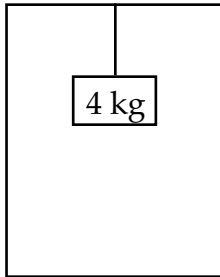


Newton's Laws (especially weight and mass) - Quiz 4.0

1. A 5 kg box is pushed by a 7 N force along a table top at a constant velocity.
(a) Draw a diagram labeling all the forces acting on the box.
(b) What is the weight of the box.

2. A 3 N rock is pushed upward by an 8 N force of a hand.
(a) What is the mass of the rock?
(b) What is the acceleration of the rock?

3.



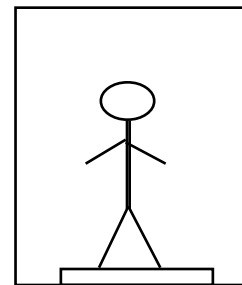
- A 4 kg block is attached to the ceiling of an elevator by a string.
(a) What is the tension in the string if the elevator is rising at a constant speed of 6 m/s?
(b) What is the tension in the string if the elevator is going up but has a downward acceleration or deceleration of 3 m/s²?
(c) What is the tension in the string if the elevator accelerates upward at 2 m/s²?

4. A 9800 N car decelerates at 9 m/s² due to a constant friction force.
(a) What is the magnitude of the friction force?
(b) What is the weight of the car?

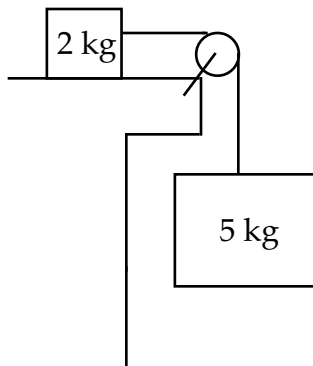
5. If a 20 kg mass and a 10 kg mass start from rest in deep space, the more massive object will exert a gravitational force on the less massive object.
Describe what will happen to the two masses.

6. Suppose you are standing on a scale in an elevator, and you know your weight to be 160 lbs.

- (a) If the elevator is at rest what is the upward normal force of the scale on your feet?
(b) If the cable is cut and you find yourself in free fall down the elevator shaft, are you "weightless"? Explain yes and no.
(c) What is your mass in slugs?



7.



Assume no friction.

- (a) What is the force of gravity (F_g) acting on the 5 kg object?
(b) If the 5 kg block accelerates downward at a rate of 7 m/s², what is the tension in the string.