

(1 point)

Title of the Experiment:

Student's name:

Section SLN:

TA's Name:

Week of the experiment:

EXPERIMENTAL DATA (10 points):

Obtain experimental data that will be used for further calculations from the graphs.

PART 1: Uniform Accelerated Motion on a Dynamic Track

Table 1. Run 1a

Time interval (units)	Coordinates (units)	Distance (units)

After plotting a curve of best fit for $x(t)$ in Logger Pro, fill in these tables with the corresponding curve fit coefficients. Pay close attention to the direction of the velocity and acceleration.

Table 2. **Position vs. Time** Curve Fit Coefficients

Run #	A	B	C	Acceleration (units)
1a				
1b				
2				
3				
4				

Table 3. **Position vs. Time** Curve Fit Parameter Definitions

Coefficients	Name of Physics quantity (i.e. position, distance, velocity, etc.)
A	
B	
C	

After plotting a line of best fit for $v(t)$ in Logger Pro, fill in the following tables with the corresponding linear fit parameters.

Table 4. **Velocity vs. Time** Linear Fit Parameters

Run #	Slope	Y-intercept	Acceleration (units)
1a			
1b			
2			
3			
4			

Table 5. **Velocity vs. Time** Linear Fit Parameter Definitions

Coefficients	Name of Physics quantity (i.e. position, distance, velocity, etc.)
m (slope)	
b (y-intercept)	

Insert $x(t)$ and $v(t)$ graphs for Runs 1-4 here.

Run1: Cart speeds up while moving away from sensor

Run2: Cart speeds up while moving towards sensor

Run3: Cart slows down while moving away from sensor.

Run4: Cart slows down while moving towards sensor

PART 2: Free Fall

After recording data from the video and fitting a curve of best fit to the $x(t)$ graph and line of best fit to the $v(t)$ graph, fill in the tables below.

Table 6. **Position vs. Time** graph Curve Fit Parameters

A	B	C	Acceleration (units)

Table 7. **Velocity vs. Time** graph Linear Fit Parameters

Slope	Y-intercept	Acceleration (units)

Table 8. (Use Logger Pro to calculate mean time and uncertainty from the time given)

Mean Time (units)	Uncertainty (units)

DATA ANALYSIS (10 points): the section includes sample calculations and error a

analysis. **Be sure to include equations!**

PART 2: Free Fall

Run A:

Calculate the percent discrepancy between accepted value of gravitational acceleration and your experimental result:

Run B:

From the average (mean) time of fall, calculate the experimental gravitational acceleration. Show equations and calculations.

Knowing that the uncertainty in height measurement is $\Delta H = 0.02$ m and the average human response time is $\Delta t = 0.2$ s, estimate the uncertainty in your experimental g . Show equations and calculations.

RESULTS (10 POINTS):

PART 1:

	Acceleration (units)		
Run #	Position vs. Time graph	Velocity vs. Time graph	Direction of acceleration and velocity compared to each other
1a			
1b			
2			
3			
4			

PART 2: Free Fall

Part:	(gravitational acceleration $\pm$ error) (units)
2A	
2B	

