1. A 0.05 kg arrow accelerates at 7,000 m/s/s out of the bow. With what force (in pounds) is the bow string exerting on the arrow (1 lb. = 4.45 N)?
2. What acceleration will be produced by a force of 1000 N on a running back with a mass of 100 kg?
3. What happens to the force required to accelerate a mass at a given rate if the mass were to suddenly double but the acceleration stayed the same?
4. What force is required to bring a 1000 kg car to rest from a speed of 90 km/hr in 45 meters?
5. How can there be forces acting on a mass, yet the mass has no acceleration?
6. How much thrust (force) must a 30,000 kg jet plane develop to accelerate at a rate of 1.5 m/s/s?
7. What acceleration will be produced by a force of 500 N on an arrow with a mass of 35 grams?
8. A 0.2 kg softball traveling 20 m/s strikes the catcher's mitt, which, in bringing the ball to rest, recoils backward 5 cm. What was the force applied on the ball by the glove?
9. A car is driving along at constant speed (let's say 50 mph). Does the car's wheels exert a force on the road? In what direction is this force? With what force does the road push the car forward? Compare the force of the air resistance on the car to that of the force exerted on the car by the road. There are forces acting on the car, but the car is not accelerating. Why not?
10. A 5 kg mass is constantly accelerated at 8 m/s/s. How much force was applied to the object?
11. A force of 42 N accelerates an object at 56 m/s/s. What is the object's mass?
12. A car of mass 1000 kg is towed by a truck exerting a force of 8500 N. What acceleration does the car undergo?
13. A person pushes a cart across the floor at constant velocity while exerting a 200 N force. What is the force of friction between the cart and the floor? In which direction is it acting? Explain your answer.
14. A constant force applied to a 15 kg mass moves it 18 m in 32 seconds starting from rest. What size force was applied?
15. A dry ice puck of mass 1.0 kg is sliding a 1.5 m/s over a smooth surface. A force of 3 N acts on the puck in the direction of its motion for 2.0 seconds. What is the final velocity of the puck?
16. A block of mass 8 kg, starting from rest, is pulled along a horizontal tabletop by a constant force of 2N. It is found that this body moves a distance of 3.0 m in 6 seconds.
   a. What is the acceleration of the body (assuming that the 2 N force is not the only force acting)?
   b. What is the ratio of the applied force to the mass?
   c. Since your answer to part (b) is not equal to that in part (a), what conclusions can you draw about this motion? Please give numerical results.
17. A rifle bullet, which travels at 360 m/s, strikes a block of wood that is fastened down so as not to move. The bullet penetrates to a depth of 0.1 m. The mass of the bullet is 1.8 grams. Assume a constant retarding force by the wood.
   a. How long a time was required for the bullet to stop?
   b. What was the decelerating force, in Newtons?
18. A common malady in runners who run on too hard a surface is shin splints. If a runner's 7.0 kg leg hits the pavement so that it comes to rest with an acceleration of -200 m/s/s on each hit, how much force must the runner's leg withstand on each step?
19. Aunt Barbara sets a full 2.0 kg milk carton on the kitchen table for breakfast. After the family has eaten, she pours herself a cup of coffee, sits down, and picks up the milk carton, only to find that the 20 N force she exerts accelerates the carton upward at a surprising 50 m/s/s. Calculate and describe why the milk carton accelerated up faster than Aunt Barbara expected.
20. Claudia stubs her toe on the coffee table with a force of 100 N.
   a. What is the acceleration of Claudia's 1.8 kg foot?
   b. What is the acceleration of the table if it has a mass of 20 kg? (Ignore any frictional effects).
   c. Why would Claudia's toe hurt less if the table has less mass?