Name: _____ Hour: _____

Unit 1 Review

1) What is the International System of Units? What does MKS stand for?
2) What is a metric prefix? What do mega, kilo, centi, and milli mean? (How many centimeters are in a meter?)
3) What is the definition of velocity? What is the standard metric unit of velocity?
4) What is the difference between average and instantaneous velocity? What is an example of each? How do you calculate each?
5) What is the formula for slope?
6) What is the slope of a position-time graph?
7) What is the definition of acceleration? What is the standard metric unit of acceleration?
8) What is the difference between speed and velocity?
9) What are three different ways that an object can accelerate?
10) What is the slope of a velocity-time graph?
11) Draw a position-time, velocity-time, and acceleration-time graph including the following kinds of motion (label each kind of motion): stopped, constant velocity, constant acceleration.
12) If a ball rolling down an incline has a constant acceleration, how would you explain the ball's velocity as it travels further and further down the incline?
13) Explain the different necessary components of a physics lab report and what is required for each component. What should every graph (for a lab report) include, besides data points?
14) What are the five fabulous formulas? What steps should you follow when you're solving a physics problem using these formulas?
15) What is the definition of free fall?
16) What is the acceleration due to gravity near the surface of the earth, and what causes it?
17) What is the Law of Falling Bodies and who discovered it?
18) What is an object's initial velocity if it starts from rest? If it's dropped?
19) What is an object's acceleration if it is in free fall?
20) What is the velocity of a rocket at the top of its trajectory? What is its acceleration at the top of its trajectory?
21) What is the Law of Odd Integers and who discovered it?
22) Sketch a potion-time, velocity-time, and acceleration-time graph of an object that is **dropped** from a tall building.

<u>Graph Interpretation</u>

- Looking at a position-time graph, you should be able to
    - Explain the motion of the object
    - Calculate the object's average velocity
    - Calculate the object's instantaneous velocity at any given time
- Looking at a velocity-time graph, you should be able to
    - Explain the motion of the object
    - Calculate the object's acceleration
- You should be able to match graphs of motion, like we did with the puzzles

Conversion factors: 1609 meters = 1 mile 1 hour = 3600 seconds

1. On a separate sheet of paper, sketch the position-time, velocity-time, and acceleration-time graph of the following scenario: A mountain bike racer starts his race from rest and accelerates until he reaches a velocity of 9.5 m/s. After some time, the biker's chain derails and he must stop to fix it. The biker then accelerates up to 6 m/s and finishes the race at this speed.

2. Sandy runs to her Grandma's house. She runs at 8 mph for the first 20 minutes, and then slows down to 6.5 mph for the last 30 minutes. What is Sandy's average velocity in mph? in m/s?

3. A tennis ball is dropped off the roof of a sky-scraper and takes 7.5 seconds to hit the ground.
   a. How tall is the building?

   b. How fast is the ball moving right before it hits the ground?

4. A vehicle accelerates from rest at a rate of 9 m/s^2.
   a. How long does it take the vehicle to reach 31 m/s?

   b. How far did the vehicle travel in this time?