1. An object is thrown upward from the top of a building. Which of the following is true? Assuming the regular x, and y axes,

   a) The object's speed decreases continuously.
   b) The object's velocity decreases continuously.
   c) The object's acceleration at the top most point of the trajectory is zero
   d) The distance time graph is a straight line.

2. Which of this is true?

   a) Acceleration is the slope of the distance time graph
   b) Acceleration is the slope of the velocity time graph.
   c) Velocity is the slope of the acceleration time graph.
   d) Distance is the slope of the velocity time graph.

.3 A correct physical equation should obey which of the following?

   a) All the terms in the equation can have different units.
   b) All the terms in the equation can have different dimensions.
   c) All the terms in the equation must have the same constants.
   d) All the terms in the equation must have the same dimensions.

Problem 2.34

A record of travel along a straight path is as follows:

1. Start from rest with a constant acceleration of 2.77m/s^2 for 15.0 s.

2. Maintain a constant velocity for the next 2.05 min.

3. Apply a constant negative acceleration of -9.47 m/s^2 for 4.39 s.

   (a) What was the total displacement for the trip?

   (b) What were the average speeds for legs 1, 2, and 3 of the trip, as well as for the complete trip?

Leg 1

$v = v_0 + at$

$v = (2.77\ m/s^2)(15\ s)$

$v = 41.55\ m/s$

$x = x_0 + v_0 t + \frac{1}{2} a t^2$

$x = \frac{1}{2}(2.77\ m/s^2)(15\ s)^2$

$x = 311.6\ m$

$v_{avg} = \frac{311.6\ m}{15\ s} = 20.8\ m/s$

Leg 2

const velocity so

$v_{avg} = 41.55\ m/s$

$x = (41.55\ m/s)(2.05\ min)(60\ s/min)$

$x = 5110.6\ m$

Leg 3

$v = v_0 + at$

$v = 41.55\ m/s - (9.47\ m/s^2)(4.39\ s)$

$v = 0$ (stopped)

$x = (41.55\ m/s)(4.39\ s) - \frac{(9.47\ m/s^2)(4.39\ s)^2}{2}$

$x = 91.2\ m$

$v_{avg} = \frac{91.2\ m}{4.39\ s} = 20.8\ m/s$

Total displacement:

$311.6\ m + 5110.6\ m + 91.2\ m = 5513.4\ m$

Avg velocity for whole trip:

$v_{avg} = \frac{5513.4\ m}{15\ s + 123\ s + 4.39\ s}$

$v_{avg} = 38.7\ m/s$