

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.

001 (part 1 of 1) 10 points

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

A person weighing 0.5 kN rides in an elevator that has a downward acceleration of 1.9 m/s^2 . The acceleration of gravity 9.8 m/s^2 .

What is the magnitude of the force of the elevator floor on the person? Answer in units of kN.

002 (part 1 of 2) 10 points

A 2.7 kg mass undergoes an acceleration given by $\mathbf{a} = (a_x \hat{i} + a_y \hat{j}) \text{ m/s}^2$, where $a_x = 3.3 \text{ m/s}^2$ and $a_y = 4.7 \text{ m/s}^2$.

Find the magnitude of the resultant force. Answer in units of N.

003 (part 2 of 2) 10 points

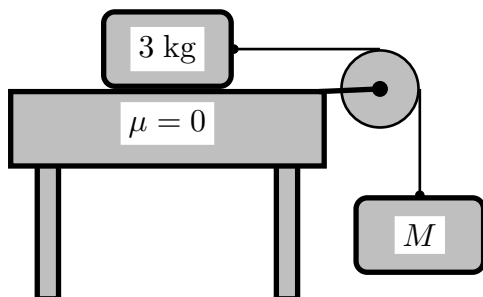
Find the direction of the resultant force.

Express your answer as the counterclockwise angle from the positive x -axis to the resultant force. Answer in units of $^\circ$.

004 (part 1 of 1) 10 points

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

The system shown below is released from rest and moves 22.3 cm in 1.67512 s.



What is the value of the mass M ? Assume all surfaces are frictionless. Answer in units of kg.

005 (part 1 of 1) 10 points

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

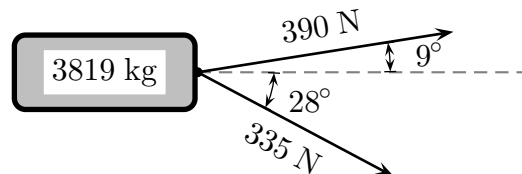
When you drop a 0.42 kg apple, Earth ex-

erts a force on it that accelerates it at 9.8 m/s^2 toward the earth's surface. According to Newton's third law, the apple must exert an equal but opposite force on Earth.

If the mass of the earth $5.98 \times 10^{24} \text{ kg}$, what is the magnitude of the earth's acceleration toward the apple? Answer in units of m/s^2 .

006 (part 1 of 3) 10 points

Two forces, 390 N at 9° and 335 N at 28° are applied to a car in an effort to accelerate it.



What is the resultant of these two forces? Answer in units of N.

007 (part 2 of 3) 10 points

Find the direction of the resultant force (in relation to forward, with counterclockwise considered positive). Answer in units of $^\circ$.

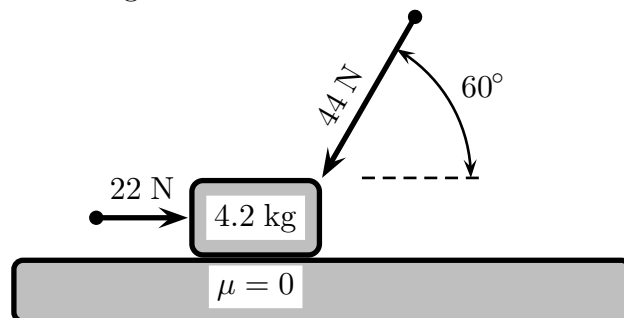
008 (part 3 of 3) 10 points

If the car has a mass of 3819 kg, what acceleration does it have? Ignore friction. Answer in units of m/s^2 .

009 (part 1 of 1) 10 points

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

The horizontal surface on which the block of mass 4.2 kg slides is frictionless. The force of 22 N acts on the block in a horizontal direction. The force of 44 N acts on the block at an angle as shown below.

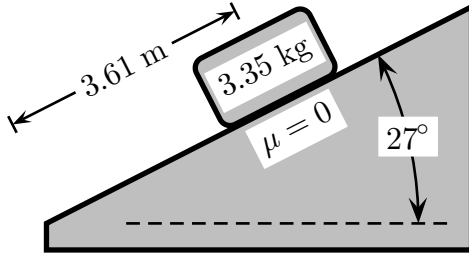


What is the magnitude of the resulting acceleration of the block? Answer in units of m/s^2 .

010 (part 1 of 3) 10 points

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

A 3.35 kg block slides down a smooth, frictionless plane having an inclination of 27° .



Find the acceleration of the block. Answer in units of m/s^2 .

011 (part 2 of 3) 10 points

What is the block's speed when, starting from rest, it has traveled a distance of 3.61 m along the incline. Answer in units of m/s .

012 (part 3 of 3) 10 points

What is the magnitude of the perpendicular force that the block exerts on the surface of the plane at a distance of 3.61 m down the incline? Answer in units of N .

013 (part 1 of 1) 10 points

At a instant when a 3.7 kg object has an acceleration equal to $\vec{a} = (a_x \hat{i} + a_y \hat{j})$, where $a_x = 6.6 \text{ m/s}^2$, $a_y = 1.9 \text{ m/s}^2$, one of the two forces acting on the object is known to be $\vec{f}_1 = (f_{1x} \hat{i} + f_{1y} \hat{j})$, where $f_{1x} = 13 \text{ N}$, $f_{1y} = 36 \text{ N}$.

Determine the magnitude f_2 of the other force acting on the object. Answer in units of N .