Physics Honors Homework 11-20-18 Name ___________________________

Your assignment is to watch videos from the website FLIPPING PHYSICS.
and to then answer some questions about the videos.
AND, to answer some questions that mimic the questions asked in the videos.
Also, answer slightly different versions of the questions that were asked in the video. This is to practice the methods used in the video.

The URLs are given on this document

Understanding and Walking Position as a Function of Time Graphs
https://www.flippingphysics.com/understanding-and-walking-graphs-of-position-as-a-function-of-time.html

What is the symbol for slope? What is the formula for slope?

Is y = mx + b the equation for slope?

What is formula for the slope of a position-time graph, and what physics quantity does it equal?

Copy this sentence:
"The slope of a position versus time graph is the velocity."

In the example given,
what is the origin (position = 0)
Which direction gives *negative position*? Which direction gives *positive position*?

If the graph is diagonal, does this mean you move diagonally?

If the position-time graph is horizontal, what does the person do?

If the slope of the line is negative, which way is the person moving?

What mistake did Mr. P's daughter make when trying to walk a position-time graph?

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6. A Toy Car UAM Problem. With two different accelerations:
https://www.flippingphysics.com/toy-car-uam-problem.html

This problem involves a *two-step motion problem*:
Original Problem:
A toy car starts from rest and experiences an acceleration of 1.56 m/s^2 for 1.6 seconds, and then brakes for 1.1 seconds and experiences an acceleration of -2.07 m/s^2.
a) How fast is the car going at the end of the braking period?
b) How far has it moved?

Guiding questions:
What is the point of the *subscripts* in the problem?

What is the point of writing Δt instead of t ?

Why are you able to use the "Uniformly Accelerated Motion Equations"?
[These are the things I have called the *kinematic equations*.]

How do they find the *initial velocity* for part 2?

Why can't the displacement be found with one single equation?

New Problem #1:
A toy car starts from rest and experiences an acceleration of 2.03 m/s^2 for 1.3 seconds, and then brakes for 1.2 seconds and experiences an acceleration of -1.76 m/s^2.
a) How fast is the car going at the end of the braking period?
b) How far has it moved?

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New Problem #2:
A toy car starts from rest and experiences an acceleration of 3.03 m/s^2 for 2.8 seconds, and then brakes for 0.80 seconds and experiences an acceleration of -4.56 m/s^2.
a) How fast is the car going at the end of the braking period?
b) How far has it moved?

10. A Graphical Uniformly Accelerated Motion Example Problem:
https://www.flippingphysics.com/graphical-uam-example.html

How do they know the acceleration is constant?

Is there a difference between the definition of acceleration and the first UAM equation? [This creates a fight in the video.]

How do they get acceleration from a velocity-time graph?

The slope of the position-time graph increases as a function of time. How do they prove this?

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New Problem #1:
Assuming an initial position of 0 and an initial velocity of 0, create position-time, velocity-time and acceleration-time graphs for an object that accelerates uniformly at a rate of 3.0 m/s^2. Your graphs should be *quantitative* (they should scales and numbers, just like those in the video).

New Problem #2:
Assuming an initial position of 0 and an initial velocity of 0, create position-time, velocity-time and acceleration-time graphs for an object that accelerates uniformly at a rate of 1.5 m/s^2. Your graphs should be *quantitative* (they should contain scales and numbers, just like those in the video).