General Physics Laboratory (Phys 119)

Basic Background

Outline:

1- Lab Report
2- Rounding Numbers
3- Units
4- Graphing
5- Slope

Lab Report

1-Title Page
–the title of the experiment
–your name
–the names of your partners
–the course and section numbers
2- Equipment
3- Objective
4- Data & Table
5- Graphs (**Note:Graphs should be drawn on special graphing paper**)
6- calculation
7-Errors

Rounding Numbers

First we need to know if we are rounding to tenths, or hundredths, etc. Or maybe to "so many decimal places". That tells us how much of the number will be left when we finish.

3.1416 rounded to hundredths is 3.14

as the next digit (1) is less than 5

1.2635 rounded to tenths is 1.3

as the next digit (6) is 5 or more

1.2635 rounded to 3 decimal places is 1.264

as the next digit (5) is 5 or more

Units

The Metric System (Prefixes)

• Mega-	1000000	M
• Kilo -	1000	k
• Hecto -	100	h
• Deca -	10	da
•	1	
• Deci -	0.1	d
• Centi -	0.01	c
• Milli -	0.001	m
• micro-	0.000001	μ
• nano-	0.000000001	n

Length

- The basic unit of length in the metric system is the meter (m)
- Metric Units of Length
  - Kilometer (km) = 1000 m
  - Hectometer (hm) = 100 m
  - Decameter (dam) = 10 m
  - Meter (m) = 1 m
  - Decimeter (dm) = 0.1 m
  - Centimeter (cm) = 0.01 m
  - Millimeter (mm) = 0.001 m
-

Knowing these conversion factors makes calculating conversions easy!

These also work for liters and grams. Just replace the base unit (m) with a (g) or (l).

Mass

- The basic unit of mass in the metric system is a gram (g)

- Metric Units of Mass
- Kilogram (kg) = 1000 g
- Hectogram (hg) = 100 g
- Decagram (dag) = 10 g
- Gram (g) = 1 g
- Decigram (dg) = 0.1 g
- Centigram (cg) = 0.01 g
- Milligram (mg) = 0.001 g

Example 1

Convert 3m to cm

$$\frac{3\text{m}}{1\text{m}} \quad \frac{100\text{ cm}}{1\text{m}}$$

Given — Conversion Factor

$$\frac{(3 \times 100)}{1} = 300\text{cm}$$

For meters to cancel out, meters in the conversion factor must be on the opposite side of the fraction (fence).

Multiply every number on top of the fence and divide by the bottom.

Example 2

Convert 1516 g to kg

$$\frac{1516\ \text{g}}{} \quad \frac{1\ \text{kg}}{1000\ \text{g}}$$

conversion factor

$$\frac{(1516 \times 1)}{1000} = 1.516\ \text{kg}$$

Example 3

Convert 7200mm to km

$$\frac{7200\ \text{mm}}{} \quad \frac{1\ \text{cm}}{10\ \text{mm}} \quad \frac{1\ \text{km}}{100{,}000\ \text{cm}}$$

$$\frac{(7200 \times 1 \times 1)}{(10 \times 100{,}000)} = .0072\ \text{km}$$

WORK SHEET 1

Convert 1200 cm to m.

$$\frac{1200\ \text{cm}}{} \left| \frac{1\ \text{m}}{100\ \text{cm}} \right| = \frac{(1200 \times 1)}{100} = 12\ \text{m}$$

Convert 3 m to mm.

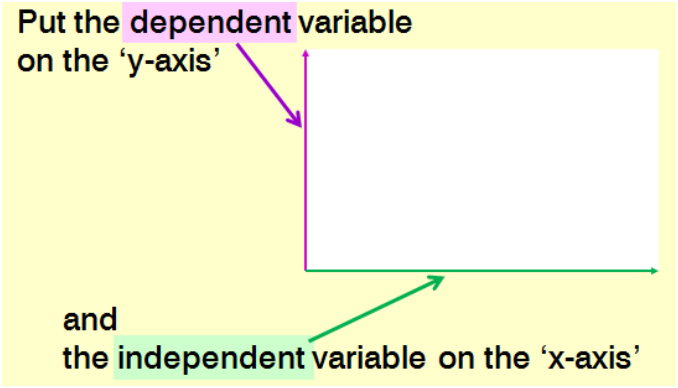
$$\frac{3\ \text{m}}{} \left| \frac{100\ \text{cm}}{1\ \text{m}} \right| \frac{10\ \text{mm}}{1\ \text{cm}} = \frac{(3 \times 100 \times 10)}{(1 \times 1)} = 3000\ \text{mm}$$

Graphing

How to set up your graph!

1-Draw the Axes
2- Title
3- Choose simple scales
4- plot the point
5- Draw the best line

Draw the Axes & Title



* Write an appropriate title for the graph at the top.
* The title should contain both the independent and dependent variables

Choose simple scales

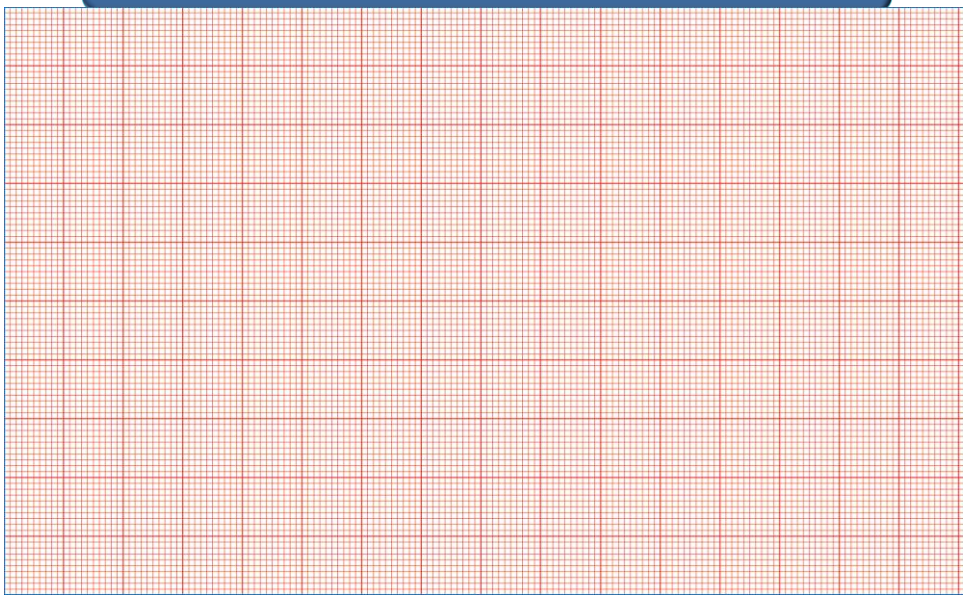
•Decide on an appropriate scale for each axis.

•The scale refers to the min and max numbers used on each axis. They may or may not begin at zero.

•The min and max numbers used for the scale should be a little lower than the lowest value and a little higher than the highest value.

Choose a scale that will make your graph use most of the sheet of paper.

Choose simple scales



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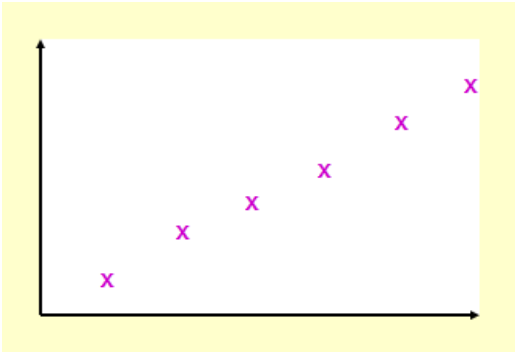
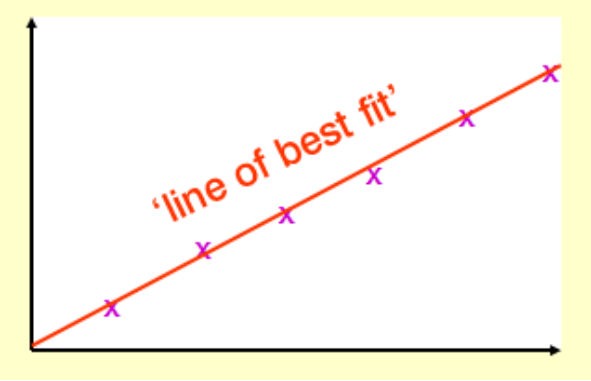
plot the point



* To mark the points we usually use an X

Draw the best line

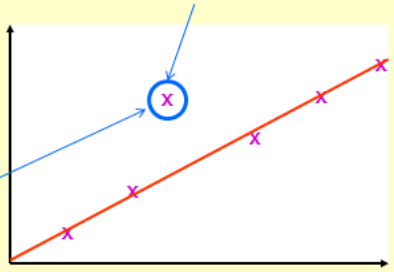


If a point is not on the line

5. If a point is not on the line…

…use your apparatus to check this measurement again

This is called an anomalous point.



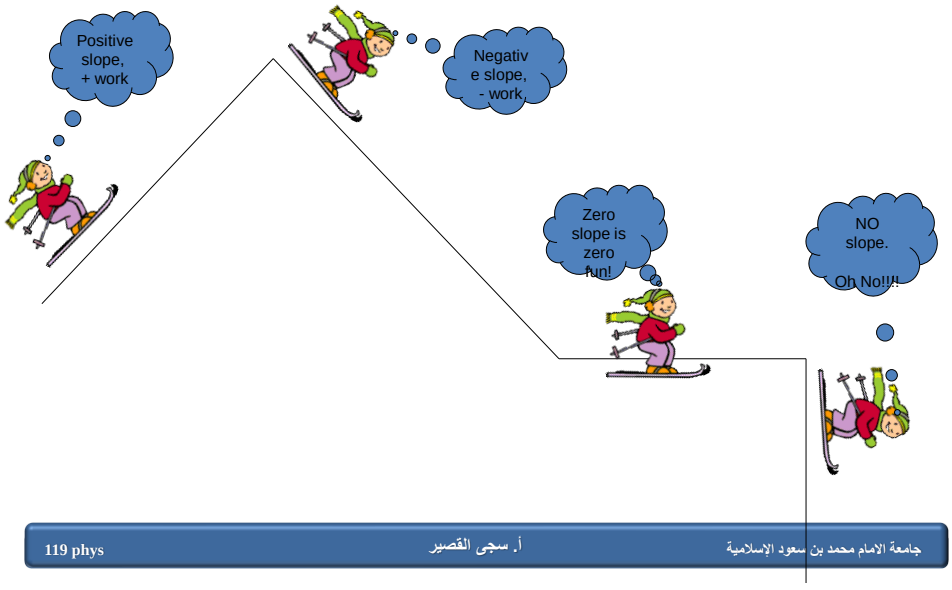
Slope

Slope is the rate of change of a line

$$slope = \frac{\Delta y}{\Delta x} = \frac{\text{(change in y)}}{\text{(change in x)}}$$

$$slope = \frac{y_2 - y_1}{x_2 - x_1}$$

Slope



Excel

WORK SHEET 1

- Use data in the following table to draw a graph and find the slope (use graph paper).

No	X	Y
1	4.0	0.010
2	6.2	0.034
3	8.0	0.040
4	9.6	0.056

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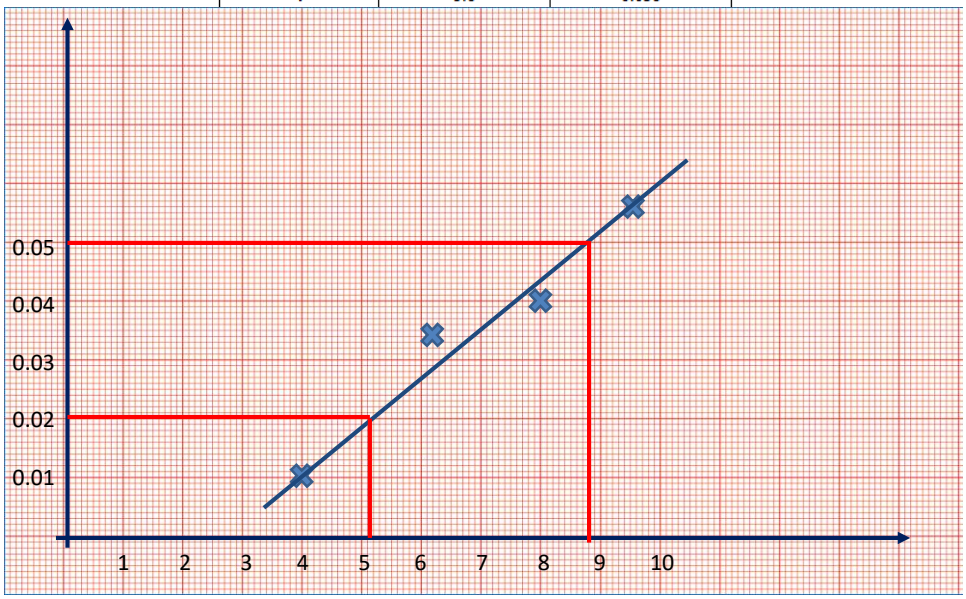

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