Unit 1 major HW (Due Oct 28) 100 points

1D Kinematics Lab

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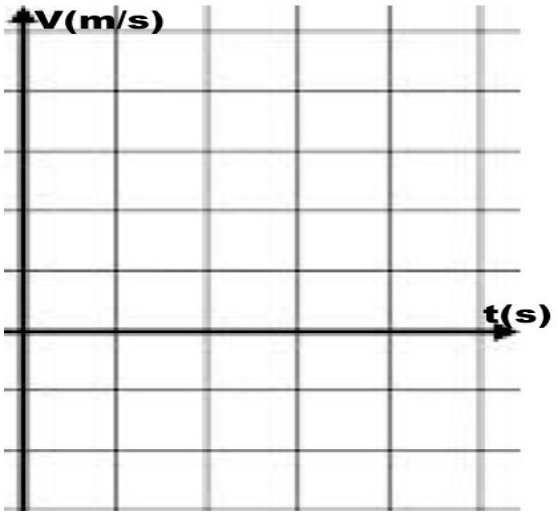
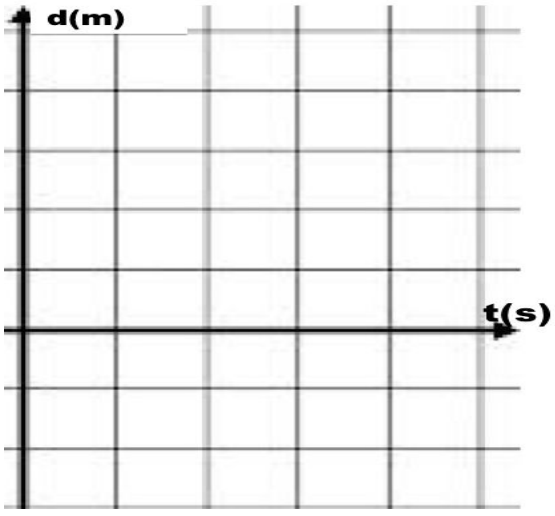
Part 1: Convert the following VT graph to DT graph **10 Points**

Given (VT graph)	Use the info in the left box to sketch a dt graph
	

Simulation: Go to "www.bari-science-lab.com" and clink on **Brooklyn Tech** and click on Homework and then click on Kinematics 1D Simulation. Play with the controls of the simulation to get used to the controls:

- Two ways to move the man around?
- How to make the man move automatically?
- How to record and playback the man's motion?
- How to playback the man's motion in slow motion?
- How to quickly reset the man to starting conditions?

Part II: Constant Velocity (30 points)

1. Reset all of the man's values to zero.
2. Using the position slider, set the man to stand near the tree. Give him a velocity of 1.2 m/s (and an acceleration of 0).
3. Click --to start the man in motion until he hits the wall, then hit to stop recording

4. Use the playback feature to answer these questions:

- **What happened to the blue position slider as the man moved across the screen**

  ……..

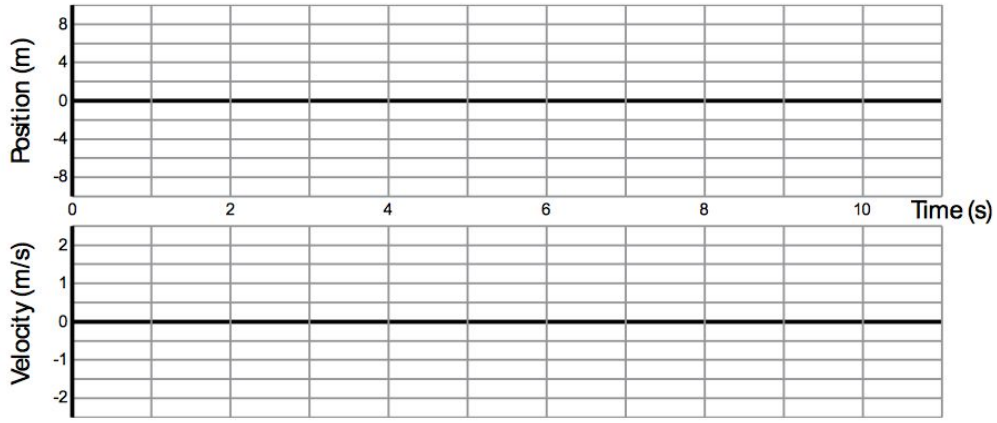
- **What happened to the red velocity slider as the man moved across the screen?**

  ……..

5. Use the playback feature to record the man's position and velocity data.

Time (s)	Position (m)	Velocity (m/s)
0.0		
1.0		
2.0		
3.0		
4.0		
5.0		
6.0		
7.0		
8.0		
9.0		
10.0		

6. Plot your data in the graphs below:



7. According to your graphs...
   a. What shape is your position graph?

   b. What is the slope of your position graph?

   c. Why does or doesn't your answer to b. make sense?

   d. What shape is your velocity graph? Is it horizontal, vertical, or diagonal?

   e. Why does or doesn't your answer to d. make sense?

Part III: Constant Acceleration (30 points)

Constant Acceleration

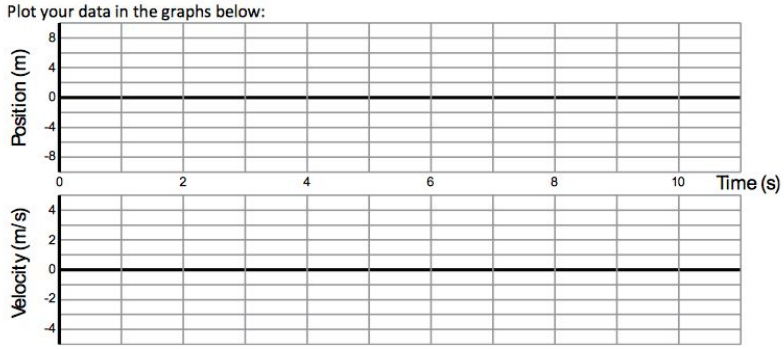
1. Reset all of the man's values to zero.
2. Using the position slider, set the man to stand near the tree. Give him a velocity of 0 m/s and an acceleration of 0.5 m/s^2.
3. Click ▸ to start the man in motion until he hits the wall, then hit ⏸ to stop recording.
4. Use the playback feature to answer these questions.
   a. What happened to the blue position slider as the man moved across the screen?

   b. What happened to the red velocity slider as the man moved across the screen?

5. Use the playback feature to record the man's position and velocity data.

Time (s)	Position (m)	Velocity (m/s)
0.0		
1.0		
2.0		
3.0		
4.0		
5.0		
6.0		
7.0		
8.0		
9.0		
10.0		

6. Plot your data in the graphs below:



7. According to your graphs:

a. What shapes is your position graphs?

b. Why does or does not your answer to a make sense?

c. What shape is your velocity graph?

d. Why does or does not your answer to C make sense?

e. What is the slope of your velocity graph?

f. What does the slope of the velocity graph represent?

Part IV: Making Connections (10 Points)

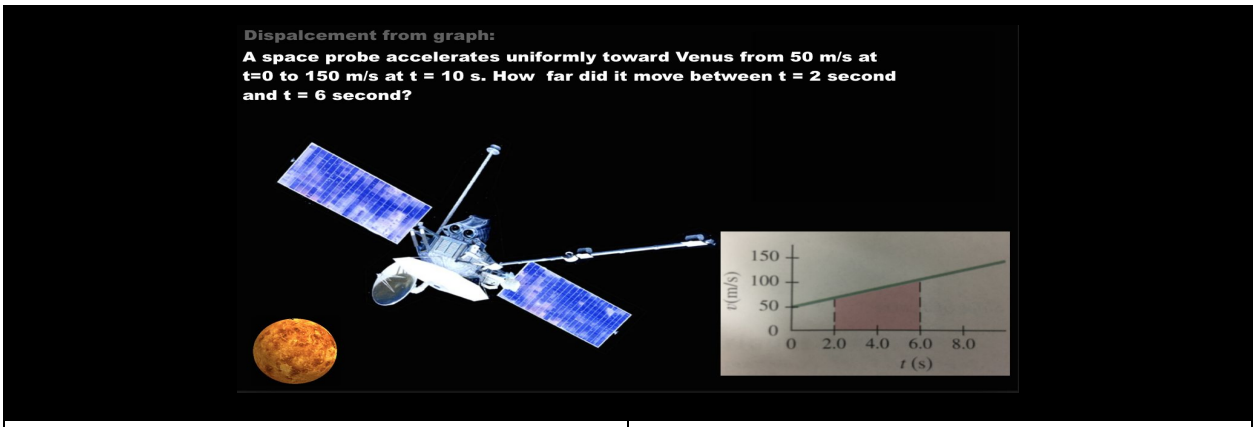
Making Connections

1. What happens to the man when he is accelerating?

2. What is the difference between an object with constant acceleration and an object with constant speed?

3. Complete the following sentences:
   a. *"The slope of a linear position graph tells us the _____ of the object."*
   b. *"The slope of a linear velocity graph tells us the _____ of the object."*
   c. *"For an object moving at a constant speed, we would expect to see a position graph with a _____ shape and a velocity graph with a _____ shape."*
   d. *"For an object moving at a constant acceleration, we would expect to see a position graph with a _____ shape and a velocity graph with a _____ shape."*

Part V: (10 points)



(2) Mr. Bari throws a ball upward into the air with an initial velocity of 15 m/s. Calculate: (a) How hig it goes; (b) How long the ball in the air before it comes back to the hand; © How long it takes for ball to reach max height? (d) Velocity of the ball when it returns to Mr. Bari's hand (e) at what time t the ball passes a point 8 meter above Mr. Bari's hand?