This print-out should have 13 questions, check that it is complete. Multiple-choice questions may continue on the next column or page: find all choices before making your selection. The due time is Central time.

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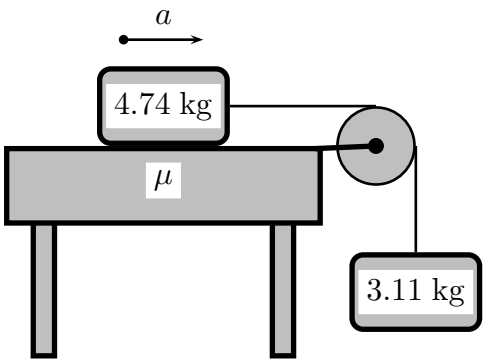
001 (part 1 of 1) 10 points

Given: $g = 9.8$ m/s^2.

Assume: The system starts from rest. When the 3.11 kg mass has fallen through 0.357 m, its downward speed is 1.3 m/s.

Two blocks are arranged at the ends of a massless string as shown in the figure.



What is the frictional force between the 4.74 kg mass and the table? Answer in units of N.

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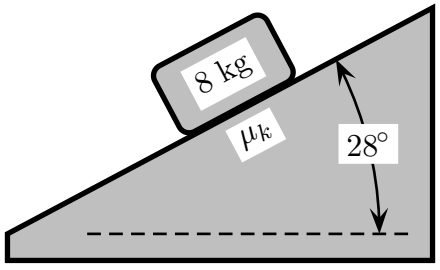
002 (part 1 of 1) 10 points

Given: $g = 9.8$ m/s^2.

A block is released from rest on an inclined plane and moves 18 m during the next 4.7 s.



What is the coefficient of kinetic friction μ_k for the incline?

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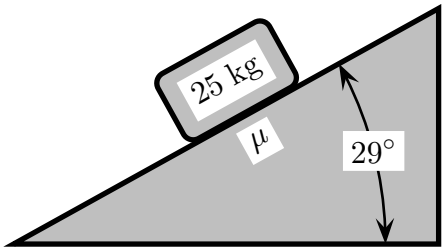
003 (part 1 of 3) 10 points

Given: $g = 9.8$ m/s^2 .

A block is at rest on the incline shown in the figure. The coefficients of static and kinetic friction are $\mu_s = 0.65$ and $\mu_k = 0.55$, respectively.



What is the frictional force acting on the 25 kg mass? Answer in units of N.

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004 (part 2 of 3) 10 points

What is the largest angle which the incline can have so that the mass does not slide down the incline? Answer in units of °.

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005 (part 3 of 3) 10 points

What is the acceleration of the block down the incline if the angle of the incline is 38° ? Answer in units of m/s^2.

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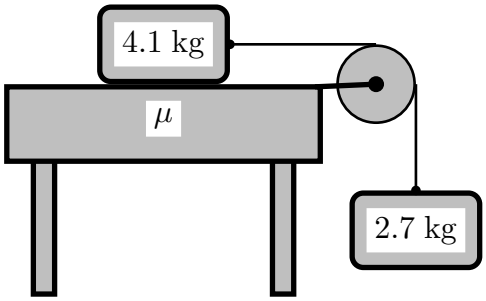
006 (part 1 of 2) 10 points

Given: $g = 9.8$ m/s^2 .

Two blocks are arranged at the ends of a massless cord over a frictionless massless pulley as shown in the figure. Assume the system starts from rest. When the masses have moved a distance of 0.414 m, their speed is 1.3 m/s.



What is the coefficient of friction between m_2 and the table?

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007 (part 2 of 2) 10 points

What is the magnitude of the tension in the cord? Answer in units of N.

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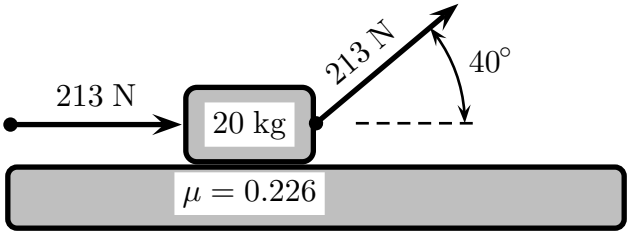
008 (part 1 of 1) 10 points

Assume: $g = 9.8$ m/s^2 .

The magnitude of each force is 213 N, the

force on the right is applied at an angle 40° and the mass of the block is 20 kg. The coefficient of friction is 0.226.



What is the magnitude of the resulting acceleration? Answer in units of $\mathrm{m/s^2}$.

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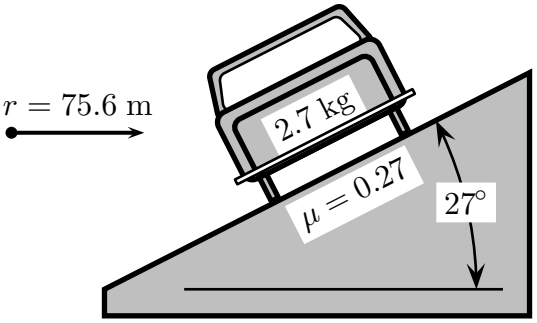
009 (part 1 of 1) 10 points

Given: $g = 9.8\ \mathrm{m/s^2}$.

A circular curve is banked so that a car traveling with uniform speed rounding the curve usually relys on friction to keep it from slipping to its left or right.



What is the maximum velocity the car can maintain in order that the car does not move up the plane? Answer in units of km/hr.

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010 (part 1 of 2) 10 points

Given: $g = 9.8\ \mathrm{m/s^2}$.

A car of mass 513 kg travels around a flat, circular race track of radius 137 m. The coefficient of static friction between the wheels and the track is 0.252.

What is the maximum speed v that the car can go without flying off the track? Answer in units of m/s.

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011 (part 2 of 2) 10 points

The same car now travels on a straight track and goes over a hill with radius 131 m at the top.

What is the maximum speed that the car can go over the hill without leaving the road? Answer in units of m/s.

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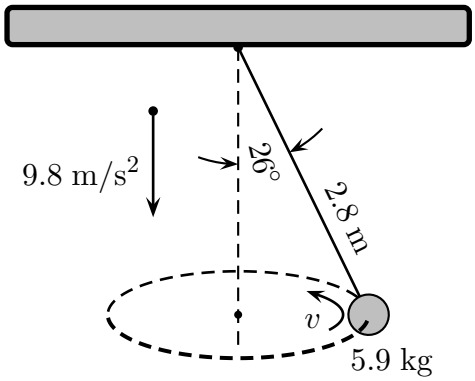
012 (part 1 of 2) 10 points

Given: $g = 9.8\ \mathrm{m/s^2}$.

A small metal ball is suspended from the ceiling by a thread of negligible mass. The ball is then set in motion in a horizontal circle so that the thread describes a cone.



What is the speed of the ball when it is in circular motion? Answer in units of m/s.

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013 (part 2 of 2) 10 points

How long does it take T_{period} for the ball to rotate once around the axis? Answer in units of s.