

Purpose –

1. Determine the mathematical relationship between change of position (displacement) and time for a cart traveling down an incline.
2. Determine the mathematical relationship between velocity and time for a cart traveling down an incline.

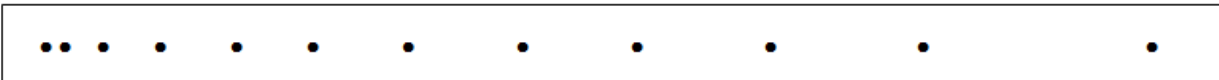
This is the procedure your classmates followed to collect the data. Please see below for theoretical data and graphs to analyze.

Data –

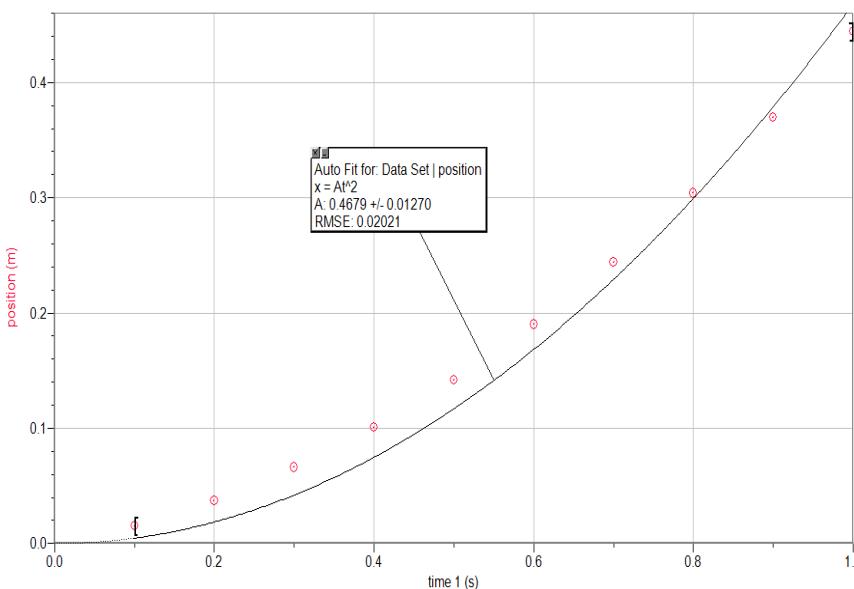
- ❑ Decide on a good starting point for your origin. Be sure that this dot is clearly visible and not in a cluster of dots.
- ❑ Count every 6 dots to make a mark (each hash mark is 0.1 s).
- ❑ Measure the position in meters of each mark.
- ❑ Enter these values for position (Y) and time (X) into logger pro. **Remember to change the labels for each column by double clicking on either X or Y. Be sure to also include units!**

	Data Set			
	time 1 (s)	position (m)	Velocity (m/s)	a (m/s ²)
1	0.1	0.015		
2	0.2	0.037	0.220	
3	0.3	0.066	0.290	0.700
4	0.4	0.101	0.350	0.600
5	0.5	0.142	0.410	0.600
6	0.6	0.190	0.480	0.700
7	0.7	0.244	0.540	0.600
8	0.8	0.304	0.600	0.600
9	0.9	0.370	0.660	0.600
10	1.0	0.444	0.740	0.800

- 1) Look at the ticker tape strip below. What is happening to the spacing of the dots? What does this indicate about the motion of the cart?

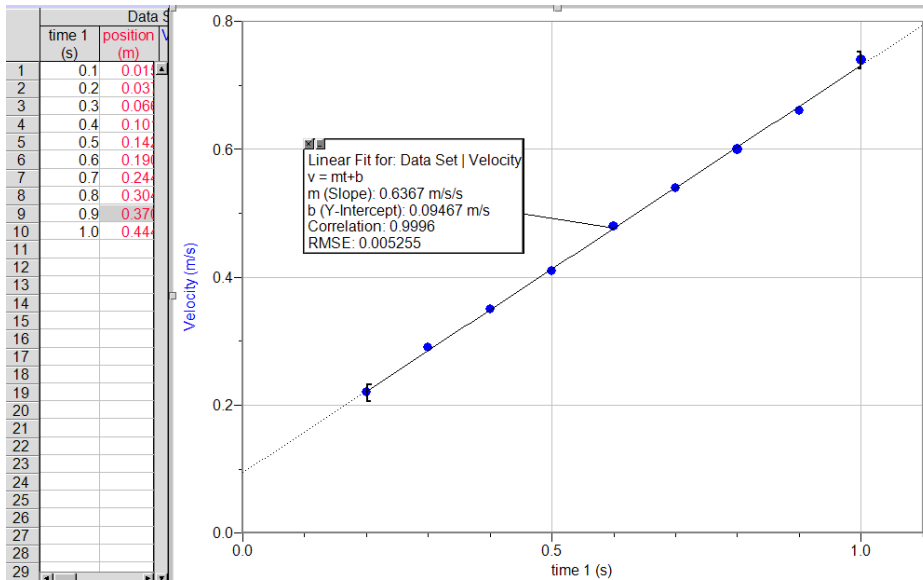


Analysis of x vs. t graph



- 2) Write the general & translated equations.
- 3) Describe the relationship between the variables.
- 4) Is the velocity of this cart constant? How can you tell?

Analysis for v vs. t graph



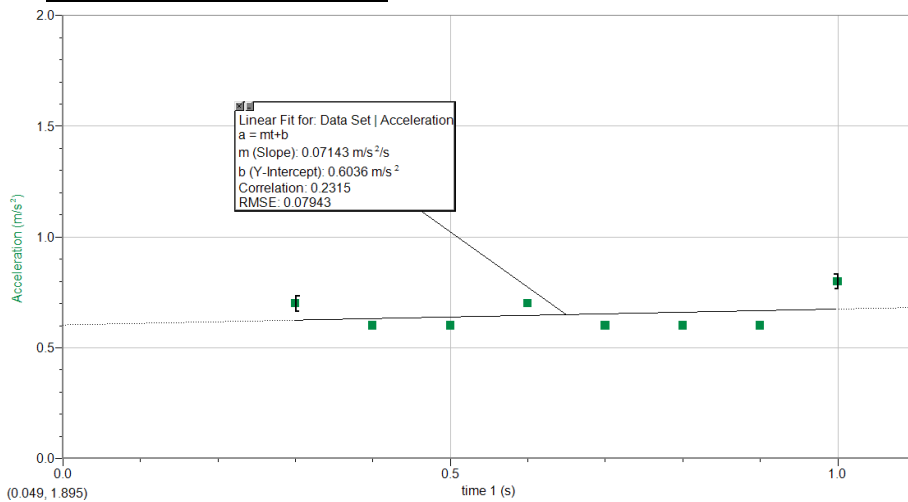
5) Write the general & translated equations.

6) Describe the relationship between the variables.

7) What quantity is represented by the slope of the line of a velocity vs. time graph?
 (Hint: Look at the units to give you an indication of what this slope is a value for)

8) Using the graph of velocity vs. time and your answer to question 7, how can you describe the motion of the cart?

Analysis for a vs. t graph



9) Write the general & translated equations.

10) Describe the relationship between the variables.

11) What is the objects acceleration? How did you determine this from looking at the acceleration vs. time graph?

12) Did the cart in this lab accelerate at a constant rate?

Conclusions –

13) What quantity can be read from the slope of a velocity vs. time graph?

14) How does the slope of a velocity vs. time graph relate to an acceleration vs. time graph?