Name _____ Hour _____

DUE _____

Level 1: 1-D Motion Problems

Things to remember for success on this assignment:

- Anything in the downward direction you need to make _____ (v, Δy, a, etc)
- If a number comes out negative in a calculation that tells you that the object is _____ or _____
- The acceleration due to gravity near the Earth's surface is _____
- If you throw an object up, what is the speed at the top of its flight? _____
- If you throw something straight up and it is in the air for a total of 8 sec, how long did it take to go just up? _____
- If you drop an object, what 2 variables do you know automatically? _____and _____

1. If your car is able to accelerate from **0** to **60 mph** in **3.5 sec**, find your acceleration. *(7.7 m/s^2)*
   HINT: ***Convert the speed to m/sec****!*

   G:

   U:

   E:

   b. How far (in meters) would you have traveled in that time? *(47 m)*

   U:

   E:

2. You decide to drop something off your roof. If it takes 2.50 sec for it to hit the ground, what is the **final velocity**? (Hint: It is falling downward, so your velocity will be negative. The acceleration due to gravity is also negative.) (-24.5 m/s)

   G:

   U:

   E:

   b. How far (Δy) will it have fallen during that time? Solve this using <u>two different</u> equations. Make sure you get the same answer for each. *(-30.6 m, It is negative because it is falling downward.)*

   U:

   <u>Equation 1</u>: **<u>Equation 2</u>**:

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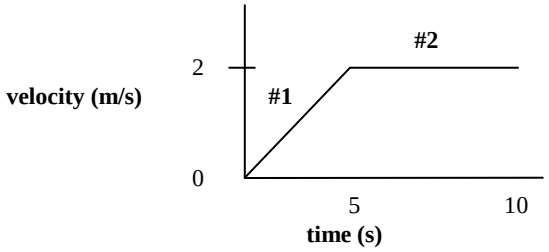
3. You are traveling at 55 **mph** and slam on your brakes. If it takes you 46.5 m to come to a stop, what is your rate of deceleration? (Deceleration is just a negative acceleration) (-6.5 m/s^2)

4. **Answer the following questions using the velocity vs. time graph below**:



a. Calculate the slope of the line for segment #1 _____

b. What is the car doing during segment #1? _____

c. Calculate the slope of the line for segment #2 _____

d. What is the car doing during segment #2? _____

e. Calculate the **AREA under the graph**. Show your work! **(Make 1 triangle and 1 rectangle!)**

f. What are the **units of the area** under the graph? Be careful! _____

g. What does the area under the graph measure? _____

h. For segment #1 find the numbers from the graph: v_i =_____ v_f = _____ Δt = _____

i. Calculate the acceleration of segment #1 using a = vf-vi/ Δt (It should be the same as b)

j. Use the $\mathbf{\Delta x = v_i \Delta t + 1/2 a \Delta t^2}$ equation to measure the distance traveled during segment #1 by plugging in numbers from the graph for your variables.