**A-Day: Due Mon., Jan 14 (Assigned: 1/10)**
**B-Day: Due Tues., Jan 15 (Assigned: 1/11)**

# 2007 Final Review 5

| Velocity (m/s) | 0 | 2.25 | 4.5 | 6.75 | 9 | 11.25 | 13.5 |
|---|---|---|---|---|---|---|---|
| Distance (m) | 0 | 0.5625 | 2.25 | ? | 9 | 14.06 | ? |
| Time (sec) | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |

1. The above chart shows the motion of an object (*maybe a carnivorous flying weasel*). It has constant acceleration during the first 3 seconds as shown. (*I'm not allowed to divulge what happened next, but it was not pretty, especially for the poor cyber-cow that got in the way.)*

   A. Find the average acceleration for the 3 seconds shown.

   B. Using the acceleration you just found, find the distance it traveled in 3 seconds.

   C. Calculate how far it traveled in 1.5 seconds.

   D. What is its average speed for the first 2 seconds?

   E. If it continues with the same acceleration, how what is its distance after 4.2 seconds (*rather important for the cow*)?

2. A plane carries 4 skydivers up to jump altitude of 6,000 m and a jump velocity of 65 m/s. The given mass of the plane includes the flight crew, fuel, and everything other than the 4 jumpers.

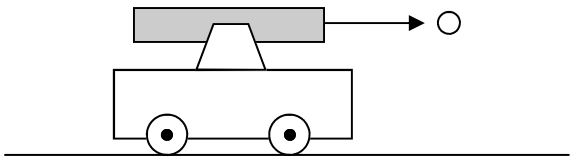
   A. Calculate the kinetic energy of the 4 jumpers when the exit the plane.

   B. Calculate the potential energy of the plane after the jumpers exit.

   C. Calculate the total momentum of the plane and jumpers just before they jump.

| | One Skydiver | Plane | Total |
|---|---|---|---|
| Mass | 100 kg | $2.4 \times 10^4$ kg | $2.44 \times 10^4$ kg |

   D. Will the jumpers continue to speed up the entire way down? (Explain.)



| | Vi | Vf | Mass |
|---|---|---|---|
| Projectile | 0 m/s | $2.4 \times 10^4$ kg | 0.016 kg |
| Cart Launcher | 0 m/s | ? | 2.1 kg |

3. The above cart launcher shoots a projectile. Use the given information to find the following.
   A. The velocity of the cart launcher after it shoots the projectile.

   B. The momentum of the cart launcher afterwards.

   C. (Think impulse.) If friction stops the cart launcher in 1.2 seconds, calculate the force of friction.

*Using your book.*

4. P.186. A person is standing in an elevator on a bathroom scale. For each of the following examples tell me if the scale read normal weight, less weight, more weight, no weight.

   A. _____ The elevator is accelerating upwards.
   B. _____ The elevator is moving with constant speed between floors.
   C. _____ The elevator cables are cut and it falls at the acceleration due to gravity. (*AAAAAHHHHHHH!!!!!!*)
   D. _____ The elevator is accelerating downwards.

   E. So when you feel weightless on a rollercoaster or amusement ride it is because which force = zero?

5. From P.200
   A. How far does an object drop in one second (on the earth)?

   B. How many meters away does it take for the earth curvature to cause a drop of 5 m?

   C. If an object where 16,000 meters away, how high would it have to be for you to see it?

   D. How fast does an object have to be traveling in order to orbit the earth in km/sec?
   (*this IS NOT the escape velocity*)?
   *(Also, please read the questions and answers at the top and bottom of p.203*)

   E. How fast is this in meter per second?