DAY 1

1. A car that weighs 3200 lbs is traveling at a constant 68 mph down a piece of straight, flat interstate highway. Use Newton's 1st Law to calculate the net force on the car. Use Newton's 2nd Law to calculate the car's acceleration.
2. In the above problem, the force of air drag on the car is 300 lbs. What is the forward force produced by the action of the car's engine and drive train?
3. For the same car, calculate the net force on the car if the car is standing still. Determine the size of the tire-to-ground contact forces in this case.
4. A fairly massive car (think big Buick) can accelerate from 0 - 60 mph in 10 seconds. Make an educated guess as to what the acceleration would be for a car 1/2 as massive with the same engine. How about for a car 2/3 as massive with the same engine?

In the figures shown, sketch in all forces acting in the system and state whether they are contact or field forces. The one below is done for you as an example.
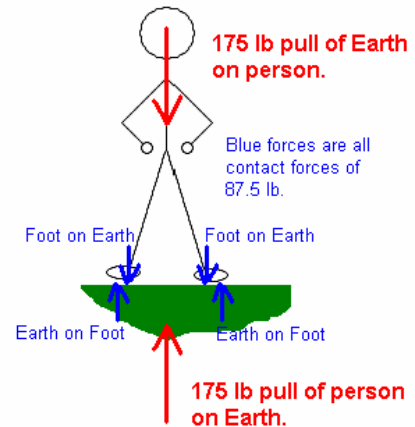
The person weighs 175 lbs.
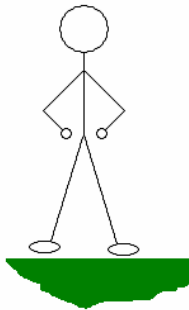
Solution:

5. The chair weighs 15 lbs.
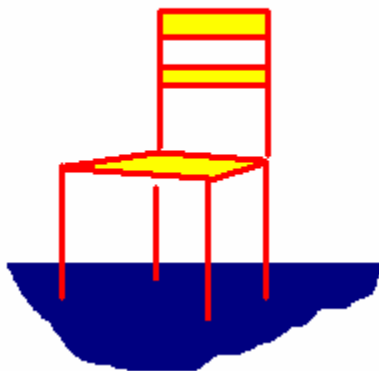
6. Person at right -- 175 lbs.
   Chair at right -- 15 lbs.

7. An air freshener hangs from
   the rearview mirror of a car.
   Sketch the air freshener (a)
   when the car is at rest (b)
   when the gas pedal is floored
   (c) when the car is moving at
   a steady 35 mph in a straight
   line (d) when the car is given
   a little gas (e) when the car
   is moving at a steady 60 mph
   in a straight line (f) when
   the brakes are applied. In
   each case draw an arrow
   showing the direction of the
   net force on the air freshener
   (if there is a net force).