January 16th 2014

Important equations:

v=v0+at

x-x0=v0t+1/2at2

v2=v02+2a(x-x0)

1. A bullet is shot into a body of water at t=0 with an initial velocity of -900 m/s. the bullet comes to a complete stop in 0.4 seconds. What is the acceleration of the bullet, and how far does it travel?
2. Two cars, starting at rest, follow the same 1km track, both going high speeds. The first car finishes the track in 12 seconds. The second car finishes the track with a final velocity of 87 m/s.
   1. What is the acceleration and final velocity of the first car?
   2. What is acceleration of the second car? And how long does it take the second car to finish the track?
3. A boat travelling towards a lighthouse at a 20 degree angle north to west has a y-component of velocity of 14 m/s. If the lighthouse is 3.5 km away, and the boat arrives in 3 minutes, what is the boat’s acceleration and final velocity?