2008 Linear Motion 5

1. A. Convert 2.4 m/s to feet per second.

   B. Now convert to feet/minute.

   3.3 ft = 1 m
   5280 ft = 1 mi
   12 in = 1 ft
   I assume you know about
   seconds, mins, etc

   From your "Kinematic Equation" notes

2. A person swims 4 complete laps in a 30 m long pool. (*30 m is one way. 1 complete lap is there and back.*)
   A. What distance did they travel?

   B. What is their total displacement?

   For each of the following situations give detailed descriptions including horizontal/vertical (x or y) and +/–.

3. A ball is thrown into the air. As it is going up
   A. Displacement is:
   B. Velocity is:
   C. Acceleration is:

4. A ball is rolling to the right and slowing down.
   A. Displacement is:
   B. Velocity is:
   C. Acceleration is:

5. A ball is rolling to the left and speeding up.
   A. Displacement is:
   B. Velocity is:
   C. Acceleration is:

6. An object stops after moving 12 m/s to the right.
   A. What is its initial velocity?
   B. What is its final velocity?
   C. Is its acceleration positive or negative?
   D. Is its displacement positive or negative?
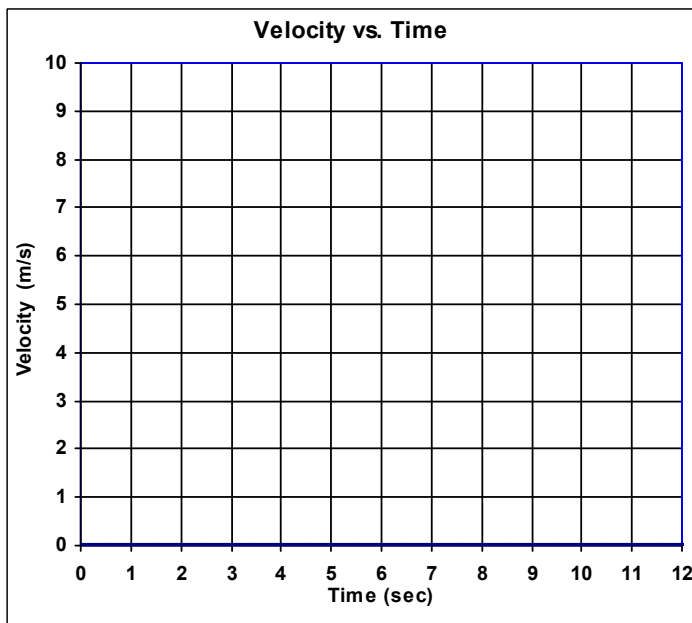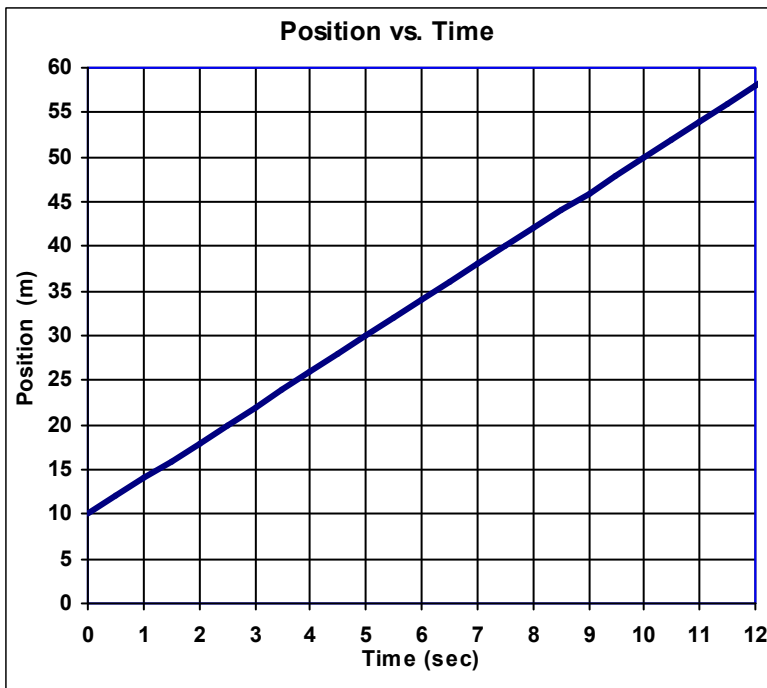
7. An object moves 50 m to the left after starting at rest. If it end up going 12 m/s to the left, how long did it take to stop?
   <u>Variables</u>:   What's Variable is Missing?   Solve:

                 What equation will you use?

8. A ball is dropped from 30 m. If its acceleration is -10 m/s^2, how fast is it going just before it hits the ground?
   A. Is its displacement positive or negative?
   B. What is its initial velocity?
   C. Is its final velocity positive or negative (just before it hits the ground)?
   D. Assign variables, choose an equation and solve.
   <u>Variables</u>:   What's Variable is Missing?   Solve:

                 What equation will you use?

Position vs. Time

(graph — Position (m) vs. Time (sec); straight line from (0,10) to (12,58))

Velocity vs. Time

(graph — Velocity (m/s) vs. Time (sec); horizontal line at 0)

Notes: "Graphing Linear Motion" and "Linear Equation"

9. Use the graph at the left to answer the following:
   A. What is the initial position of the object?
   B. In the linear equation, the initial position is what letter?
   C. Find the slope of the graph.

   D. What does the slope of this graph tell you?

   E. Does the slope of the graph change, or is it a constant slope?

   F. So, what is the speed of the object for the first 5 seconds?

   G. What is the speed of the object for the last 5 seconds?

   H. So, what is the speed of the object everywhere on the graph?

   I. USING THE ABOVE INFORMATION graph the speed of the object on the second graph.

10. *Write the kinematic equations on your equation sheet. BE SURE TO WRITE THEM EXACTLY, including parenthesis. Please note that I changed "a" is missing (etc) to no "a" due to space. No "t" means that "t" is not in your variable list. Also, write "kinematic equations" on the left like I did.*

Kinematic Equations

$\Delta x = \dfrac{1}{2}(v_i + v_f)t$	no "a"
$v_f = v_i + (at)$	no Δx
$\Delta x = (v_i t) + \left(\dfrac{1}{2}a(t)^2\right)$	no v_f
$\Delta x = (v_f t) - \left(\dfrac{1}{2}a(t)^2\right)$	no v_i
$v_f{}^2 = v_i{}^2 + (2a\Delta x)$	no t