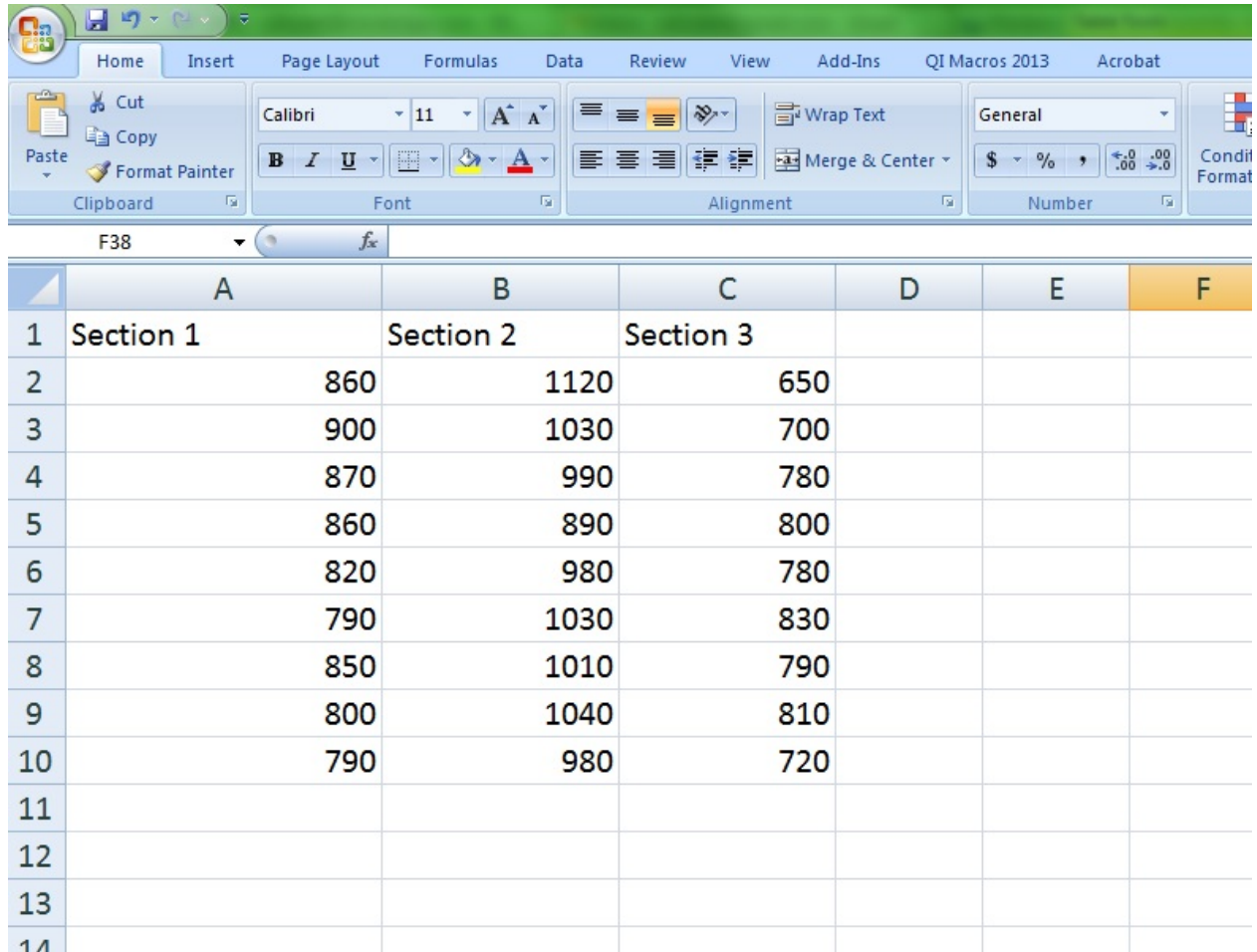


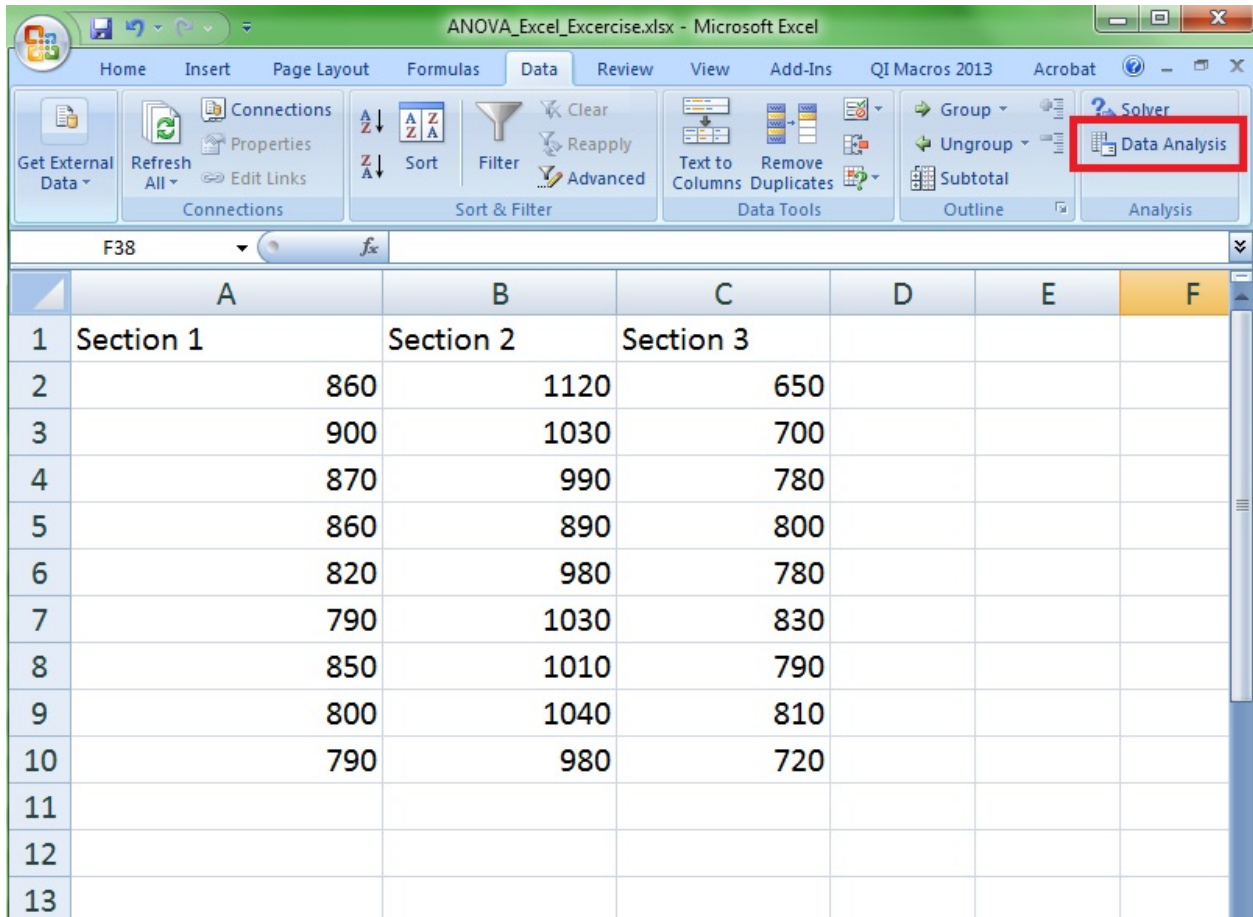
ANOVA In Excel

In this problem, we're comparing the average weekly yield from three different apple orchards.



	A	B	C	D	E	F
1	Section 1	Section 2	Section 3			
2	860	1120	650			
3	900	1030	700			
4	870	990	780			
5	860	890	800			
6	820	980	780			
7	790	1030	830			
8	850	1010	790			
9	800	1040	810			
10	790	980	720			
11						
12						
13						
14						

The null hypothesis is that the three orchards that use different pest management techniques will still have the same average weekly yield.



The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The 'Data Analysis' button is highlighted with a red rectangle. The spreadsheet contains data for an ANOVA exercise with three sections across columns A, B, and C, and rows 1 through 13.

	A	B	C	D	E	F
1	Section 1	Section 2	Section 3			
2	860	1120	650			
3	900	1030	700			
4	870	990	780			
5	860	890	800			
6	820	980	780			
7	790	1030	830			
8	850	1010	790			
9	800	1040	810			
10	790	980	720			
11						
12						
13						

First, locate the Data Analysis Tools in your spreadsheet program. In Excel, there is a Data Analysis Toolpak.

If the “Data Analysis” button is not there in your version of Excel, click on the windows button in the top left and click on “Excel Options” at the bottom. Once the window opens, click on “Add-Ins” on the left, and then “Excel Add-Ins” next to “Manage” at the bottom. From this, select the “Analysis ToolPak” option and click “OK”. “Data Analysis” should now appear on the right side of the “Data” tab.

	A	B	C	D	E	F
1	Section 1	Section 2	Section 3			
2	860	1120	650			
3	900	1030	700			
4	870	990	780			
5	860	890	800			
6	820	980	780			
7						
8						
9						
10						
11						
12						
13						
14						
15						

The 'Data Analysis' dialog box is open, showing the following list of tools:

- Anova: Single Factor (selected)
- Anova: Two-Factor with Replication
- Anova: Two-Factor Without Replication
- Correlation
- Covariance
- Descriptive Statistics
- Exponential Smoothing
- F-Test Two-Sample for Variances
- Fourier Analysis
- Histogram

At this point, we have to decide which type of data analysis we want to pursue. Because we're looking at one factor's variance, we choose "ANOVA: Single Factor."

The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The spreadsheet contains data for three sections across rows 2 to 10. The 'Anova: Single Factor' dialog box is open, and the 'Input Range' is set to '\$A\$2:\$C\$10', which is highlighted with a red box. The 'Grouped By' option is set to 'Columns'. The 'Alpha' value is 0.05. The 'Output options' section has 'New Worksheet Ply' selected.

	A	B	C	D	E	F
1	Section 1	Section 2	Section 3			
2	860	1120	650			
3	900	1030	700			
4	870	990	780			
5	860	890	800			
6	820	980	780			
7	790	1030	830			
8	850	1010	790			
9	800	1040	810			
10						

The "Input Range" is the data that is being studied. In this example, you should select the data from cell A2 to C10. Then click OK.

	A	B	C	D	E	F
1	Section 1	Section 2	Section 3			
2	860	1120	650			
3	900	1030	700			
4	870	990	780			
5	860	890	800			
6	820	980	780			
7	790	1030	830			
8	850	1010	790			
9	800	1040	810			
10	790					
11						
12						
13						
14						
15						
16						
17						
18						
19						

Anova: Single Factor

Input
 Input Range:
 Grouped By: ☒ Columns ☐ Rows
☐ Labels in first row
 Alpha:

Output options
☒ Output Range:
☐ New Worksheet Ply:
☐ New Workbook

Buttons: OK, Cancel, Help

For the “Output Range” select the excel cell that you want the data to go into. In this case, we chose cell A12. Notice that we’ve set the “alpha” is 0.05. Then click “OK.”

ANOVA_Excel_Exercise.xlsx - P							
<div> <div>HomeInsertPage LayoutFormulasDataReviewViewAdd-InsQI Macros 2013Acrobat</div> <div> <div> <div>CutCopyFormat Painter</div> <div>Clipboard</div> </div> <div> <div>Calibri11A</div> <div>B I U</div> <div>Font</div> </div> <div> <div> <div> <div></div> <div></div> </div> <div> <div></div> <div></div> </div> </div> <div> <div>Wrap Text</div> <div>Merge & Center</div> <div>Alignment</div> </div> <div> <div>General</div> <div>\$ %</div> <div>Number</div> </div> <div> <div>Conditional Formatting</div> <div>Format as Table</div> </div> <div> <div>Normal</div> <div>Check Cell</div> </div> </div> </div> </div>							
	A	B	C	D	E	F	G
10	790	980	720				
11							
12	Anova: Single Factor						
13							
14	SUMMARY						
15	Groups	Count	Sum	Average	Variance		
16	Column 1	9	7540	837.778	1544.44		
17	Column 2	9	9070	1007.78	3794.44		
18	Column 3	9	6860	762.222	3494.44		
19							
20							
21	ANOVA						
22	Source of Variation	SS	df	MS	F	P-value	F crit
23	Between Groups	284718.5185	2	142359	48.3484	0.000000003821	3.40283
24	Within Groups	70666.66667	24	2944.44			
25							
26	Total	355385.1852	26				
27							
28							
29							

From these results we notice the differences in the means and the variances. The statistical proof that these are different is that the p-value is less than alpha (0.05).

This means that we can *reject the null hypothesis*. Therefore we can conclude that the effects of different pest management techniques DO have an effect on the yield of apples.