

QUANTITATIVE METHODS

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Winter 2005

LAB 3

Graphs – Part I

Example 1

Suppose that an ecologist desires to know the composition of a forest in a particular region. To do this, a random sample of 50 trees is taken from the forest, and the species of each tree is noted. What we will now do is compile the information obtained by the ecologist and graphically represent it.

Go to Excel.

In cell A1 write in Bold 20 “Graphs - Part 1”. In cell A2 write “Lab 4” in size 12 and in cell A3 write “By: your name” in size 12. Label Sheet 1 “Forest Composition”. Save your work under LAB 4. Don’t forget to periodically save your work!

In cell A6 write “Sample” in bold. Open the worksheet “Data – Tree Sample” from my web site and copy the sample results in cells A7:A56.

Frequency Distribution Table


The first thing to do is to compile the result in a table. In cells C5:E12, do the following:

Composition of Forest		
Tree	Frequency	Relative Frequency
Pine		
Maple		
Spruce		
Oak		
Elm		
<i>Total</i>		

where the lines may be omitted, and the width of the columns are adjusted so that the words fit properly.


To find the frequency of each tree, we will get EXCEL to do the counting for us. Go to cell D7. In the functions (the f_x button), go to STATISTICAL (in category) and COUNTIF (in function). Click in the space for the RANGE, and with your mouse, blacken the list of trees A7:A56. Put \$ signs before the 7 and the 56, so that this block will stay fix. Next, in CRITERIA, click on the cell C7 where Pine is written. Click OK. Copy this formula, with your mouse, for the other trees. For the cell D12, use the Σ button to find the sum. For the relative frequency column, we divide the number of trees of one kind by the total number, and express the answer as a percentage. Use a formula making references to cells for this, and use your mouse to copy the formula down the column. For the last cell, you should obtain 100% when adding the percentages.

Graphing

Click on the Chart Wizard  icon. For a bar diagram, click on COLUMN and then on NEXT. Next, click in Data Range, erase what is written (if anything) and blacken the cells E7:E11 corresponding to your relative frequencies. Note: you should see a bar diagram representing your data if all is well. Click on SERIES, and in CATEGORY (X) AXIS LABELS. Blacken the list of names for our trees, that is, the cell block C7:C11. Click on Next. Fill in the white places by entering appropriate titles for the chart, the X-axis and the Y-axis. Click on FINISH.

Modifying graphs

Let us modify the graph a little. With your mouse, move it down so that it does not obstruct any data.

We would like our graph to be a little bigger. With your mouse go to one of the black squares till you see a  appearing. Click on the mouse and increase the size of the graph to a more convenient one.

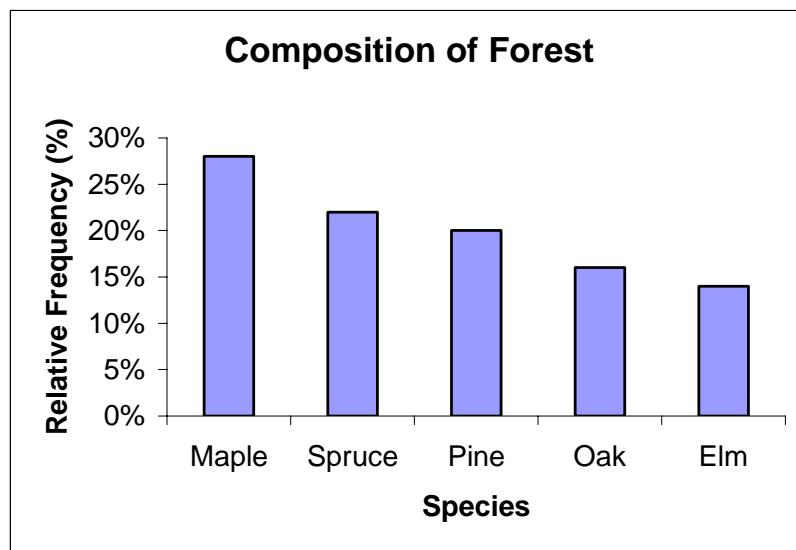
Since we only have one set of points, we don't need the legend "Series 1" on the right of your graph. To get rid of it, click on it with the right button on your mouse, and, when you see the small menu, go to CLEAR.

We would also like to get rid of the gray background. Click on it with the right button of your mouse. A menu appears. Go to FORMAT PLOT AREA and click on NONE in Border and in Area and then click OK.

We would also like to get rid of the vertical lines. Do the same as previously to see the menu then click on CHART OPTIONS – GRIDLINES. Next, click on the appropriate box to lose the lines. Click OK

To make a **Pareto Diagram**, we need to put the rectangles in order of height. To do this, blacken the cells C6:E11 and go to DATA – SORT – SORT BY - FREQUENCY (the option HEADER ROW must be checked). Also, click on DESCENDING. The graph and table should automatically me updated.

Here is what your Pareto Diagram should look like.



Example 2

Suppose that Gallup Polls conducted a survey on the voting intentions of Quebecers at the next Provincial Elections. In their random sample, they obtained the following responses.

Party	Frequency
PLQ	355
PQ	348
ADQ	336

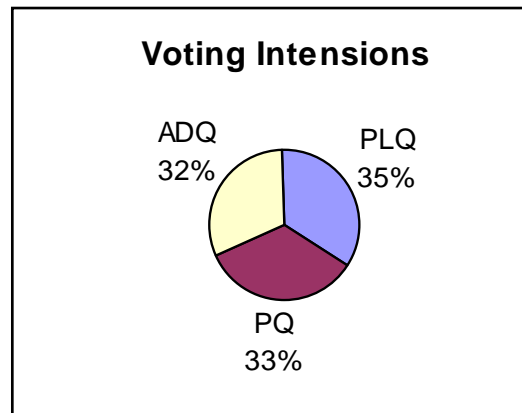
Go to Sheet 2 and rename it “Voting Intentions”. In cell A1:A3, do a heading similar to that of Sheet 1. From the data above, construct a frequency distribution table in cells A6:C11 that looks like:

Voting Intentions		
Party	Frequency	Relative Frequency
PLQ	355	
PQ	348	
ADQ	336	
<i>Total</i>		

Fill in the column Relative Frequency and find the two totals. All this should be done using formulas with reference to other cells.

Pie Diagrams

Make a Pie Diagram in the same way you made the bar graph in example 1. It should look like this.

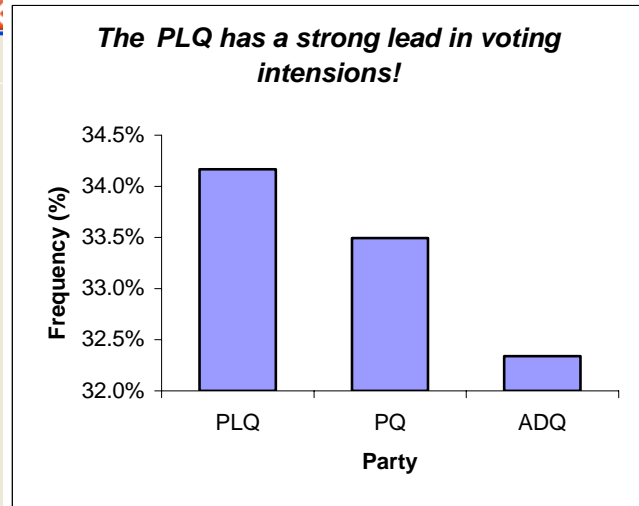
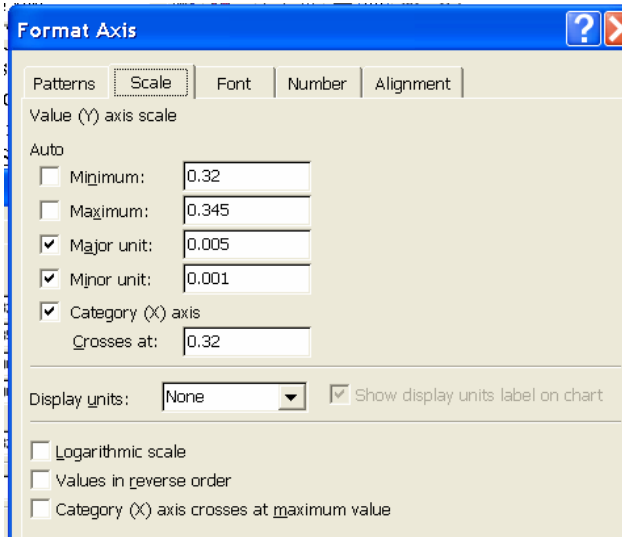


To see the percentages and the labels, click on the Pie with the right button on the mouse and go to **FORMAT DATA SERIES – DATA LABELS** and click on **CATEGORY NAME** and **PERCENTAGE**.

How to Cheat with Bar Diagrams

Make a Bar Diagram in the same way as in Example 1.

Suppose we wish to publish the diagram in the paper with the headline “The PLQ has a strong lead in the polls”. To support this statement, we *decrease* the range of values for the frequencies by changing the minimum and maximum values. On the y-axis, click with your right button and go to **FORMAT AXIS – SCALE** and change the cells MINIMUM and MAXIMUM, as shown below on the left. (Note: Increases the height of the graph a little bit.)



Suppose that we now want the headline to be “The Three parties are at equality in voting intentions”. To observe this, we make similar modifications as before, except that we *increase* the range of values for the frequencies by changing the minimum and maximum values.

