

Chapter 6 Worksheet

1. A tow rope is used to pull a 1750 kg car, giving it an acceleration of 1.35 m/s^2 . What force does the rope exert?
2. A racing car undergoes a uniform acceleration of 4.00 m/s^2 . If the net force causing the acceleration is $3.00 \times 10^3 \text{ N}$, what is the mass of the car?
3. A 5.2 kg bowling ball is accelerated from rest to a velocity of 12 m/s as the bowler covers 5.0 m of approach before releasing the ball. What force is exerted on the ball during this time?
4. A high jumper, falling at 4.0 m/s, lands on a foam pit and comes to rest, compressing the pit 0.40 m. If the pit is able to exert an average force of 1200N on the high jumper in breaking the fall, what is the jumper's mass?
5. On Planet X, a 50 kg barbell can be lifted by exerting a force of only 180N.
 - a. What is the acceleration of gravity on Planet X?
 - b. If the same barbell is lifted on Earth what minimal force is needed?
6. A proton has a mass of $1.672 \times 10^{-27} \text{ kg}$. What is its weight?
7. A force of 20N accelerates a 9.0 kg wagon at 2.0 m/s^2 along the sidewalk.
 - a. How large is the frictional force?
 - b. What is the coefficient of friction?
8. A 2.0 kg brick has a sliding coefficient of friction of 0.38. What force must be applied to the brick for it to move at a constant velocity?
9. In bench pressing 100 kg, a weight lifter applies a force of 1040N. How large is the upward acceleration of the weights during the lift?
10. An elevator that weighs $3.0 \times 10^3 \text{ N}$ is accelerated upward at 1.0 m/s^2 . What force does the cable exert to give it this acceleration?
11. A person weighing 490 N stands on a scale in an elevator.
 - a. What does the scale read when the elevator is at rest?
 - b. What is the reading on the scale when the elevator rises at a constant velocity?
 - c. The elevator slows down at -2.2 m/s^2 as it reaches the desired floor. What does the scale read?
 - d. The elevator descends, accelerating at -2.7 m/s^2 . What does the scale read?
 - e. What does the scale read when the elevator descends at a constant velocity?
 - f. Suppose the cable snapped and the elevator fell freely. What would the scale read?
12. Skip this problem
13. Skip this problem
14. Skip this problem
15. A 10.0 kg mass, m_1 , on a frictionless table is accelerated by a 5.0 kg mass, m_2 , hanging over the edge of the table. What is the acceleration of the mass along the table?