Unit - 3: Linear Motion Study Guide

1. Know your key terms! Distance, Displacement, Speed, Instantaneous Speed, Velocity, Acceleration, Deceleration, Free Fall, Rate, Vector, Reference Point, Slope.

2. Look over your Linear Motion Notes and know how to use the kinematics equations! I will supply these on the test for you so just understand which equation you would use and how to use it.

Horizontal Motion: $v = \dfrac{d}{t}$ $\quad d = vt \quad$ $t = \dfrac{d}{v}$ $\quad \Delta v = v_f - v_o \quad$ $a = \dfrac{\Delta v}{t}$

Vertical Motion: $\quad v = at \quad$ $v = gt \quad$ $d = \frac{1}{2}gt^2 \quad$ $t = \sqrt{\dfrac{2d}{g}}$

3. What is the average speed of a dog that runs 50m in 10s?

$$v = \frac{d}{t} \qquad \frac{50m}{10s} = \boxed{5m/s}$$

4. A skateboarder traveling 2m/s increases to 4m/s in 4s. What is the skateboarder's acceleration?

$$a = \frac{\Delta v}{t} \qquad \frac{4m/s - 2m/s}{4s} = \frac{2m/s}{4s} = \boxed{.5m/s^2}$$

5. An apple falls from a tree a distance of 30m. How long does it take to reach the ground?

$$t = \sqrt{\frac{2d}{g}} \qquad \sqrt{\frac{2(30m)}{10m/s^2}} \qquad \sqrt{6} = \boxed{2.4s}$$

6. A ball is dropped from rest, after 4s how far has it fallen?

$$d = \frac{1}{2}gt^2 \qquad \frac{1}{2}(10m/s^2)(4s)^2 = \boxed{80m}$$

7. How are distance - time graphs different from velocity - time graphs? What does the slope of a line on each graph tell you? What does a horizontal line on each graph tell you? Be able to read the graphs and determine the slopes of the lines. Some sample graphs are below:

HORIZONTAL LINE ON D/T GRAPH = OBJECT IS NOT MOVING.
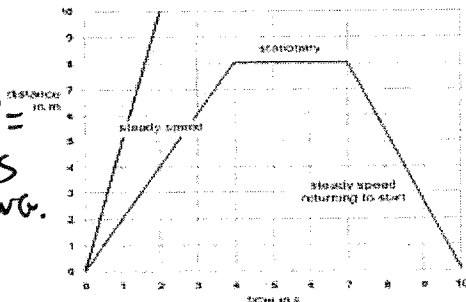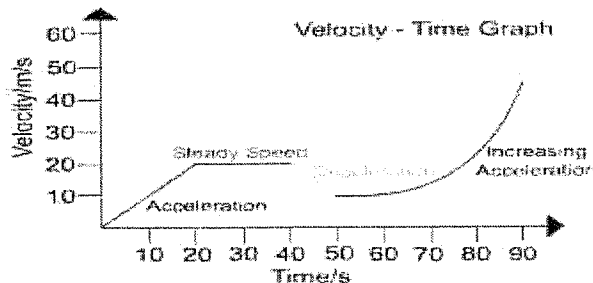
HORIZONTAL LINE ON S/T GRAPH = OBJECT MOVES AT CONSTANT SPEED

D/T GRAPHS TELL YOU IF AN OBJECT IS MOVING AND S/T GRAPHS TELL YOU THE RATE THAT AN OBJECT MOVES AT.

D/T SLOPE = SPEED

S/T SLOPE = ACCELERATION