

Minitab Instructions: ANOVA-Full Factorial Designs

Open Minitab:

Double-click the Minitab icon



to open Minitab.

Once Minitab opens, note that there are 2 windows that open automatically:

- 1) The **session window** is used to show results.
- 2) The **worksheet** is used for the raw data.
 - The soft-drink data from the **ANOVA: Full Factorial Design** tutorial data has already been typed into the worksheet columns.
 - Each row represents one trial (or run)
 - The 1st grey row is for column labels
 - Each column represents one variable

	C1	C2	C3-T	C4	C5	C6	C7
	run order	test	Carb(A)	Pressure(B)	Speed(C)	Results	
1	3	1	10%	25	200	-4	
2	7	2	12%	25	200	1	
3	8	3	10%	30	200	-1	
4	2	4	12%	30	200	5	
5	6	5	10%	25	250	-1	
6	4	6	12%	25	250	3	
7	1	7	10%	30	250	2	
8	5	8	12%	30	250	11	
9							
10							
11							

ANOVA:

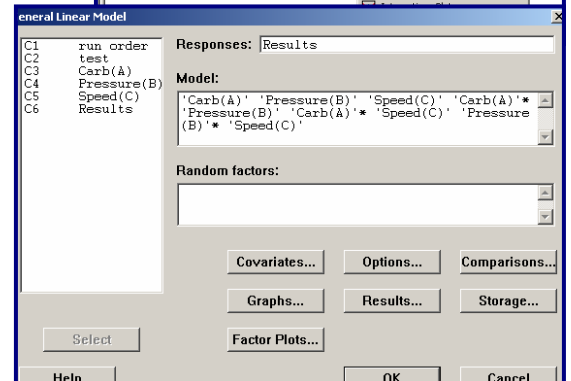
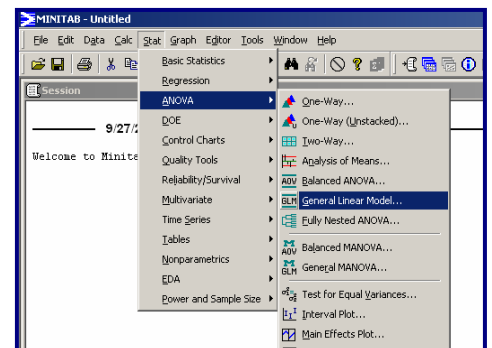
Go to Stat >> ANOVA >> General Linear Models

When the cursor is in the “responses:” space, double click “C6 Results”

Place the cursor in the “Model:” space, then double click each factor (i.e. factors A, B, and C) and then use the * symbol to show all 2-way interactions.

The 3-way interaction would be written as:
Carb(A)*Pressure(B)*Speed(C) or C3*C4*C5

However, as discussed in the tutorial there are not enough degrees of freedom to include the 3-way term in this analysis.

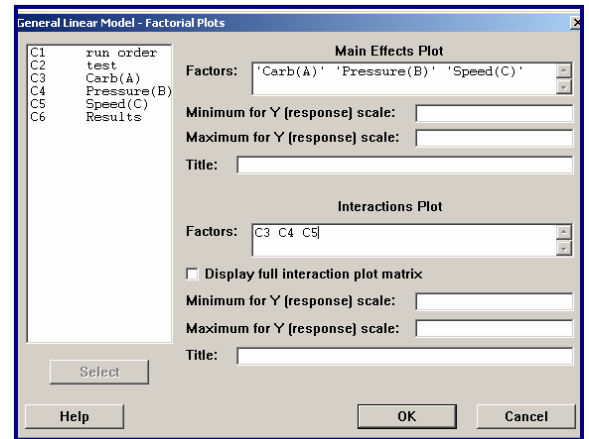


Main Effects and Interaction Plots:

While still in the General Linear Model window select Factor Plots.

Double click Carb(A) or type C3 to select factor A in both the Main Effects Plot and Interaction Plot.

Select OK.



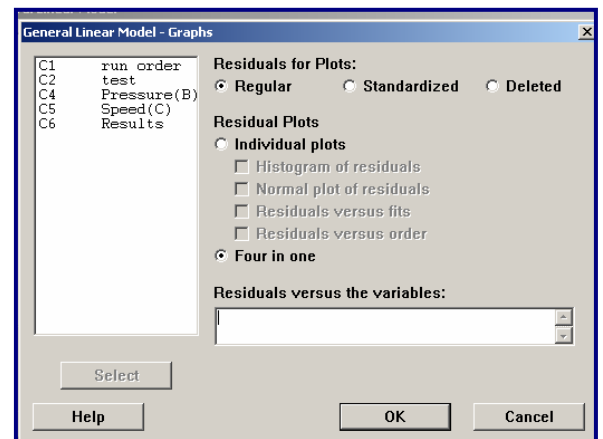
Validating Model (Fisher Assumptions):

While still in the General Linear Model window select Graphs.

Create residual plots to verify that the sampling errors are normally distributed and that the sampling errors are independent.

Select OK.

Select OK in the General Linear Models Window.



Results:

In addition to the graphs, the following results will show in the session window:

General Linear Model: Results versus Carb(A), Pressure(B), Speed(C)

Factor	Type	Levels	Values
Carb(A)	fixed	2	10%, 12%
Pressure(B)	fixed	2	25, 30
Speed(C)	fixed	2	200, 250

Analysis of Variance for Results, using Adjusted SS for Tests

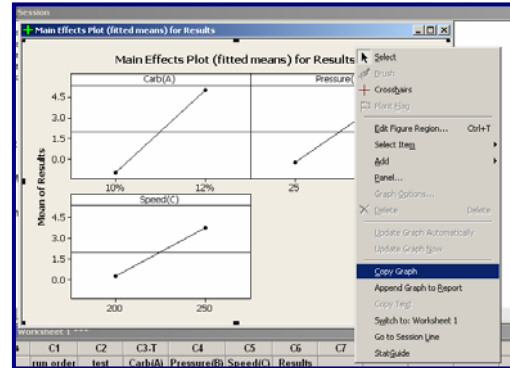
Source	DF	Seq SS	Adj SS	Adj MS	F	P
Carb(A)	1	72.000	72.000	72.000	36.00	0.105
Pressure(B)	1	40.500	40.500	40.500	20.25	0.139
Speed(C)	1	24.500	24.500	24.500	12.25	0.177
Carb(A)*Pressure(B)	1	4.500	4.500	4.500	2.25	0.374
Carb(A)*Speed(C)	1	0.500	0.500	0.500	0.25	0.705
Pressure(B)*Speed(C)	1	2.000	2.000	2.000	1.00	0.500
Error	1	2.000	2.000	2.000		
Total	7	146.000				

S = 1.41421 R-Sq = 98.63% R-Sq(adj) = 90.41%

Minitab Instructions: Moving Graphs to other Documents

Click on any graph, right click on the graph, and select Copy graph.

Go to Word, PowerPoint or other document and paste the graph.



While in Word, right click the graph again and select format object.

In the Layout tab, select Tight.

Select O.K.

You will not be able to use the cursor to move the graph around and change the graph size.

