Uniformly Accelerated Linear Motion

Name			ID	TA	
Partne	ers				
Date_			Section		
1. N	Ieasu	rements of acceleration		M	<u>_</u> 9
	a.	Mass of large glider:	(kg)	1	
	b.	Mass of small glider:	(kg))	m

L

Please use SI units. (*m*, *kg*, sec, etc.)

	<i>S</i> distance between photogates	<i>t</i> time obtained by photogates	<i>m</i> hanging mass	M glider or cart mass	$\frac{m}{m+M}$	$ \stackrel{a}{\left(=\frac{2s}{t^2}\right)} $
Case 1			0.05 kg	Large glider		
Case 2			0.10 kg	Large glider		
Case 3			0.15 kg	Large glider		
Case 4			0.10 kg	Small glider		
Case 5			0.15 kg	Small glider		
Case 6			0.10 kg	Small + large		
Case 7			0.15 kg	Small + large		

• Plot *a* vs. $\frac{m}{m+M}$ using Excel spread sheet. (Note that *a* is y-axis and $\frac{m}{m+M}$ is x-axis.) Then, obtain the linear fit line.

Slope _____

Discussion: Compare the result (slope) with the expected value of $g = 9.8 \text{ m/s}^2$.

How to obtain a linear fit line by Excel

1. Type the obtained values for x- and y-axes. Columns A and B are x and y respectively. Then select only the numbers.

XY (Sc 🔜 XY (S

Area O Doughnut Radar Surface Bubble

2

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D	È	8	1	9	ABC
	CB		-		fx
		A	E	}	
1		1		2	
2		3		4	
3		5		6	
4		7		8	
5		9		10	
6					
7					

2. Click Chart Wizard from the tool bar. Select XY (Scatter) as follows.



- 3. With going through the Chart Wizard, name the graph title, x- and y-axes. After clicking "Finish", you will have the following.
- 4. Right click one of dots on the graph. Then select "Add Trendline."



-

Cancel

Scatter. Compares pairs of values

Press and Hold to <u>V</u>iew Sample

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<u>N</u>ext >



5. You will see the following, but you do not have to change anything for that. Then click "Options."

Type Of	otions		
-Trend/Regre	ssion type	Polynomial Order:	
Power	Exponential	Period:	
Based on <u>s</u> erie Series1	25:		_
]	<u>_</u>		

6. Check the box, "Display equation on chart." Then click "OK."

Add Trendline	? ×
Type Options Trendline name • Automatic: Linear (Series1) • C Gustom:	
Forecast Forward: 0 Inits Backward: 0 Inits Set intercept = 0	
Display <u>equation on chart</u> Display <u>R</u> -squared value on chart	
OK Cano	el

7. You will have the line equation on the chart.

