

Regression Analysis

Accounting presentation created by
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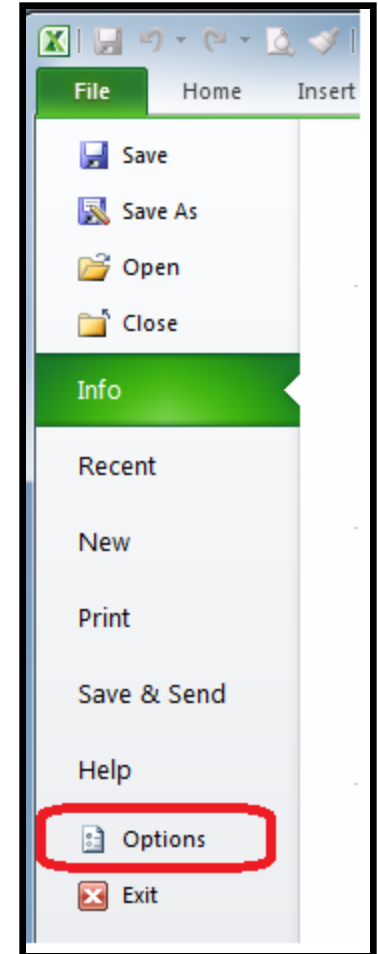


Regression Analysis

- First, how regression analysis works is above my level of knowledge. I just know how to create it and read it.
- Within Microsoft Excel, regression analysis is an Add-in. So lets add it in.
- Open Microsoft Excel, I am using Excel 2010 so your presentation may be a bit different based on version and setup.

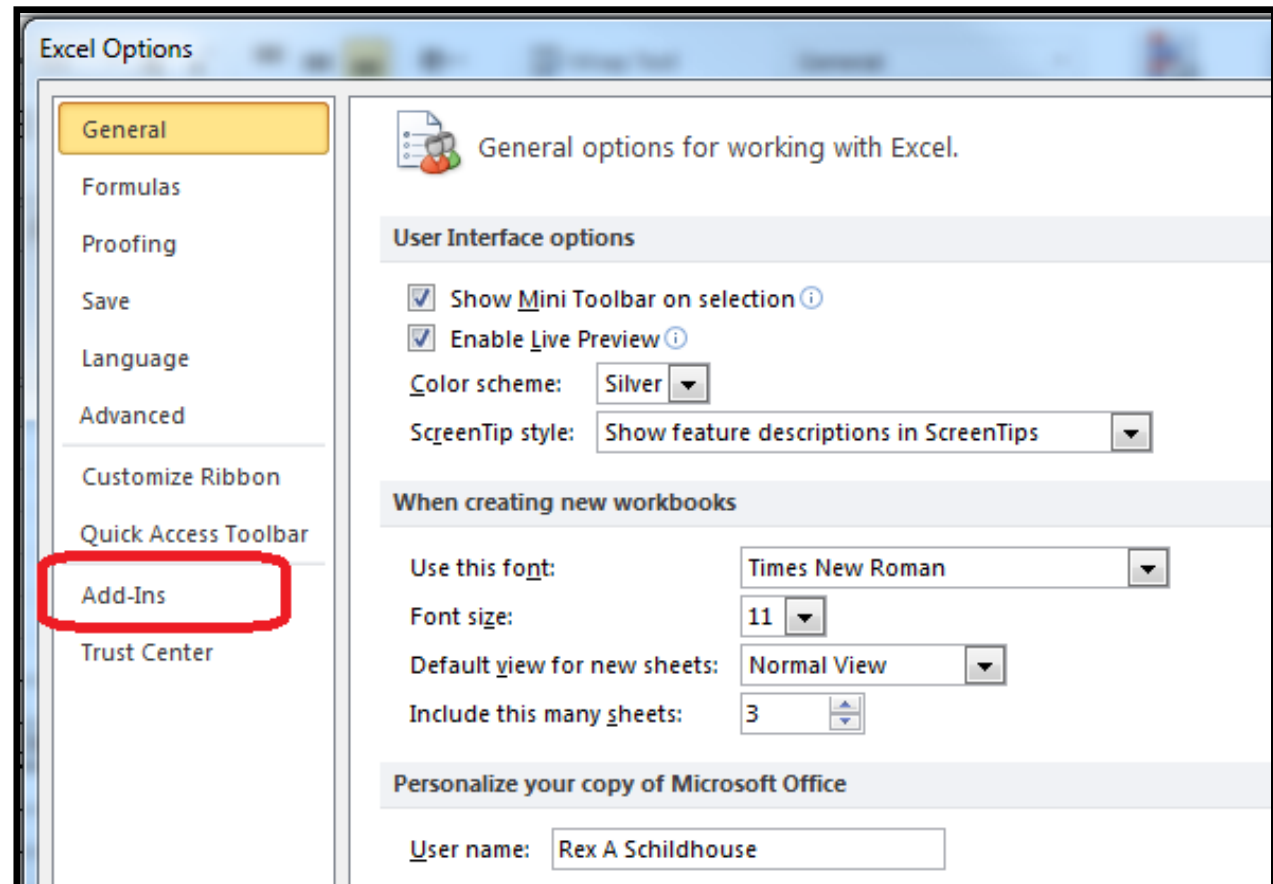
Regression Analysis

- Once the Regression tool is installed it will remain installed until removed.
- Under the File drop-down menu select the Options item.
- Depending how your system is set up, you may require double-clicking some of these actions.



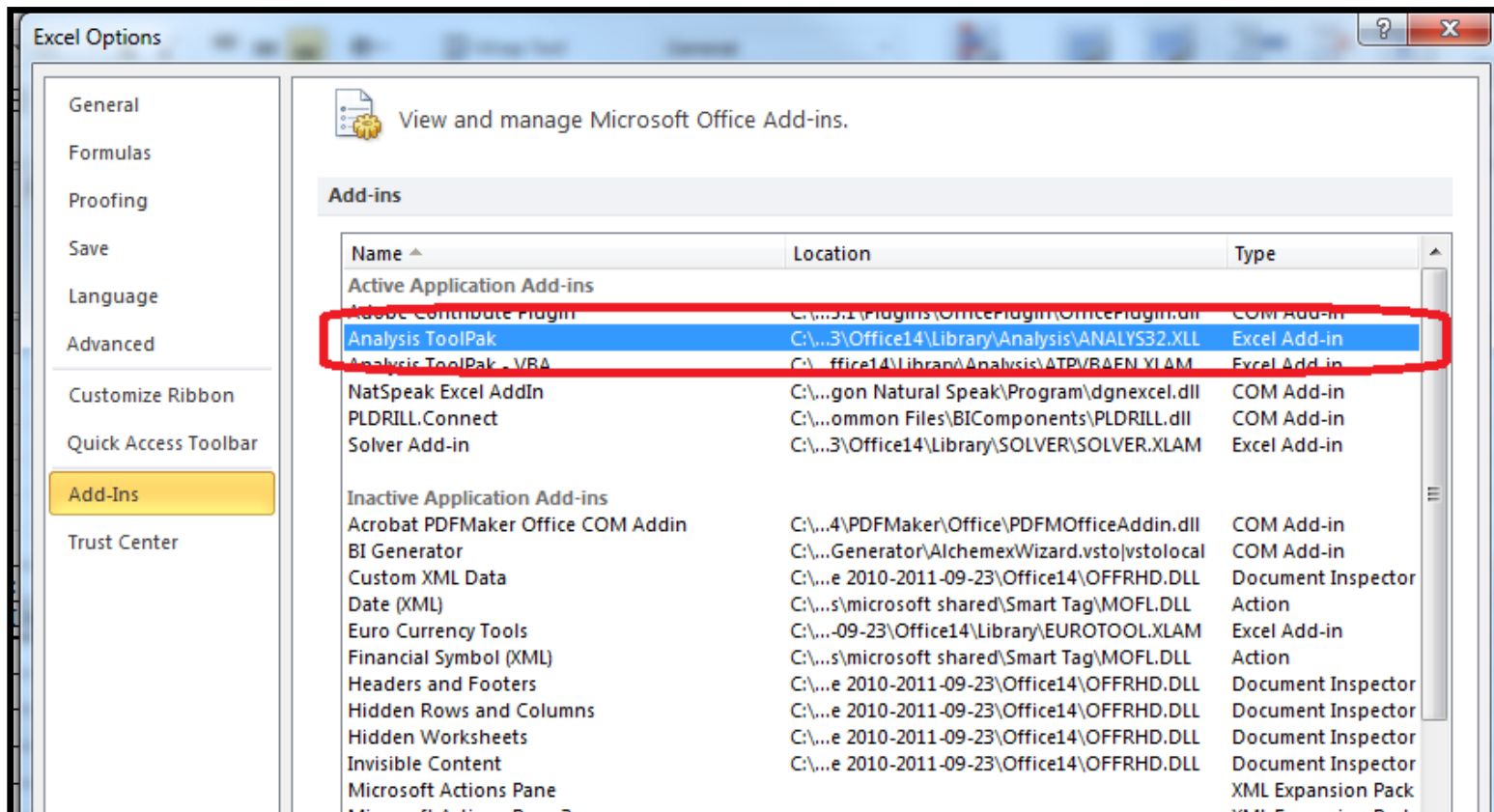
Regression Analysis

- From the pop-up dialog box select the Add-Ins option.



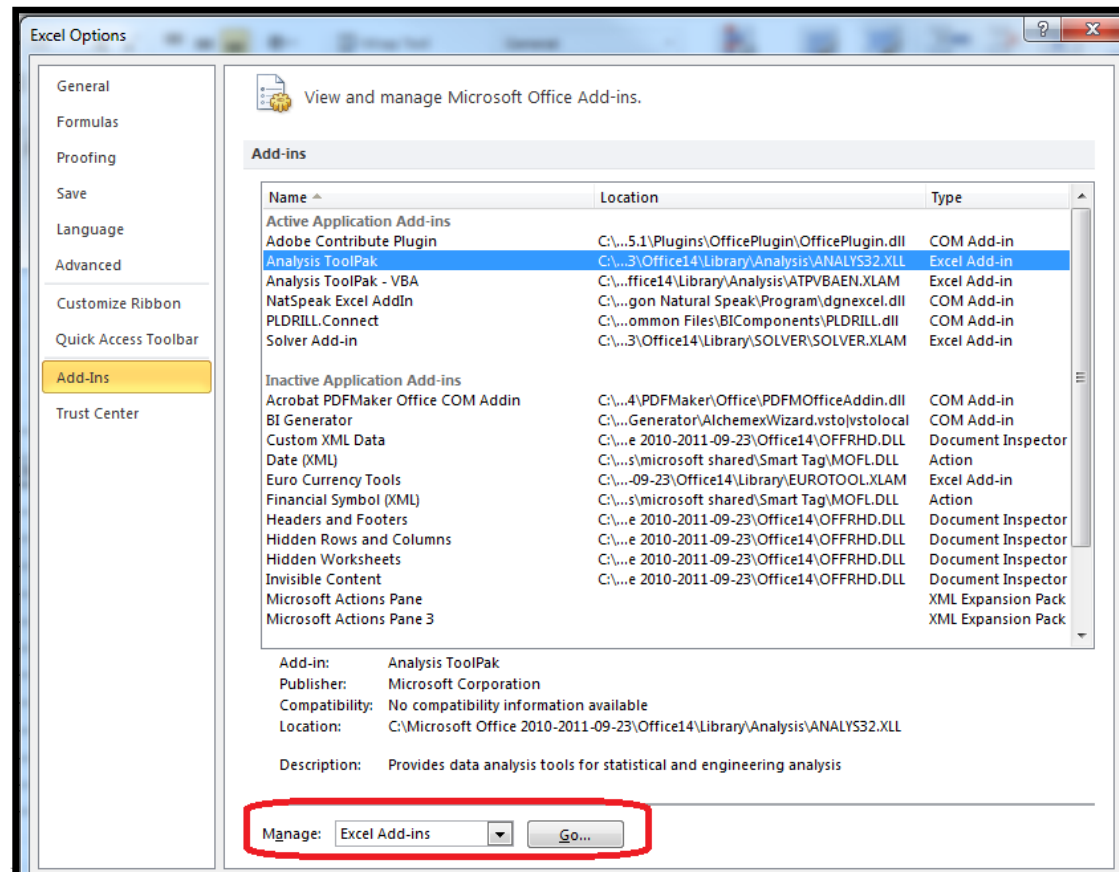
Regression Analysis

- Within the Add-Ins pop-up dialog box click on the Analysis ToolPak choice.



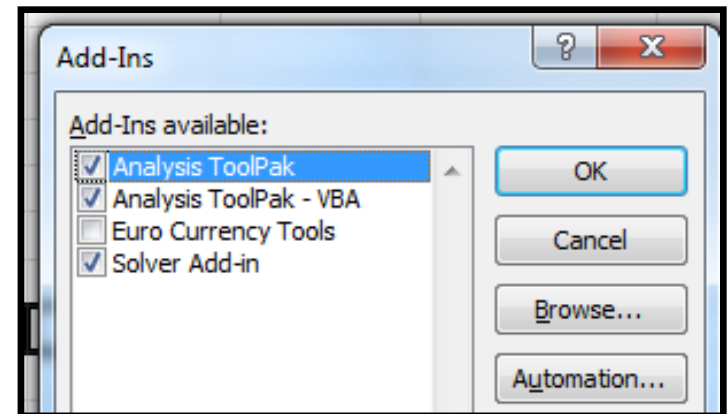
Regression Analysis

- With the Analysis ToolPak selected click on Manage Excel Add-Ins at the bottom of the pop-up dialog box.



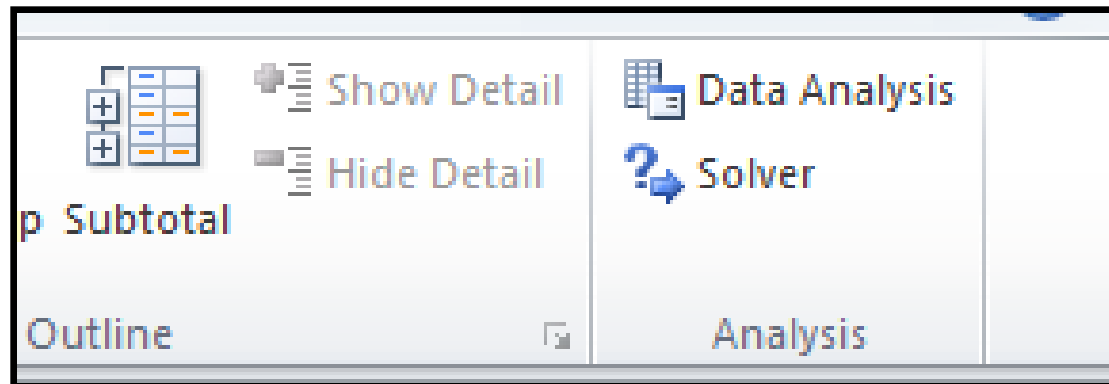
Regression Analysis

- Microsoft Excel is going to present you with another pop-up dialog box. Select Analysis ToolPak, Analysis ToolPak – VBA, and Solver Add-in as shown.
- Unless you have a need for the Euro currency symbol to be on your system, I do not recommend selecting that choice.



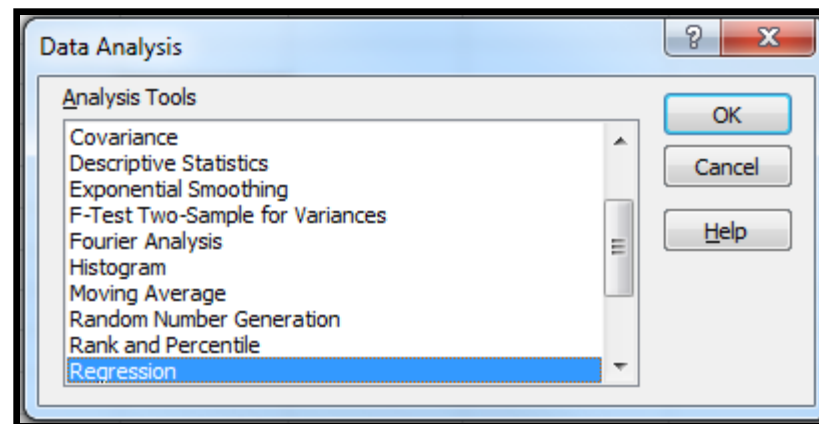
Regression Analysis

- Your system will most likely grind and whir for a while installing the new features.
- When it is complete you will have these new choices on the Data menu bar.



Regression Analysis

- To access the Regression analysis tool click on the Regression option then click on OK.



Regression Analysis

- Here is my data and the Regression pop-up dialog box populated for my data.

	A	B	C
52	Regression Analysis		
53	Month:	Guest Volume (x):	Utility Cost (y):
54	January	15,850	\$113,825
55	February	14,850	\$112,750
56	March	16,950	\$117,625
57	April	17,130	\$118,450
58	May	23,150	\$131,250
59	June	24,250	\$134,850
60	July	25,050	\$136,150
61	August	24,975	\$132,675
62	September	19,650	\$121,450
63	October	18,550	\$118,375
64	November	17,475	\$116,950
65	December	16,550	\$114,550

Regression

Input

Input Y Range:

Input X Range:

Labels Constant is Zero

Confidence Level: %

Output options

Output Range:

New Worksheet Ply:

New Workbook

Residuals

Residuals Residual Plots

Standardized Residuals Line Fit Plots

Normal Probability

Normal Probability Plots

OK Cancel Help

Regression Analysis

- I selected Labels on the dialog box and then set my Input Y range, dollars, to C53-C65.

	A	B	C
52		Regression Analysis	
53	Month:	Guest Volume (x):	Utility Cost (y):
54	January	15,850	\$113,825
55	February	14,850	\$112,750
56	March	16,950	\$117,625
57	April	17,130	\$118,450
58	May	23,150	\$131,250
59	June	24,250	\$134,850
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Regression

Input

Input Y Range:

Input X Range:

Labels Constant is Zero

Confidence Level: %

Output options

Output Range:

New Worksheet Ply:

New Workbook

Residuals

Residuals Residual Plots

Standardized Residuals Line Fit Plots

Normal Probability

Normal Probability Plots

OK Cancel Help

Regression Analysis

- With Labels selected on the dialog box I set my Input X range, units, to B53-B65.

	A	B	C
52	Regression Analysis		
53	Month:	Guest Volume (x):	Utility Cost (y):
54	January	15,850	\$113,825
55	February	14,850	\$112,750
56	March	16,950	\$117,625
57	April	17,130	\$118,450
58	May	23,150	\$131,250
59	June	24,250	\$134,850
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63	October	18,550	\$118,375
64	November	17,475	\$116,950
65	December	16,550	\$114,550

Regression

Input

Input Y Range:

Input X Range:

Labels Constant is Zero

Confidence Level: %

Output options

Output Range:

New Worksheet Ply:

New Workbook

Residuals

Residuals Residual Plots

Standardized Residuals Line Fit Plots

Normal Probability

Normal Probability Plots

OK Cancel Help

Regression Analysis

- I wanted my regression analysis to appear on the same worksheet so I defined the Output Range as E53.

	A	B	C
52	Regression Analysis		
53	Month:	Guest Volume (x):	Utility Cost (y):
54	January	15,850	\$113,825
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56	March	16,950	\$117,625
57	April	17,130	\$118,450
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Regression

Input

Input Y Range:

Input X Range:

Labels Constant is Zero

Confidence Level: %

Output options

Output Range:

New Worksheet Ply:

New Workbook

Residuals

Residuals Residual Plots

Standardized Residuals Line Fit Plots

Normal Probability

Normal Probability Plots

OK Cancel Help

Regression Analysis

- Microsoft Excel loves to graph so I selected all the Residuals and Normal Probability Plots.

	A	B	C
52	Regression Analysis		
53	Month:	Guest Volume (x):	Utility Cost (y):
54	January	15,850	\$113,825
55	February	14,850	\$112,750
56	March	16,950	\$117,625
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65	December	16,550	\$114,550

Regression

Input

Input Y Range:

Input X Range:

Labels Constant is Zero

Confidence Level: %

Output options

Output Range:

New Worksheet Ply:

New Workbook

Residuals

Residuals Residual Plots

Standardized Residuals Line Fit Plots

Normal Probability

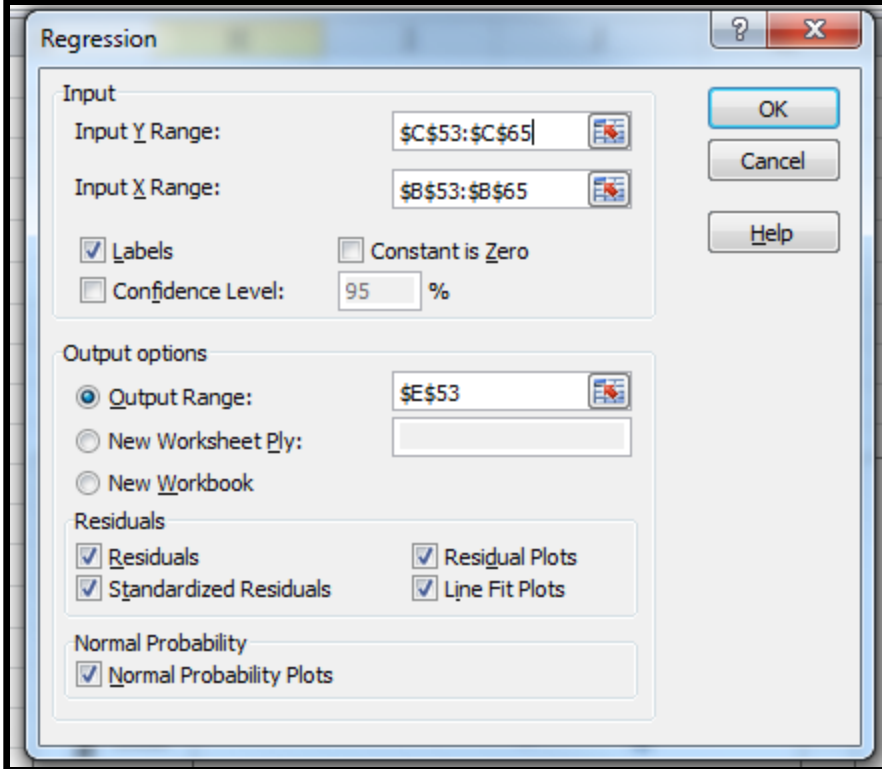
Normal Probability Plots

OK Cancel Help

Regression Analysis

- Then click on OK and watch Excel work its math magic.

	A	B	C
52	Regression Analysis		
53	Month:	Guest Volume (x):	Utility Cost (y):
54	January	15,850	\$113,825
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65	December	16,550	\$114,550



The image shows the 'Regression' dialog box in Microsoft Excel. The dialog is titled 'Regression' and has a question mark icon and a close button (X) in the top right corner. It is divided into several sections:

- Input:**
 - Input Y Range:** \$C\$53:\$C\$65
 - Input X Range:** \$B\$53:\$B\$65
 - Labels
 - Constant is Zero
 - Confidence Level: 95 %
- Output options:**
 - Output Range: \$E\$53
 - New Worksheet Ply:
 - New Workbook
- Residuals:**
 - Residuals
 - Standardized Residuals
 - Residual Plots
 - Line Fit Plots
- Normal Probability:**
 - Normal Probability Plots

Buttons for 'OK', 'Cancel', and 'Help' are located on the right side of the dialog.

Regression Analysis

- The presented data includes the table below.
- Here are some short-cuts.
- The closer Multiple R, R Square, and Adjusted R Square are to 1 the better.
- Ensure that the number of Observations is your data input – 12 for twelve months in my data.
- So this is pretty good data.

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.987949335
R Square	0.976043889
Adjusted R Square	0.973648278
Standard Error	1419.781304
Observations	12

Regression Analysis

- In the table Regression Analysis tells you that the Intercept is “77789.10674.” This is your fixed costs, \$77,789.10674.
- The Guest Volume, because I enabled Labels, is “2.283968431,” your variable cost per unit is \$2.283968431.

	<i>Coefficients</i>	<i>S</i>
Intercept	77789.10674	
Guest Volume (x):	2.283968431	

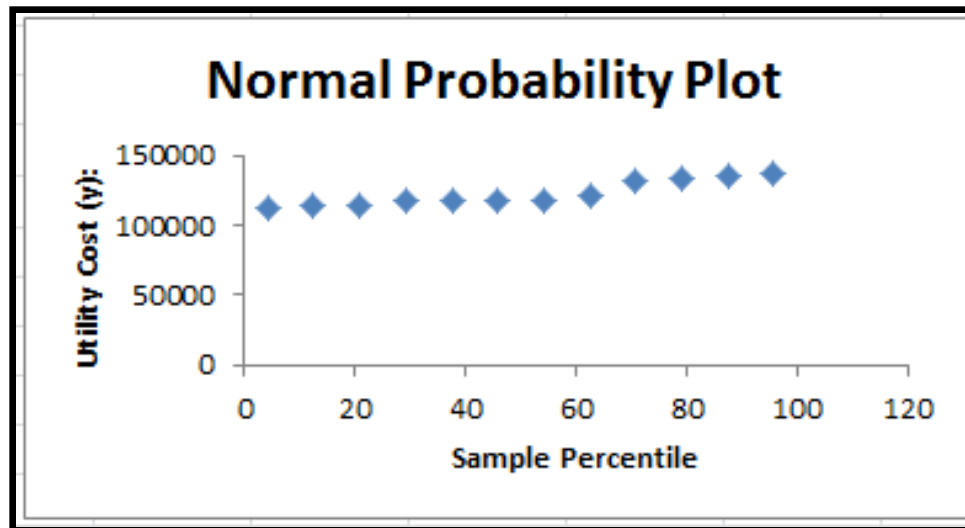
Regression Analysis

- If you watched the High-Low Method presentation you may remember that High-Low computed a fixed cost of \$78,141.18 and a variable cost of \$2.29 per unit.
- High-Low is good for meetings and quick and dirty. Regression is better.

	<i>Coefficients</i>	<i>S</i>
Intercept	77789.10674	
Guest Volume (x):	2.283968431	

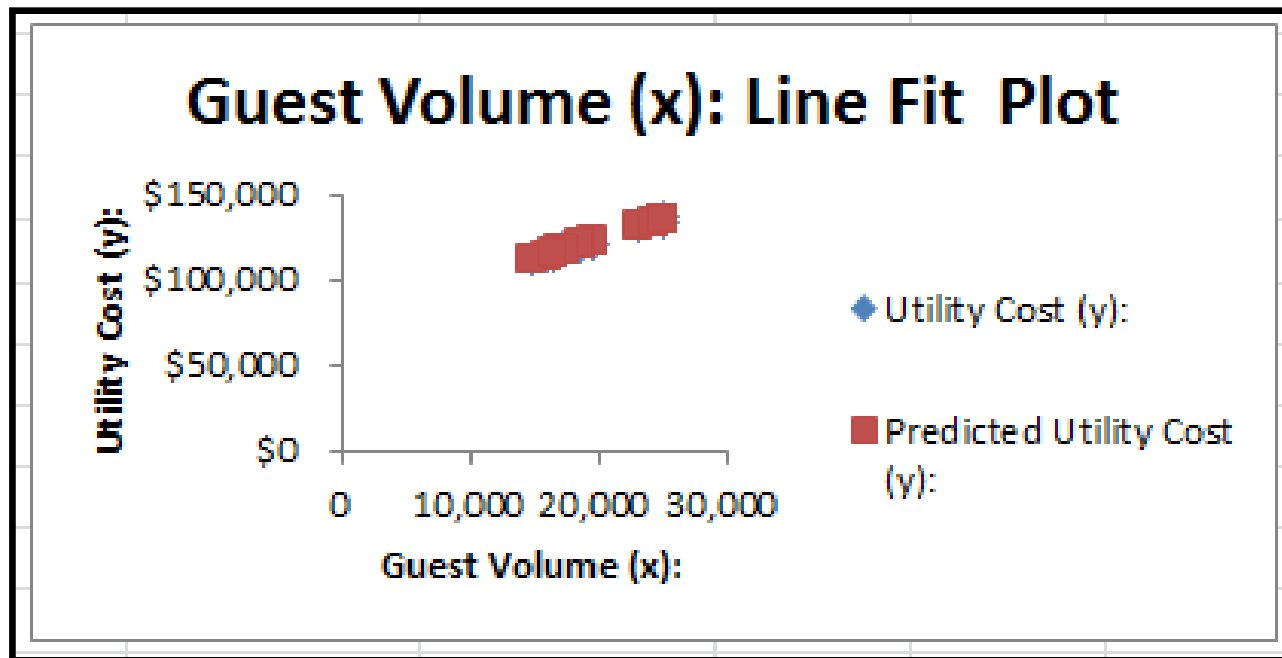
Regression Analysis

- Microsoft Excel is going to present some graphs because we asked for them.
- The Normal Probability Plot is shown.
- It is pretty consistent.



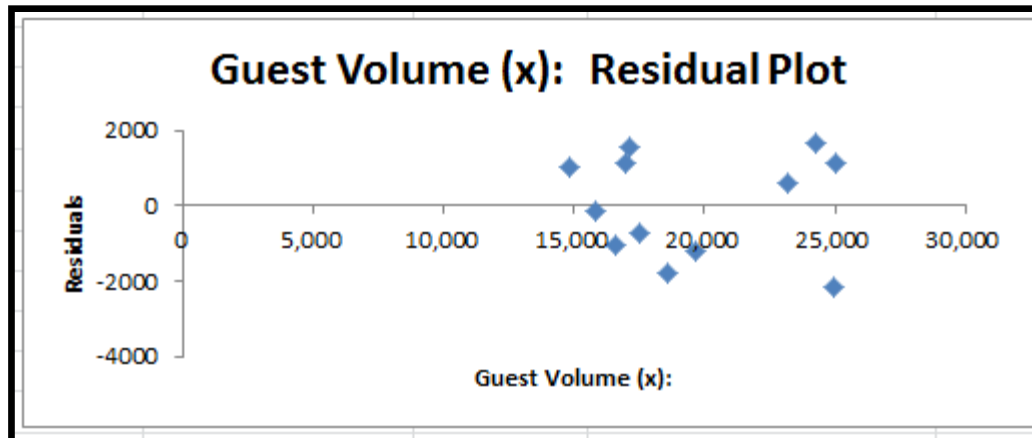
Regression Analysis

- The Guest Volume (x) Line Fit Plot, because I have Labels enabled, is pretty consistent.



Regression Analysis

- The Guest Volume (x) Residual Plot has some degree of variance in it.
- This variance is probably the reason for the evaluation statistics being in the 0.97 range.

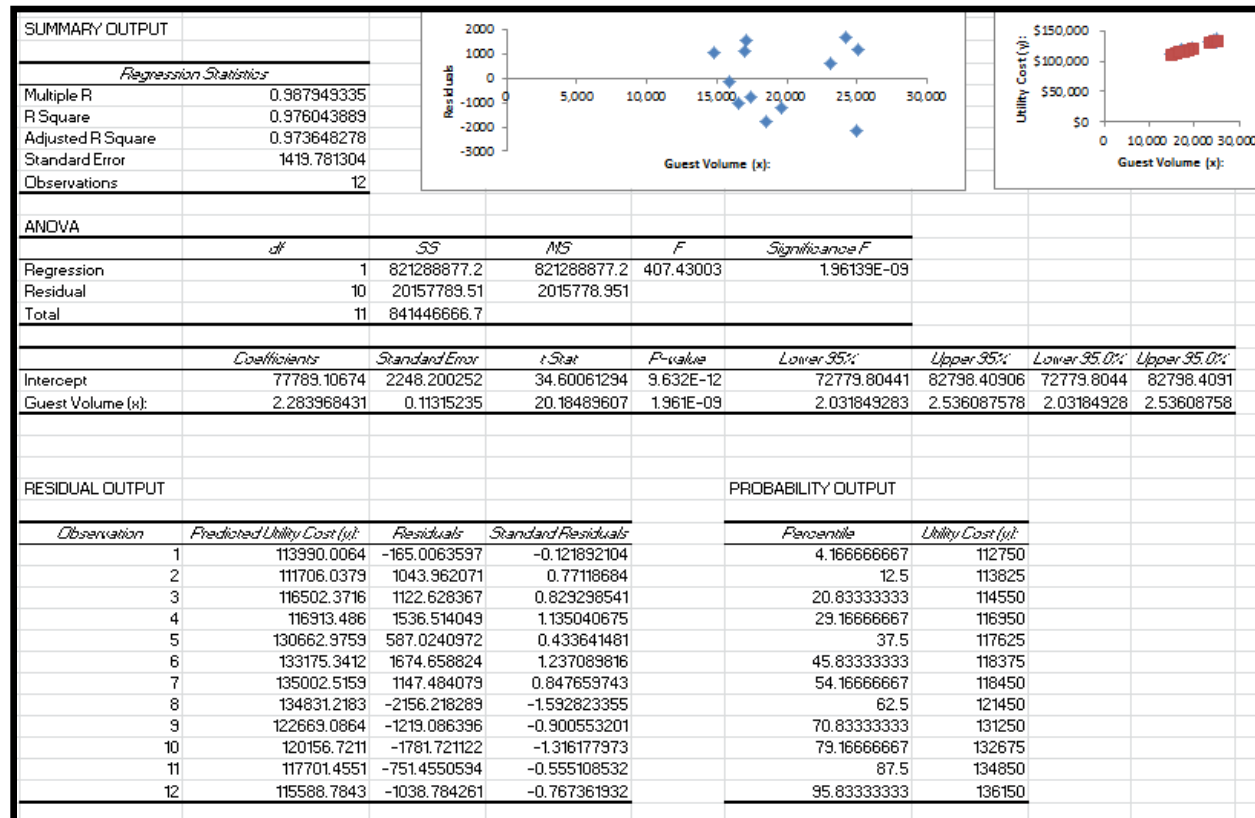


Regression Analysis

- Microsoft Excel makes the Regression Analysis Tool available to you.
- You do not need to know how it does its magic.
- You do need to know how to input the data.
- You need to know how to evaluate its accuracy.
- You need to know how to read the answers.

Regression Analysis

- Here is all of the data the Regression Analysis Tool threw at us. We use only a portion of it.



Regression Analysis

- You need to know where the data we want is.

Regression Analysis

The end.