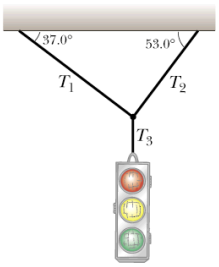
Physics I, Review

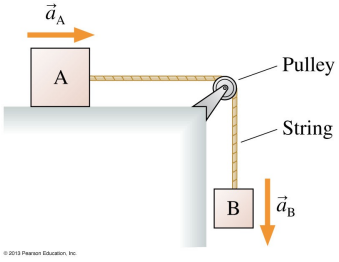
Free-Body Diagrams (Forces)
Sketch the free-body diagrams for the following objects:

the ball

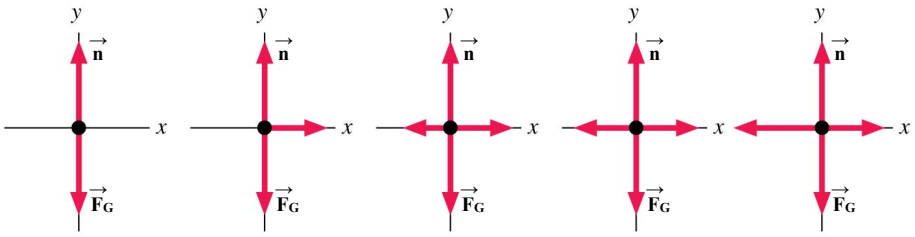
the traffic light; knot



the boxes



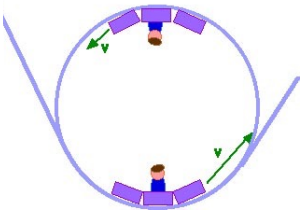
Newton's Laws
A box is pulled to the right across a wooden floor. There's friction between the box and the floor.
Which is the correct FBD if the box is slowing?
Which is the correct FBD if the box is speeding?



A. B. C. D. E.

Apparent Weight; Circular Motion
Consider a roller coaster at the bottom of a loop. The weight of a person as read on a scale is:
(Recall, a scale read the force it exerts on the object.)

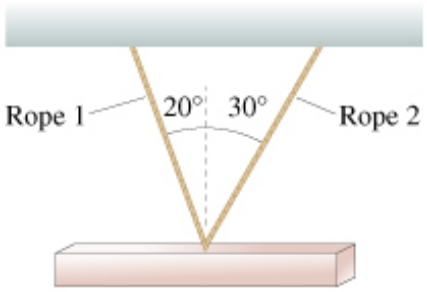
a. the normal weight.
b. greater than the normal weight.
c. less than the normal weight.
d. zero.



Physics I, Review

Translational Equilibrium

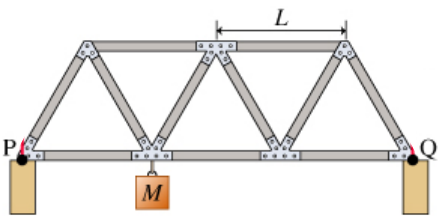
A 1400 kg steel beam is supported by two ropes, as shown in the figure. Calculate the tensions in the ropes.



Physics I, Review

Static Equilibrium

A bridge weighing 2000 N supports a 1000 kg mass *M*. The bridge is constructed of 11 beams of length L = 5.0 m, and is supported at the ends by piers at joints P and Q.

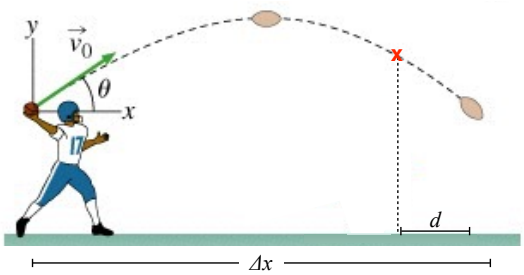


What is the magnitude of the force the piers exert on the bridge.

Mechanics: Consider the beams to have negligible mass and to exert forces along their length. Find the forces acting on joint P.

Physics I, Review

Projectiles (Kinematics)
Find v_{0x}, v_{0y}, time of flight, horizontal range.



Horizontal component

$$v_{fx} = v_{0x} = \text{const}$$

$$x_f = x_i + v_{0x}\Delta t$$

Vertical component

$$v_{fy} = v_{0y} + a_y\Delta t$$

$$y_f = y_i + v_{0y}\Delta t + \frac{1}{2}a_y(\Delta t)^2$$