Frequently Asked Questions

This document will be updated until **_August 20th_**, after which there will be no further assistance available. If your question has not been answered in this document, try rereading the instructions, viewing the online resources and looking over the rubric. Until then, if you don't see your question answered here, please email Chloe at chloe.miklaucic@queensu.ca.

It is recommended that for formatting requirements, you read the **formatting section** of the assignment, and use the **pdf tutorials** & **practice assignment answer key** as examples. The videos will help show you how to do things, but these are the most updated resources for the formatting requirements.

DIRECTORY

General Questions

Finding the Excel Word Assignment & Tutorials

The assignment, the practice assignment and tutorials for Microsoft Excel and Word can be found HERE.

Submitting the Excel Word Assignment

The instructions for submitting the Excel Word Assignment will be provided a **week before the due date**.

Determining Significant Figures

Error should be reported to **1 significant figure.** If there is a number that has an error value associated with it, it should be reported to the **same digit** as the error.

Examples: 678 ± 16 should be expressed as $(6.8 ± 0.2) \times 10^2$ or $(68 ± 2) \times 10^1$ or 680 ± 20

987.54 ± 0.11 should be expressed as 987.5 ± 0.1

If there is **not an error value associated** with a given value, and the number of significant figures has not been specified in the question, report all numerical values to **two decimal places.**

Performing Calculations

When performing calculations, use as many significant figures as the numbers are **presented with**. If you are using the equations or the values from the regression analyses, you must use the numbers as they are presented **with error** because that is the only digits that can be guaranteed.

Trendline Equations

Trendline equations should always be included **whenever a trendline is included on a plot**. The trendline equations should be presented on the plot with their trendlines and should also have the R^2 value on the plot.

Downloading Analysis ToolPak for Mac

Go to the *Tools* drop down menu and select Add-Ins. From there, you should see the option to check off both or either of the Analysis ToolPak or Solver.

Basic Plot Guidelines

Figure 1 below was taken from the practice assignment answer key in order to help you see what a good plot should look like. Some things to note:

- No gridlines, use inside tick marks instead
- Axis titles with units but no chart titles
- Legend is enclosed by the plot, but not overlapping any data
- Plot enclosed by a black box – plot area line and axis are black lines
- Trendline equations and R^2 values present on the graph, with variables & subscripts to show what trendline they are attached to
    - You may also choose to add a line to the label to show what series they work with
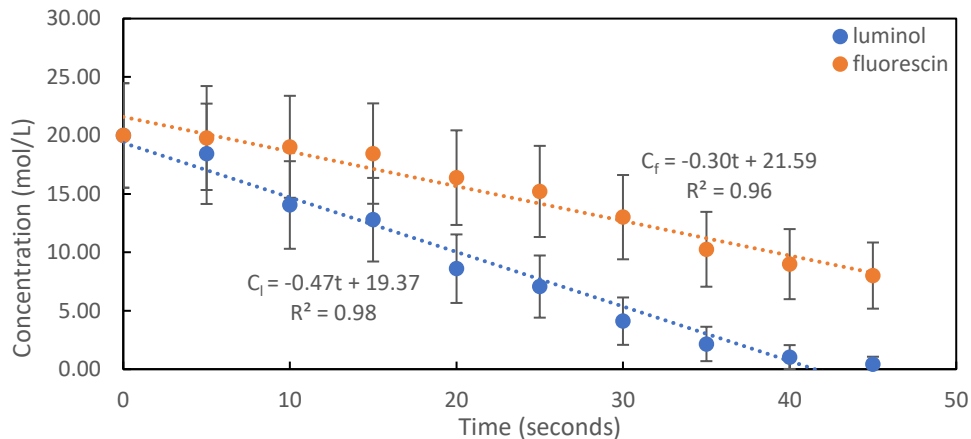- Descriptive Figure caption

Figure 1: Example plot for formatting purposes

Formatting Equations

Start by creating an equation by clicking **Equation** in the **Insert** tab. Write your equation.

$$y = mx + b$$

Then you need to add an equation number on the end. If you were adding a number to Equation 1, you would write "#(1)" in the equation editor on the right of your equation and click enter.

$$y = mx + b \tag{1}$$

Digits for Calculations

You should be using the number of digits dictated by error in your calculations. If the number has no error associated, use all the digits provided by the trendline. If the number has error associated with it, only use the same number of digits that are presented with the error. For example, if a value is given as 5.274 ± 0.1, then you can only use 5.3 in calculations.

Error Bars

Error bars should only be in the y-direction. We know the mass exactly, so there should be no error bars in the x-direction. Ensure you set the x-direction to 0 and remove the caps so they can't be seen.

Ln Uncertainty

To calculate the ln uncertainty, simply take the ln of the previously calculated uncertainty values.

Additional Tips

Introduction

The Problem Definition section of your introduction should just be based on the 101 project that you will be working on this fall. The project is designing an automated fluid dispenser. You do not need to discuss the efficiency of different gear ratios in this paragraph. The Problem Definition is not as much specifically related to this assignment as it is practice and preparation for your work this fall. There is no right answer for what to write, just try to develop an understanding of the problem (the need for an automated fluid dispenser) from different perspectives. Also do not forget to cite at least one source!

Steps to Follow 1
Make sure to check your units when calculating power.

Steps to Follow 2
In this step you must calculate the efficiency of every trial and then take the average of the three trials. It is important that you calculate the efficiency first because there are two dependent variables (measured variables) in this experiment, so the conditions are not consistent across every trial. This means that you cannot normalize the data (take the average) until you consider the varying conditions by analyzing the data (calculating the efficiency).

Steps to Follow 4
To learn more about completing regression analysis, try watching this video starting at 2:16 (except do not check "Constant is 0" box). That video and more resources are available on the Excel Word Assignment Website.

If you are having trouble reading your results and filling out Table 7, look for a table like Table 1 below. You will use the 4 values highlighted in yellow (the y-intercept and its error and the slope and its error).

Table 1: Example table from a regression analysis

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 68.0%	Upper 68.0%
Intercept								
X Variable								

Steps to Follow 5
The input X range and input Y range are the same as those used in the regression analysis from Steps to Follow 4.