

Lab 01: 1-d Kinematics Worksheet

Name _____ Date _____

Partners _____

PART I - RAMP DATA

Number of books	Height of books, h (m)	Length of incline, x (m)	$\sin(\theta)$	Acceleration			Average acceleration (m/s ²)
				trial 1 (m/s ²)	trial 2 (m/s ²)	trial 3 (m/s ²)	
1							
2							
3							
4							
5							

PART II – FREE-FALL DATA

Trial #	Acceleration (m/s ²)
1	
2	
3	
4	
5	
Average =	

PART III - ANALYSIS

1. Use Logger *Pro* or Excel to plot a graph of the average acceleration (y axis) vs. $\sin(\theta)$. Use the linear fit feature of Logger *Pro* or the Add a Trendline feature of Excel to determine the slope of your best-fit line:

$$\text{Slope of best-fit line} = \underline{\hspace{2cm}} \text{ m/s}^2$$

Print out this graph and staple it to this worksheet before you turn it in.

2. How well does the measured value of g in Question 1 agree with the accepted value of 9.8 m/s^2 ? Compute the *percent error*:

$$\% \text{ error} = 100 \times \frac{|\text{slope} - 9.8 \text{ m/s}^2|}{9.8 \text{ m/s}^2} = \underline{\hspace{2cm}} \%$$

3. Use vector components to show why the cart's acceleration down the ramp equals $g\sin(\theta)$. Record your derivation below.

4. How well does the average value of g in Part II agree with the accepted value of 9.8 m/s^2 ? Compute the *percent error*:

$$\% \text{ error} = 100 \times \frac{|\text{average} - 9.8 \text{ m/s}^2|}{9.8 \text{ m/s}^2} = \underline{\hspace{2cm}} \%$$

5. Which method, Part I or Part II, yields a more accurate measurement of g ? Explain in detail below why you believe this is so.