic friction is $\mu_k = 0.111$.



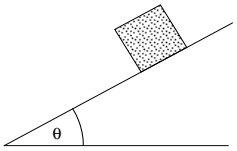
If the system is set in motion with m_1 moving to the right, then what will be the magnitude of the system's acceleration? Consider the pulley to be massless and frictionless.

Tries 0/20

If the system is set in motion with m_1 moving to the left, then what will be the magnitude of the system's acceleration?

Tries 0/20

The initial velocity of a 2.35 kg block sliding down a frictionless inclined plane is found to be 1.21 m/s. Then 1.69 s later, it has a velocity of 5.89 m/s.



What is the angle of the plane with respect to the horizontal?

Tries 0/20

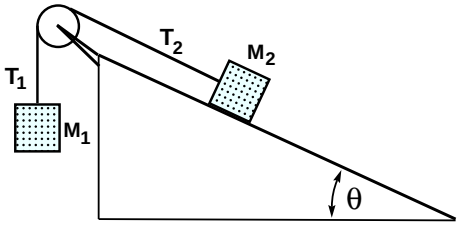
A block is at rest on a plank whose angle can be varied. The angle is gradually increased from 0 deg. At 33.3°, the block starts to slide down the incline, traveling 3.00 m down the incline in 1.80 s. Calculate the coefficient of static friction between the block and the plank.
Motion of a block

Tries 0/20

Calculate the kinetic coefficent of friction between the block and the plank.

Tries 0/20

M_1 and M_2 have equal masses and are connected as shown. T_1 and T_2 are the tensions in the rope. The pulley is frictionless and massless. The incline is frictionless and is at an angle of $\theta = 30.0°$ from the horizontal. The quantities T_1, T_2 and g are magnitudes.



Choices: **greater than**, **less than**, **equal to**.

- $M_2 g \sin(\theta)$ is .... T_2
- T_1 is .... T_2
- The magnitude of the acceleration of M_1 is .... that of M_2
- T_2 is .... $M_1 g$
- T_1 is .... $M_1 g$

Tries 0/20
