Introduction

## Chapter

## 1

Chapter 1 is an introduction to the basic organization of statistics. This includes some basic ways to store and manipulate data. In this chapter you will be shown how to enter a table and do some simple formulas to calculate sums and products involving data and frequencies. In the beginning of this manual, every step will be described. As the manual progresses, previously discussed details will be eliminated for brevity’s sake.

# Summations and Frequency Charts

Excel provides a lot of freedom to organize data in any way that best fits the situation. For a table consisting strictly of values, it is usually simplest to enter the data into a column format. If the data involves frequencies, it may make more sense to enter the data in rows to mimic typical frequency tables.

The annual salaries (in thousands of dollars) of four coworkers are 75, 90, 125, and 61 respectively, and you are asked to calculate the sum, square of sum, and the sum of the squared values using this data. Let *x1*, *x2*, *x3*, and *x4* be the annual salaries (in thousands of dollars) of the first, second, third, and fourth worker respectively. Start by opening a new Excel spreadsheet, then enter the values shown in the illustration in the cells indicated by the row and column headers on the left and top of the illustration.



Get in the habit of formatting the column label (shown above in cell A1) something different than the rest of the column. This improves readability and also helps Excel to “know” that the first cell is a label and not a data item in certain situations. For most examples throughout this manual, column labels will appear in bold, centered, with a bottom border and set off by the orange accent color for consistency. These formatting options can be found in the **Font** or **Alignment** groups of the **Home** tab as shown below:



If a label covers more than one column, we’ll note it by using the merge and center option. Simply select the cells you want to share the label and click on the **Merge and Center** option in the **Alignment** group of the **Home** tab.

Now that the data has been entered, we can perform the calculations requested in the example. Enter the following in the cells indicated (i.e. B1, B2, etc.). Note that the quotation marks indicate labels; those marks should not be entered into the cell.

**B1: “x-squared”**

Select **A1** and click on the **Format Painter** in the **Clipboard** group of the **Home** tab, then click on **B1**. This will format **A1** and **B1** exactly the same.

**B2: =A2^2**

Note that all formulas in Excel begin with an equals “=” sign.

**Autofill** the formula from **B2** to **B5**. Autofill is a shortcut method of copying formulas from one cell to adjacent cells. In this instance, select **B2**, put your mouse over the tiny square in the lower right-hand corner of the cell (the mouse will become a cross), and click and drag to cell **B5**.



The resulting cells are shown below with formulas on the left and the same sheet shown with values on the right. Note that you can show your formulas at anytime by holding the <CONTROL> key and pressing the tilde (~) key.



Notice how the cell reference changes depending on the row. Excel automatically changes the formula to do this.

Next, enter the following: **D1: “Sum of x”**

**D2: =Sum(A:A)** This allows the sum of any number of data items in column A. You have to make sure to enter only the proper data and no other numerical items into A.

**E1: “Sum of Squares”**

Autofill the **D2** formula to **E2**.

**F1: “Square of Sums”**

**F2: =D2^2**

Use the format painter to format the labels similar to the previous column headers in **A1:C1**. The colon between two cell references indicates the rectangular range of cells defined in the upper left by the first reference and lower right by the second.

The results are shown below:

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You can resize the columns if necessary by placing your mouse on the line between the column headers and clicking and dragging (or automatically by double-clicking on the line).

For tables involving frequencies, you will need to enter two columns: one for the x values and the second for the frequencies. The formulas for the squared frequencies, product of values and frequencies, and the product of squared values and frequencies can then be entered in the next available columns as shown below:



Select **C2:E2** and autofill the formula down to **C5:E5**. You can autofill all three formulas at once.

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In the previous example, we used separate columns for the sums to illustrate how sums may be calculated for any sized data set. Excel will calculate these sums as data is entered or changed. In the next example, we’ll show the more conventional method of using Excel’s AutoSum feature. The disadvantage of this is that Excel sometimes makes an assumption as to where to find the data to be summed; there are times when this assumption is not correct. Additionally, when using AutoSum it becomes a little more complicated to add data to the column if necessary.

Select the cells that you would like to hold the sums and click the **AutoSum** button in the **Function Library** group of the **Formulas** tab.



This automatically creates and places the formulas for you. But be careful. Make sure that Excel made the proper assumption of what you want summed. (You will see this by a blue rectangle indicating the range to be summed. You can also check your formulas by using <CONTROL> + ~ as described earlier.) If it hasn’t, you may adjust the formula by clicking on the cell, selecting the cell references in the formula bar and selecting the proper cells, as shown below:



The blue box indicates the cells to be summed. This box may be adjusted directly by clicking and dragging it to resize it or by selecting the desired cells. Format the sums differently from the rest of the data to set them apart.



We’ve formatted the sums row and the calculated columns to appear in a lighter shade of the orange Label color to indicate calculated values. The comma format with zero decimal places is used to make the larger numbers more readable. You can adjust this via the options in the **Format** group of the **Home** tab.