ACCELERATION LAB

Name: ABSENT STUDENT DATA

Question: Can you determine the rate of acceleration of the car on the ramp?

Procedure:
1. Trial 1:
   a. Set up the ramp such that it is attached to the **8th** opening on the colorful ramp stand.
   b. Put Photogate A at 30cm, and attach Photogate B at 60cm. *(The big numbers on the ramp are cm)*
   c. Make sure the timer is set to interval mode and make sure the green light above **ONLY A** is lit up. Set the car to the top and make sure the timer is at zero. Roll the car down the ramp. This calculation will give you the time of Point A. Record in your table.
   d. Make sure the timer is set to interval mode and make sure the green light above **ONLY B** is lit up. Set the car to the top and make sure the timer is at zero. Roll the car down the ramp. This calculation will give you the time of Point B. Record in your table.
   e. Reset the car to the top of the ramp. Make sure the timer is reset to zero.
   f. Make sure the timer is set to interval mode and make sure the green light above **BOTH A & B** is lit up. Roll the car and record your time in the box labeled "time between A&B".
   g. Calculate 'Speed Point A', 'Speed Point B', and 'Acceleration'.
2. Set the ramp up such that it is attached to the **PROPER height** on the colorful ramp stand. Repeat steps A – G for Trial 2 – Trial 4.

	Trial 1 8th opening on Stand	Trial 2 6th opening on Stand	Trial 3 4th opening on Stand	Trial 4 2nd opening on Stand
Time A (Only Photogate A lit up)	0.0349	0.0396	0.0475	0.0611
Time B (Only Photogate B lit up)	0.0246	0.0279	0.0333	0.0436
Time between A & B (Both Photogate A & B lit up)	0.1798	0.2047	0.2438	0.3157
Calculate	Calculate	Calculate	Calculate	Calculate
Speed Point A $[V_i]$				
Speed Point B $[V_f]$				
Change in Speed (Speed Point B – Speed Point A)				
Acceleration ((Speed B – Speed A)/Time)				

GRAPHING: Add labels to each axis, including units *(x axis is time, y axis is speed)* and a title to the graph. Your scale should be set up so that the graph covers the entire grid.

You are going to create a line graph for each ramp level (you will have 4 lines). Each line will have 2 points:
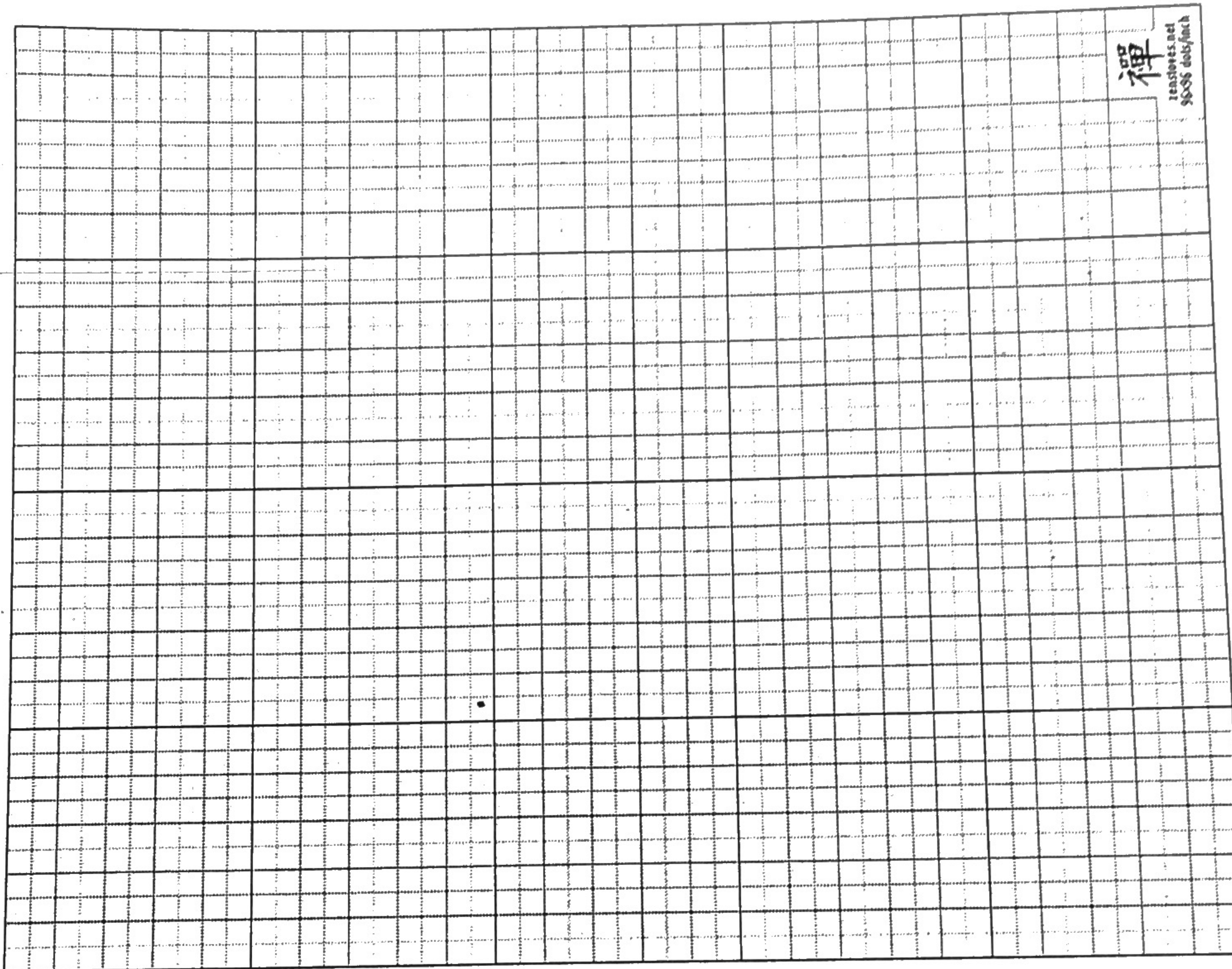
Point 1: (0, V_i)

    On the X axis: Time is 0 seconds

    On the Y axis: speed is the initial velocity cm/s

Point 2: (T_{ab}, V_f)

    On the X axis: Time is time between photogate A and photogate B

    On the Y axis: speed is the final velocity in cm/s

Concluding Questions:

1. Is your graph a straight line or a curve?

2. Does the car accelerate as it rolls down the ramp? How can you tell if it does or not?

3. What happened to the acceleration of the car as we increased the angle of the ramp?

4. Real World! Explain to me how what you learned today could be applied to something awesome, like a roller coaster. Your explanation should be a minimum of 4 complete sentences.