

Another feature that Excel has that can make your life easier when looking at data is that it will make charts and graphs for you, relatively easily. Locate the ‘Graphing BMI’ data set.

|       | Height feet | Height inches | Weight pounds | BMI   |
|-------|-------------|---------------|---------------|-------|
| Adam  | 5           | 10            | 177           | 25.39 |
| Bill  | 5           | 9             | 183           | 27.02 |
| Bob   | 5           | 9             | 170           | 25.10 |
| Brett | 6           | 4             | 255           | 31.04 |
| Brian | 5           | 7             | 154           | 24.12 |
| Chris | 5           | 6             | 155           | 25.01 |
| Colin | 5           | 9             | 198           | 29.24 |
| Eli   | 5           | 7             | 182           | 28.50 |
| Fred  | 6           | 1             | 211           | 27.84 |
| Jeff  | 5           | 11            | 189           | 26.36 |
| Joe   | 5           | 10            | 180           | 25.82 |
| Matt  | 6           | 2             | 223           | 28.63 |
| Paul  | 6           | 1             | 179           | 26.43 |
| Phil  | 6           | 0             | 205           | 27.80 |
| Ron   | 6           | 3             | 239           | 29.87 |
| Sam   | 6           | 3             | 175           | 26.72 |
| Sean  | 6           | 2             | 287           | 36.84 |
| Steve | 5           | 11            | 192           | 26.78 |
| Todd  | 5           | 4             | 142           | 24.37 |
| Tyler | 5           | 6             | 147           | 23.72 |

### Inserting Column Review:

Back in the ‘Formatting Basics’ lecture, we learned how to insert a column (or row). For a later purpose, I would like to have height measured in inches. To make room for this, I am going to insert a column between the existing height and weight columns. I’m going to ‘Ctrl click’ on the column title D and select insert, because the column inserted will go left the cell I select. Merge and center the new cells D10 and D11 and title this inserted column ‘Total Inches.’ I would also suggest “wrapping the text.”

**Note:** Notice when inserting the column, the formulas are adjusted automatically to still reference the cells we initially

intended.

### Cell Reference Formula Reminder:

|       | Height feet | Total Height inches | Weight pounds | BMI   |
|-------|-------------|---------------------|---------------|-------|
| Adam  | 5           | 10                  | 177           | 25.39 |
| Bill  | 5           | 9                   | 183           | 27.02 |
| Bob   | 5           | 9                   | 170           | 25.10 |
| Brett | 6           | 4                   | 255           | 31.04 |

In cell D12 I’m going to insert a formula to calculate the height in total inches. Keep in mind to do this, we’ll need to multiply the height in feet by 12, and add the additional inches to this total. Just as before, I’m going to move my cursor to the bottom right

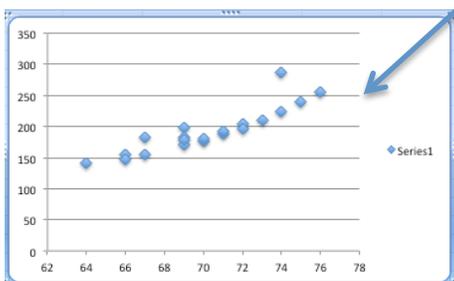
corner of cell D12, and once it turns into the bold, black cross and drag all the way down to copy the formula down to all the men.

|       | Height feet | Total Height inches | Weight pounds | BMI   |
|-------|-------------|---------------------|---------------|-------|
| Adam  | 5           | 10                  | 177           | 25.39 |
| Bill  | 5           | 9                   | 183           | 27.02 |
| Bob   | 5           | 9                   | 170           | 25.10 |
| Brett | 6           | 4                   | 255           | 31.04 |
| Brian | 5           | 7                   | 154           | 24.12 |
| Chris | 5           | 6                   | 155           | 25.01 |
| Colin | 5           | 9                   | 198           | 29.24 |
| Eli   | 5           | 7                   | 182           | 28.50 |
| Fred  | 6           | 1                   | 211           | 27.84 |
| Jeff  | 5           | 11                  | 189           | 26.36 |
| Joe   | 5           | 10                  | 180           | 25.82 |
| Matt  | 6           | 2                   | 223           | 28.63 |
| Paul  | 5           | 9                   | 179           | 26.43 |
| Phil  | 6           | 0                   | 205           | 27.80 |
| Ron   | 6           | 3                   | 239           | 29.87 |
| Sam   | 6           | 3                   | 175           | 26.72 |
| Sean  | 6           | 2                   | 287           | 36.84 |
| Steve | 5           | 11                  | 192           | 26.78 |
| Todd  | 5           | 4                   | 142           | 24.37 |
| Tyler | 5           | 6                   | 147           | 23.72 |

### Insert a Scatter-Plot:

I would like to start displaying data with charts with a scatter-plot displaying height (in inches) and weight. I’m going to begin by selecting all of the heights and weights located in columns D and E. Once the data is selected, the next step may depend on which version of excel you have. From the top menu, select *Insert* and click *Chart...* If nothing obvious happens, then you have the newer version of Excel, as I do. The Chart menu appears in the toolbar above the spreadsheet in our version. (You could have clicked *Chart* in this menu, without having to go to *Insert* in the top menu).

Either way, choose *Scatter* and Excel will automatically make the plot. This is the initial plot I received. Notice that things are not labeled clearly, and some formatting may make things look nicer.



## Formatting the Chart:

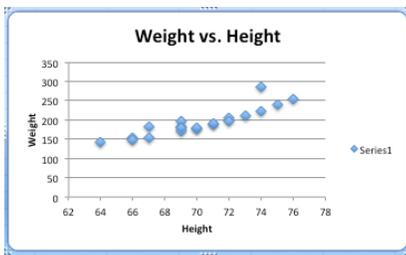
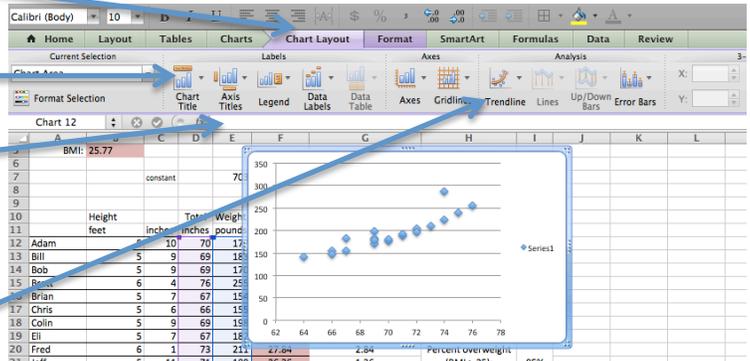
In the menu, select *Chart Layout* you will have many options unique to the type of chart (in this case scatter).

Lets first add a Chart Title:  
Call it "Weight vs. Height"

Also add titles to the axes, labeling them Weight and Height, respectively.

One cool thing you can do is insert a trend line within the scatter-plot, which helps show the pattern of the data.

Now things look a little better, and the plot is much easier to interpret.



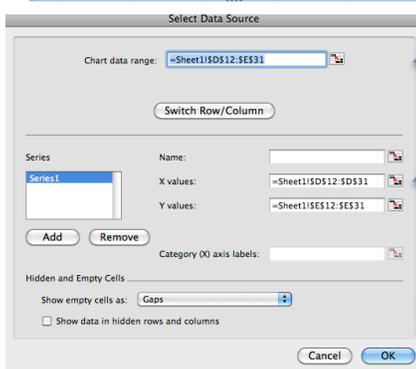
## Switching Data:

If you want to have change the data you have selected, perhaps you would like to simply switch the x- and y-axes, you may do so by 'Ctrl' clicking on the scatter-plot and choosing Select Data... From here you'll get this menu. The easiest way to choose the data is by clicking and dragging (rather than typing it

in). Click the button with the red arrow for whichever axis you would like to modify, and you'll be allowed to click and drag the cells you would like to use.

**Note:** If you change the data in the cells your scatter-plot uses, it will automatically change the scatterplot.

**Note:** You should make sure the data displayed is how you want it before labeling the axes and other formatting, as they will not automatically change if you change the data used in the scatter plot.

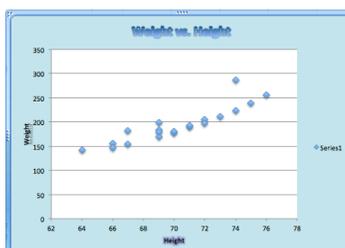
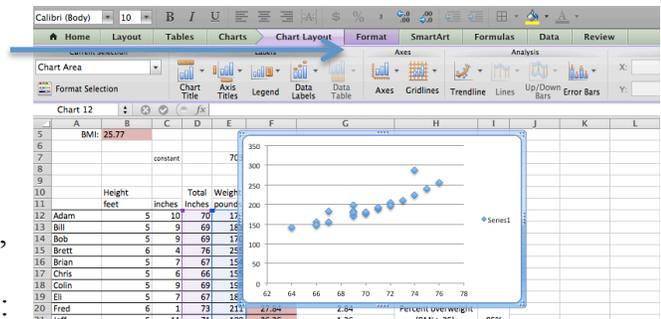


## Other formatting of the scatter-plot:

If you're interested in other formatting options for your scatter-plot, select the scatter-plot and click the *Format* option in the *Chart* menu.

From here you can change line colors, font styles, background colors etcetera, to make the plot look just the way you want it.

There is really not functionality to these modifications, other than aesthetics. I played around with the options to see what I could change, and this was my end result:



### Another Formula Review:

For the next two charts, I would like to insert another formula to count how many men are considered obese based of the defined criteria (BMI > 30). To do this, I am going to use the =COUNTIF formula, to count the number of BMI's that are over 30. First click on cell F34 and type the following formula:

Obease: =COUNTIF(E12:E31, ">30")

Similarly, in Cell F35 I'm going to calculate the number of people who are "healthy" and have a BMI < 25.

Healthy: =COUNTIF(F12:F31, "<25")

Then, because we have already counted the total number of men previously (cell I15), we can quickly calculate the number of overweight men in cell F36 by subtracting the number of obese men and healthy men from the total:

Overweight: =I15-F34-F35

Hopefully we agree that this is what the final counts should be:

**Note:** I formatted the labels to "shrink to fit" into the cells.

|             |    |
|-------------|----|
| Obease:     | 2  |
| Healthy:    | 3  |
| Overweight: | 15 |

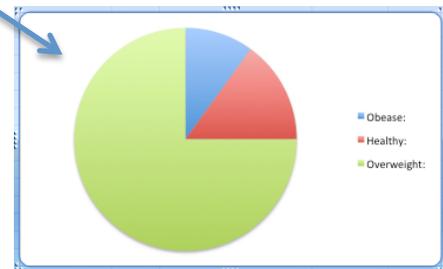
### Creating a Pie Chart:

A pie chart is used to show proportions of observations that fall into various categories. To insert a pie chart, the most important thing is to select the cells that have the values you're interested in. My suggestion would be to also highlight the category names as well, as Excel is smart enough to know that is how you would like them labeled. That is, highlight the labels and counts in cells E34 through F36.



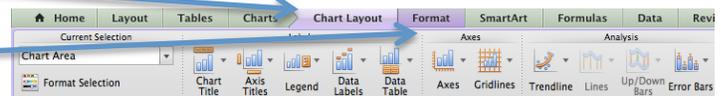
|             |    |
|-------------|----|
| Obease:     | 2  |
| Healthy:    | 3  |
| Overweight: | 15 |

Now from the Charts menu choose Pie. You'll notice there are many choices of types of pie charts. Really, they all work the exact same way. Again, the choice is simply a matter of aesthetics – what you think looks best. I'd say pick the basic one, in the top left corner. As I mentioned, Excel has not only made the pie chart, but also indicated in the legend which color represents which category.

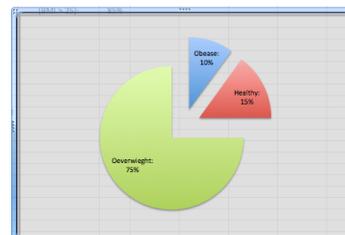


### Formatting The Pie Chart:

As was the case with the scatter-plot, this pie chart is a little boring, and more formatting can be done. Just as before, select the chart, and click Chart Layout for adding a title or data labels (including percentages within the data), or under Format you can modify colors, borders, text, etc. within the plot.



**Note:** One neat thing about pie charts, if you want to point out one piece of the pie, you can click it and pull it out of the pie, so it stands out a little more. After messing with the formatting, perhaps your final pie chart resembles mine:



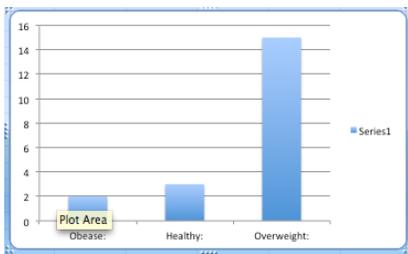
## Creating a Bar Graph:



|          | Height | Total  | Weight | BMI    | BMI Decrease needed to not be overweight |                        |
|----------|--------|--------|--------|--------|--|------------------------|
|          | feet   | inches | inches | pounds |  |                        |
| 12 Adam  | 5      | 10     | 70     | 177    | 25.39                                    | 0.30                   |
| 13 Bill  | 5      | 9      | 69     | 183    | 27.02                                    | 2.02                   |
| 14 Bob   | 5      | 9      | 69     | 170    | 25.10                                    | 0.10                   |
| 15 Brett | 6      | 4      | 76     | 255    | 31.04                                    | 6.04                   |
| 16 Brian | 5      | 7      | 67     | 154    | 24.12                                    | Keep up the good work! |
| 17 Chris | 5      | 6      | 66     | 155    | 25.01                                    | 0.01                   |
| 18 Colin | 5      | 9      | 69     | 198    | 29.24                                    | 4.24                   |
| 19 Eli   | 5      | 7      | 67     | 182    | 28.50                                    | 3.50                   |
| 20 Fred  | 6      | 1      | 73     | 211    | 27.84                                    | 2.84                   |
| 21 Jeff  | 5      | 11     | 71     | 189    | 26.36                                    | 1.36                   |
| 22 Joe   | 5      | 10     | 70     | 180    | 25.82                                    | 0.82                   |
| 23 Matt  | 6      | 2      | 74     | 223    | 28.63                                    | 3.63                   |
| 24 Paul  | 5      | 9      | 69     | 179    | 26.43                                    | 1.43                   |
| 25 Phil  | 6      | 0      | 72     | 205    | 27.80                                    | 2.80                   |
| 26 Ron   | 6      | 3      | 75     | 230    | 29.87                                    | 4.87                   |
| 27 Sam   | 6      | 0      | 72     | 197    | 26.72                                    | 1.72                   |
| 28 Sean  | 6      | 2      | 74     | 287    | 36.84                                    | 11.84                  |
| 29 Steve | 5      | 11     | 71     | 192    | 26.78                                    | 1.78                   |
| 30 Todd  | 5      | 4      | 64     | 142    | 24.37                                    | Keep up the good work! |
| 31 Tyler | 5      | 6      | 66     | 147    | 23.72                                    | Keep up the good work! |

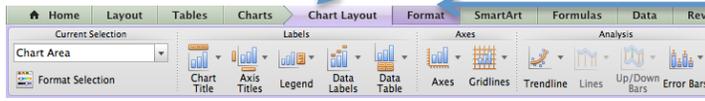
Bar graphs are also great for displaying data, similar to a pie chart. The difference is that bar graphs display the count of observations, whereas pie charts display percent of observations. Just as we did with the pie chart, select the data you would like to display in a bar graph (as well as the labels of the data). This time from Charts choose Column. Again, I have chosen the most basic bar graph – the top left option.

**Note:** What excel calls a ‘Bar Graph’ is a horizontal bar graph, and I think those look a little funny. Honestly though, they display the data the exact same way – just turned on its side. As with many of the formatting things, it is a matter of what you think looks better (or what fits better in the space available in a presentation). Just as with the pie chart, because I also selected the labels with the data, Excel has labeled the bars in the bar graph.



## Formatting the Bar Graph:

Just as we have done previously, after selecting your graph, we may add or modify the labels, axes and scales from the Chart Layout menu. Also, we can modify fonts and colors,



etc. from the Format tab. After messing with labels and formatting, perhaps your bar

graph looks somewhat like this:



## Other Charts and Graphs:

There are other types of graphs and charts that can be made, for various uses. The main one we have not discussed is a line graph. Typically, line graphs are used to observe the values of something over time (perhaps someone records their weight once a week). As far as creating a line graph, it is very similar to a scatter plot, although you only need one column/row of data.



|          | Height | Total  | Weight | BMI    | BMI Decrease needed to not be overweight |                        |
|----------|--------|--------|--------|--------|--|------------------------|
|          | feet   | inches | inches | pounds |  |                        |
| 12 Adam  | 5      | 10     | 70     | 177    | 25.39                                    | 0.30                   |
| 13 Bill  | 5      | 9      | 69     | 183    | 27.02                                    | 2.02                   |
| 14 Bob   | 5      | 9      | 69     | 170    | 25.10                                    | 0.10                   |
| 15 Brett | 6      | 4      | 76     | 255    | 31.04                                    | 6.04                   |
| 16 Brian | 5      | 7      | 67     | 154    | 24.12                                    | Keep up the good work! |
| 17 Chris | 5      | 6      | 66     | 155    | 25.01                                    | 0.01                   |
| 18 Colin | 5      | 9      | 69     | 198    | 29.24                                    | 4.24                   |
| 19 Eli   | 5      | 7      | 67     | 182    | 28.50                                    | 3.50                   |
| 20 Fred  | 6      | 1      | 73     | 211    | 27.84                                    | 2.84                   |
| 21 Jeff  | 5      | 11     | 71     | 189    | 26.36                                    | 1.36                   |
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| 23 Matt  | 6      | 2      | 74     | 223    | 28.63                                    | 3.63                   |
| 24 Paul  | 5      | 9      | 69     | 179    | 26.43                                    | 1.43                   |
| 25 Phil  | 6      | 0      | 72     | 205    | 27.80                                    | 2.80                   |
| 26 Ron   | 6      | 3      | 75     | 230    | 29.87                                    | 4.87                   |
| 27 Sam   | 6      | 0      | 72     | 197    | 26.72                                    | 1.72                   |
| 28 Sean  | 6      | 2      | 74     | 287    | 36.84                                    | 11.84                  |
| 29 Steve | 5      | 11     | 71     | 192    | 26.78                                    | 1.78                   |
| 30 Todd  | 5      | 4      | 64     | 142    | 24.37                                    | Keep up the good work! |
| 31 Tyler | 5      | 6      | 66     | 147    | 23.72                                    | Keep up the good work! |

Although it would not make sense to make a line graph of the height in inches of the men in the BMI data set, I’m going to do it anyway. I will select their heights in inches (cells D12 through D31) and choose Line from the Charts menu. Again, I’m going to pick the most basic line graph, although the others would work fine too. From here, I can title and label the chart, as well as format it to my liking, just as I have in the other graphs. Here is my end result:

