

Friedmans problem

The GLM Procedure

Class Level Information		
Class	Levels	Values
subj	7	1 2 3 4 5 6 7
music	3	c h n

Number of Observations Read	21
Number of Observations Used	21

The GLM Procedure

Dependent Variable: score

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	180.2857143	22.5357143	9.53	0.0004
Error	12	28.3809524	2.3650794		
Corrected Total	20	208.6666667			

R-Square	Coeff Var	Root MSE	score Mean
0.863989	7.208819	1.537881	21.33333

Source	DF	Type I SS	Mean Square	F Value	Pr > F
subj	6	149.3333333	24.8888889	10.52	0.0003
music	2	30.9523810	15.4761905	6.54	0.0120

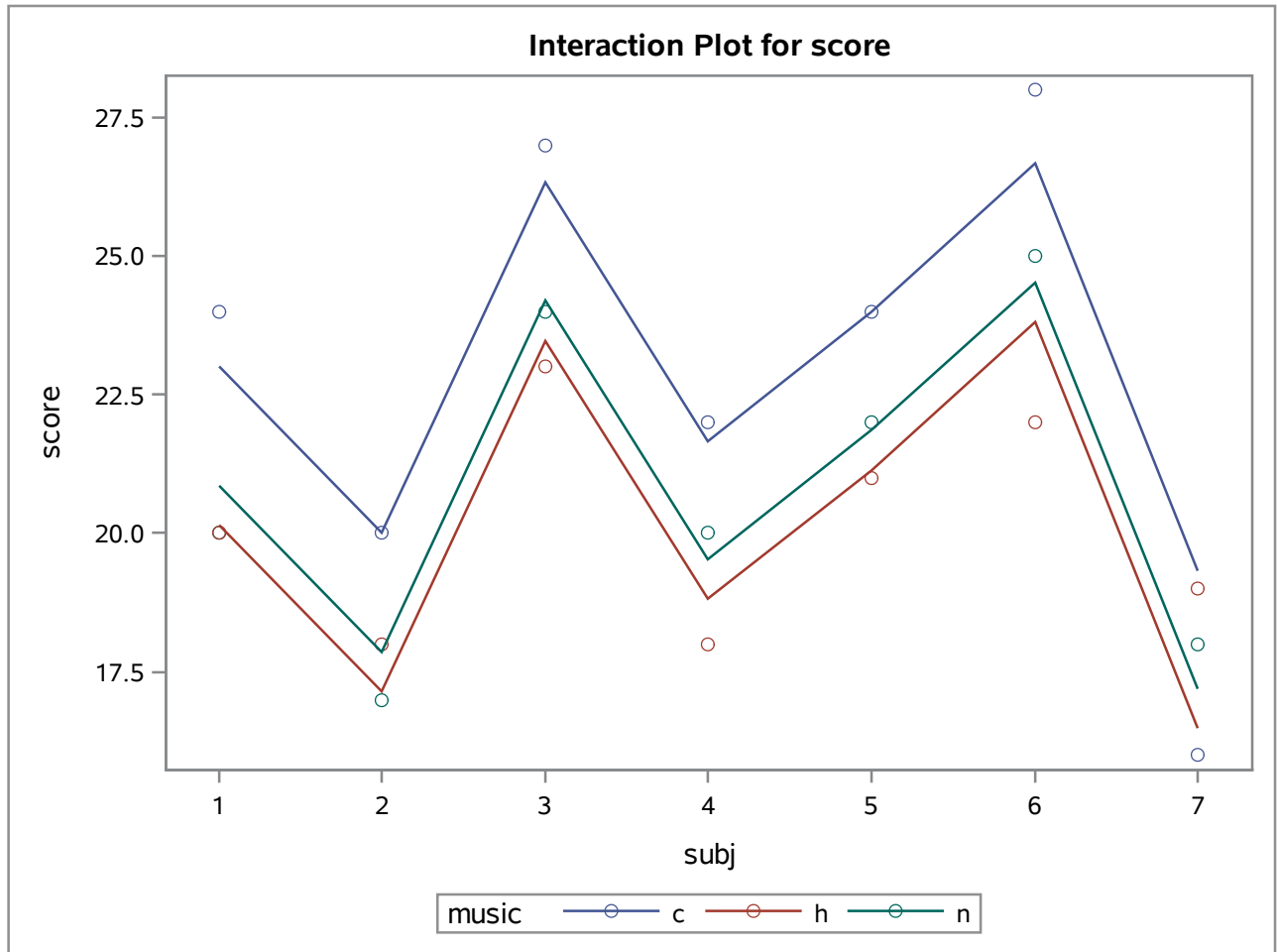
Source	DF	Type III SS	Mean Square	F Value	Pr > F
subj	6	149.3333333	24.8888889	10.52	0.0003
music	2	30.9523810	15.4761905	6.54	0.0120

Parameter	Estimate		Standard Error	t Value	Pr > t
Intercept	17.19047619	B	1.00677974	17.07	<.0001
subj 1	3.66666667	B	1.25567495	2.92	0.0128
subj 2	0.66666667	B	1.25567495	0.53	0.6052
subj 3	7.00000000	B	1.25567495	5.57	0.0001
subj 4	2.33333333	B	1.25567495	1.86	0.0878
subj 5	4.66666667	B	1.25567495	3.72	0.0029
subj 6	7.33333333	B	1.25567495	5.84	<.0001
subj 7	0.00000000	B	.	.	.
music c	2.14285714	B	0.82203221	2.61	0.0229
music h	-0.71428571	B	0.82203221	-0.87	0.4019
music n	0.00000000	B	.	.	.

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The GLM Procedure

Dependent Variable: score

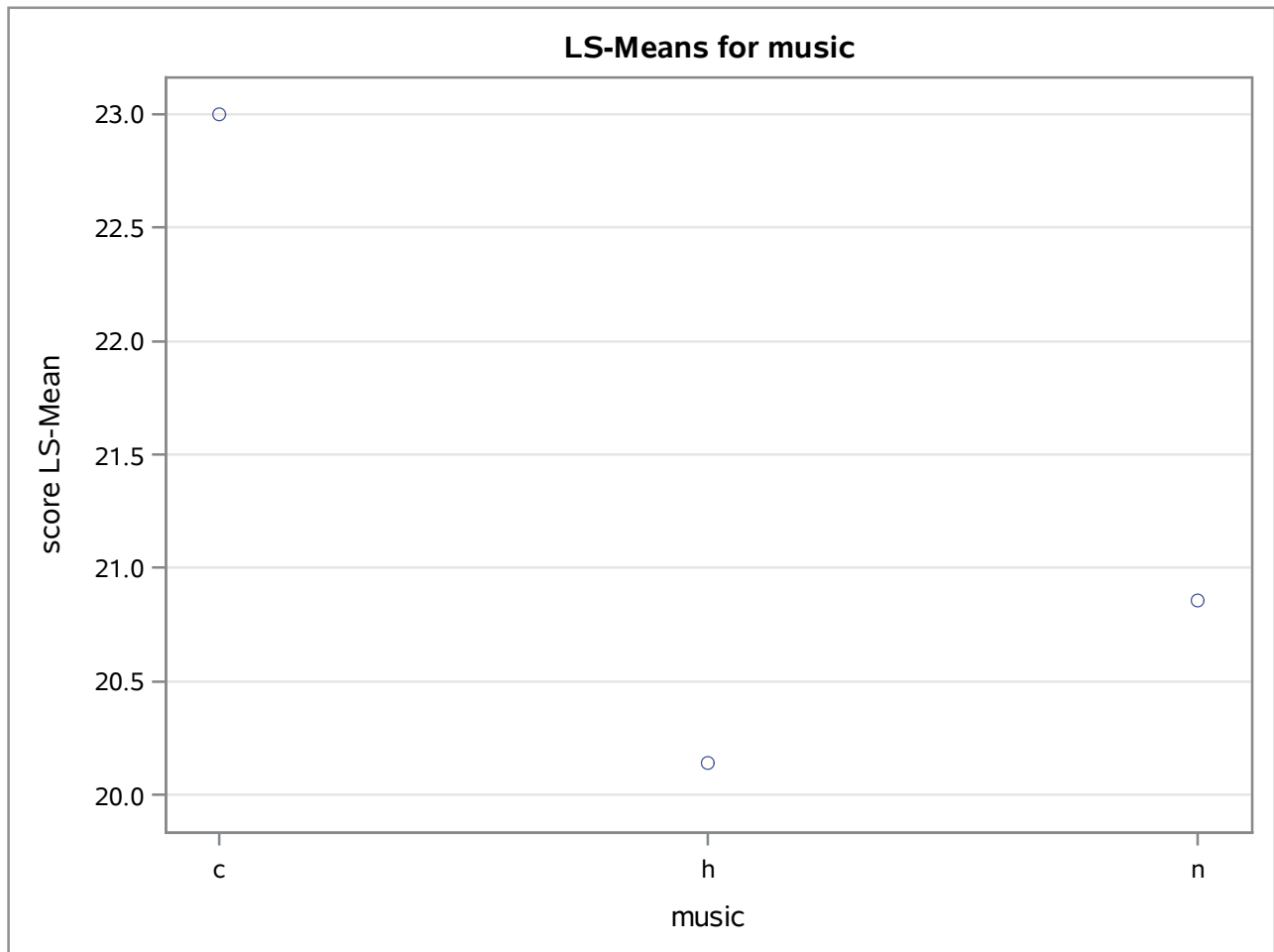


Friedmans problem

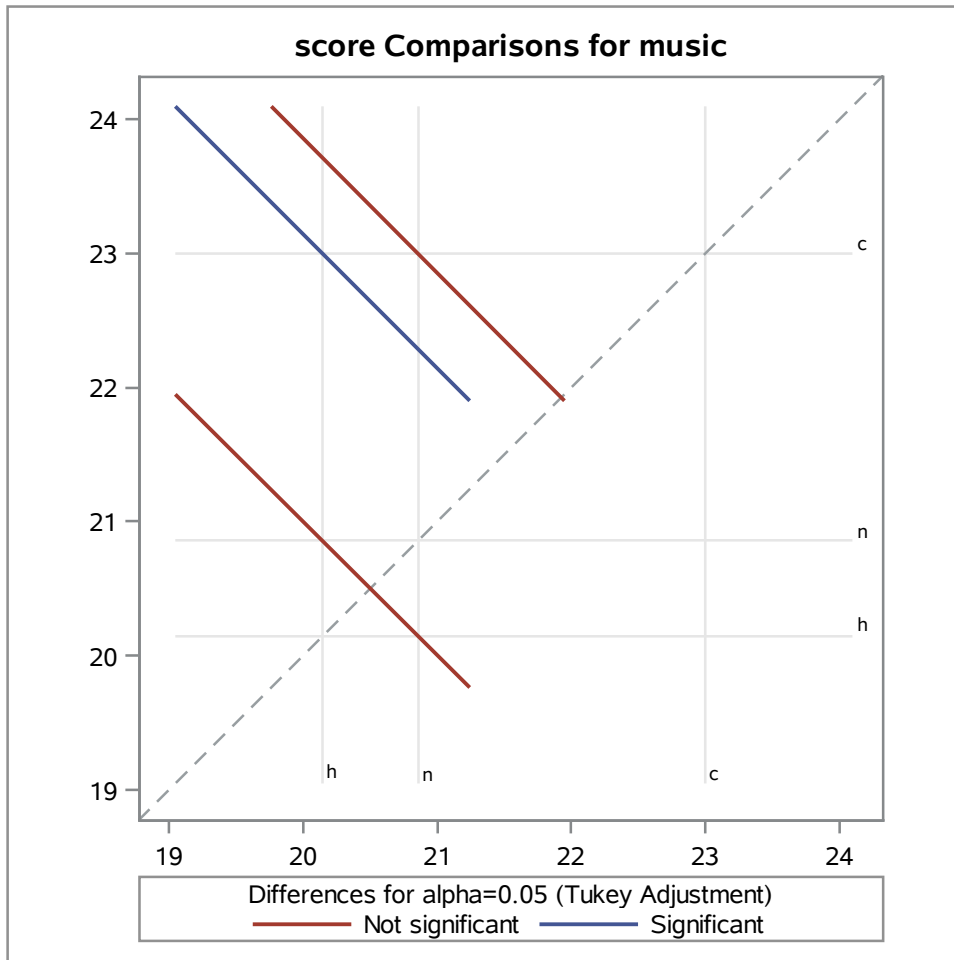
The GLM Procedure Least Squares Means Adjustment for Multiple Comparisons: Tukey

music	score LSMEAN	LSMEAN Number
c	23.0000000	1
h	20.1428571	2
n	20.8571429	3

Least Squares Means for effect music Pr > t for H0: LSMean(i)=LSMean(j)			
Dependent Variable: score			
i/j	1	2	3
1		0.0118	0.0557
2	0.0118		0.6691
3	0.0557	0.6691	

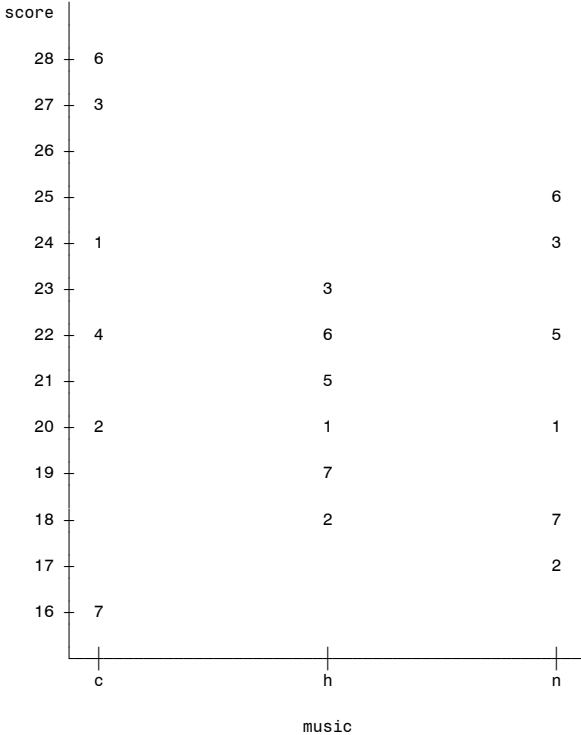


The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey



Friedmans problem

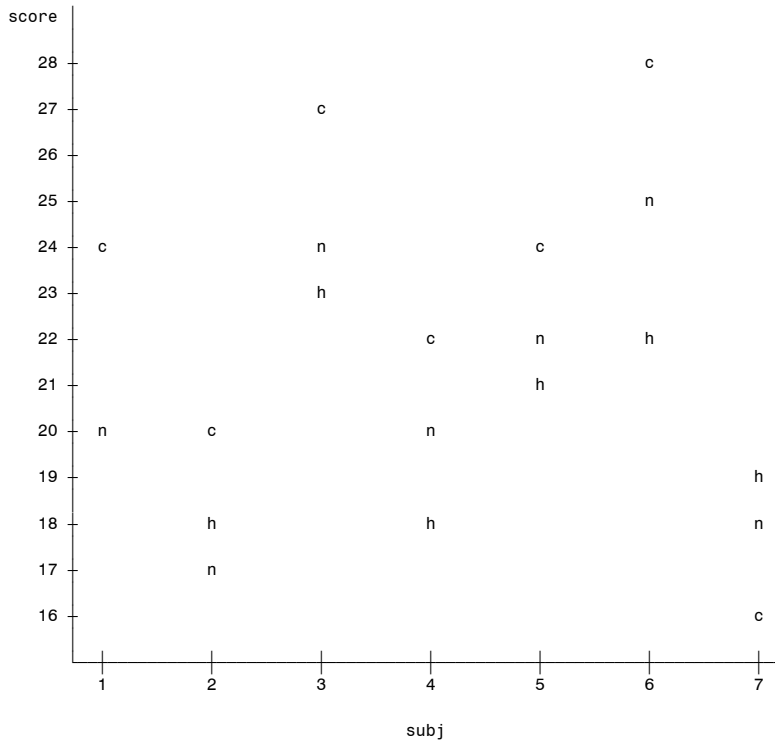
Plot of score*music. Symbol is value of subj.



NOTE: 3 obs hidden.

Friedmans problem

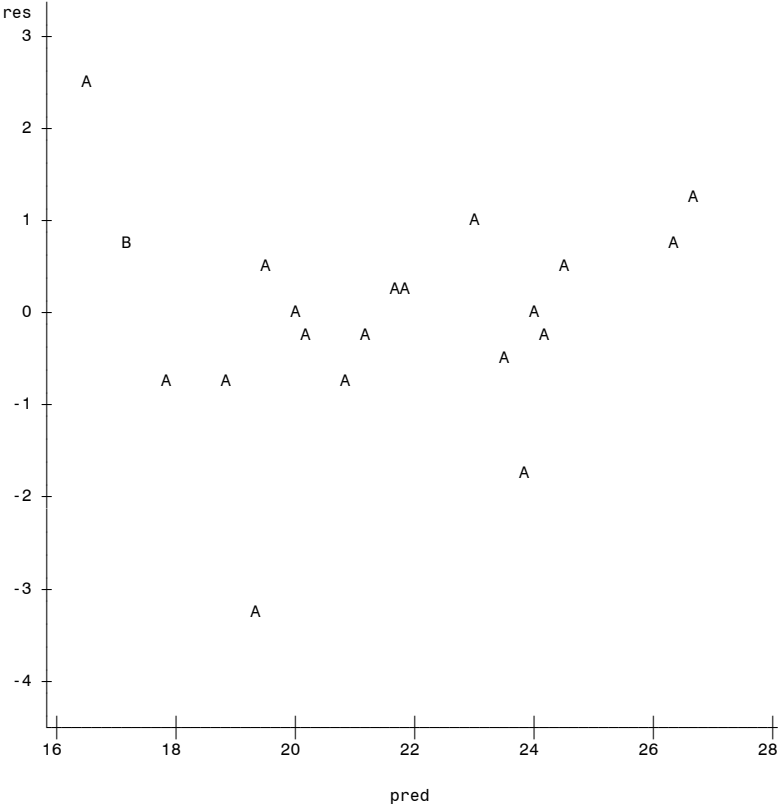
Plot of score*subj. Symbol is value of music.

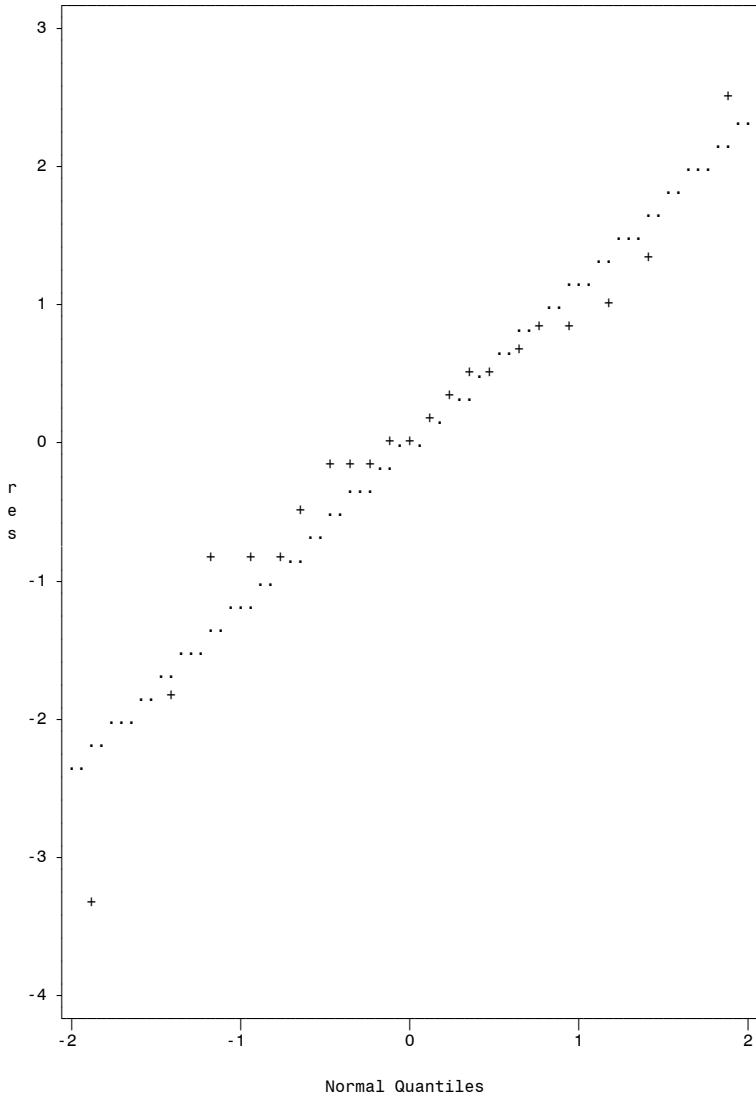


NOTE: 1 obs hidden.

Friedmans problem

Plot of res*pred. Legend: A = 1 obs, B = 2 obs, etc.





Normal Line: ... Mu=0, Sigma=1.1912

Friedmans problem

The FREQ Procedure

Summary Statistics for music by score Controlling for subj

Cochran-Mantel-Haenszel Statistics (Based on Rank Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	3.1296	0.0769
2	Row Mean Scores Differ	2	5.8519	0.0536

Total Sample Size = 21

The REG Procedure
Model: MODEL1
Dependent Variable: defect

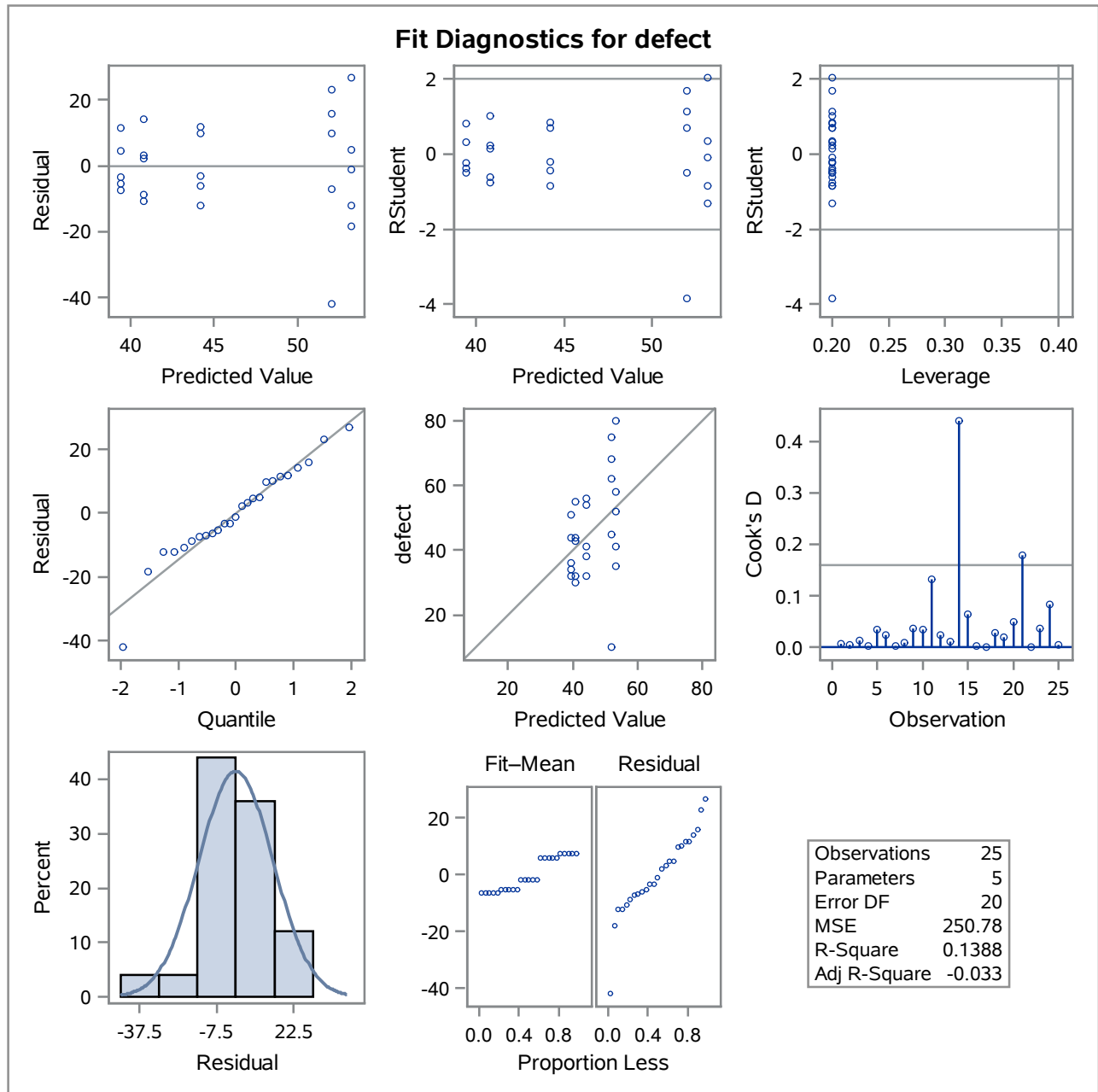
Number of Observations Read	25
Number of Observations Used	25

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	808.24000	202.06000	0.81	0.5360
Error	20	5015.60000	250.78000		
Corrected Total	24	5823.84000			

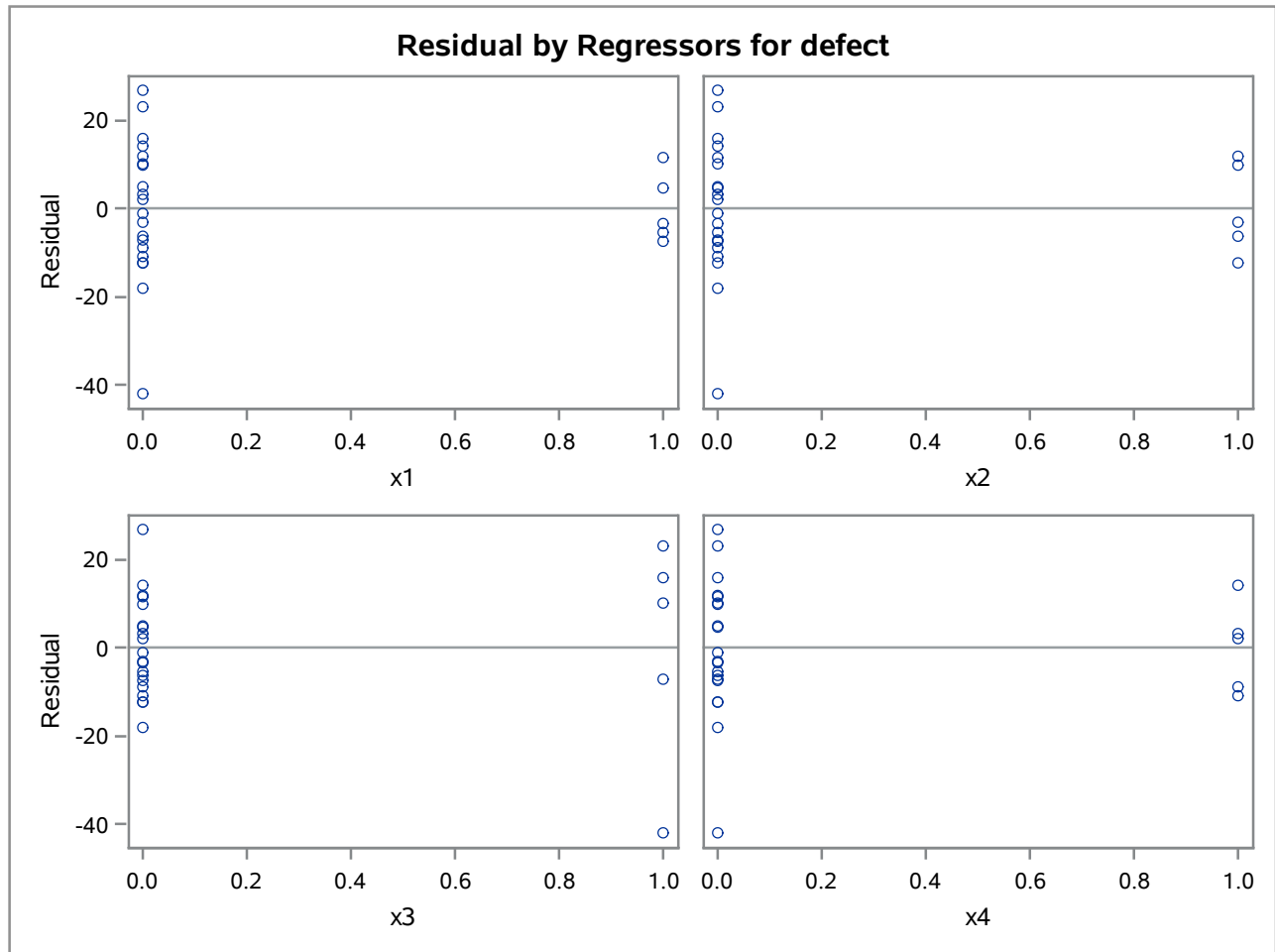
Root MSE	15.83603	R-Square	0.1388
Dependent Mean	45.92000	Adj R-Sq	-0.0335
Coeff Var	34.48614		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	53.20000	7.08209	7.51	<.0001
x1	1	-13.80000	10.01559	-1.38	0.1835
x2	1	-9.00000	10.01559	-0.90	0.3796
x3	1	-1.20000	10.01559	-0.12	0.9058
x4	1	-12.40000	10.01559	-1.24	0.2300

The REG Procedure
 Model: MODEL1
 Dependent Variable: defect



The REG Procedure
Model: MODEL1
Dependent Variable: defect



The GLM Procedure

Class Level Information		
Class	Levels	Values
line	5	1 2 3 4 5

Number of Observations Read	25
Number of Observations Used	25

The GLM Procedure

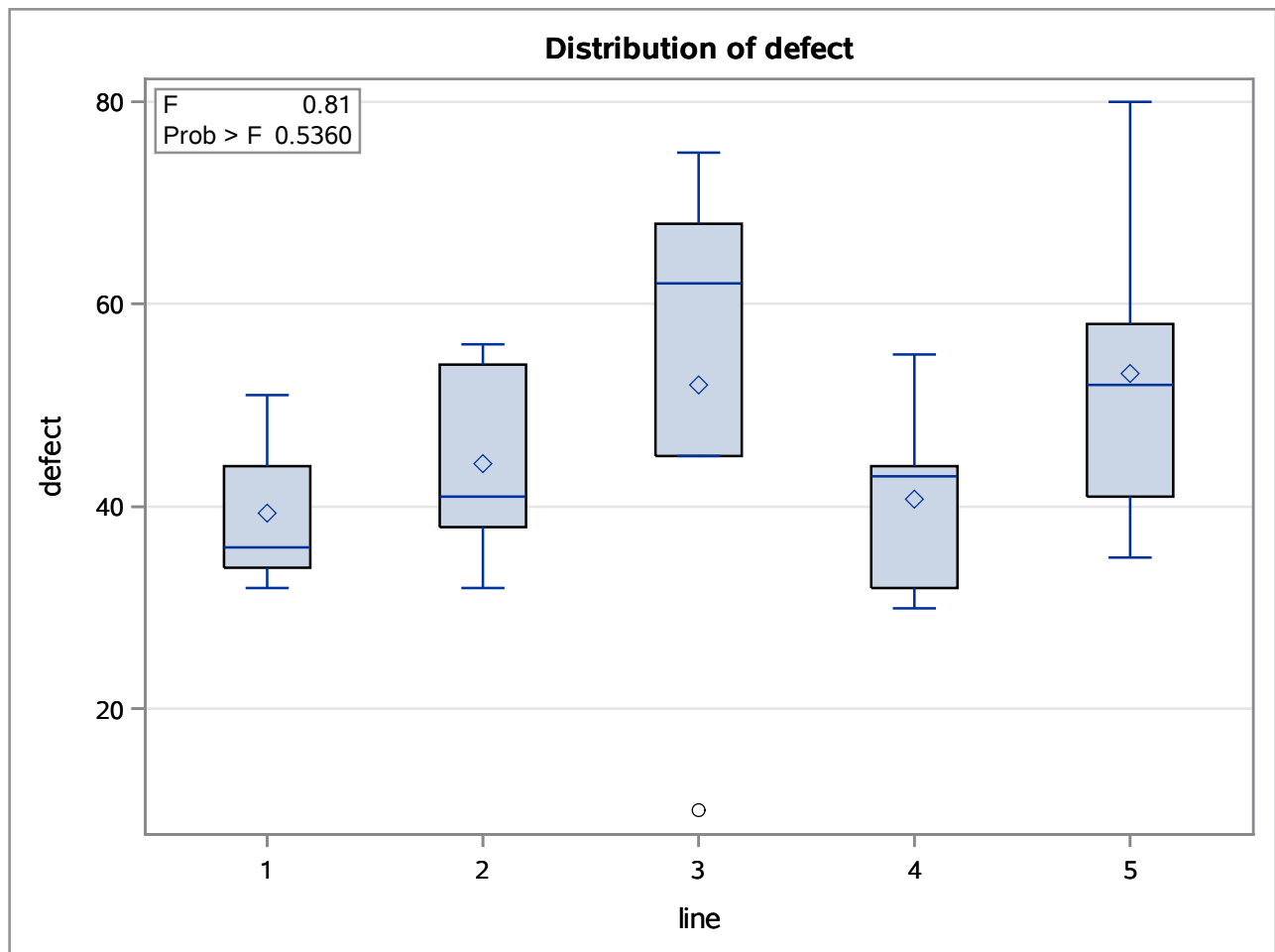
Dependent Variable: defect

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	808.240000	202.060000	0.81	0.5360
Error	20	5015.600000	250.780000		
Corrected Total	24	5823.840000			

R-Square	Coeff Var	Root MSE	defect Mean
0.138781	34.48614	15.83603	45.92000

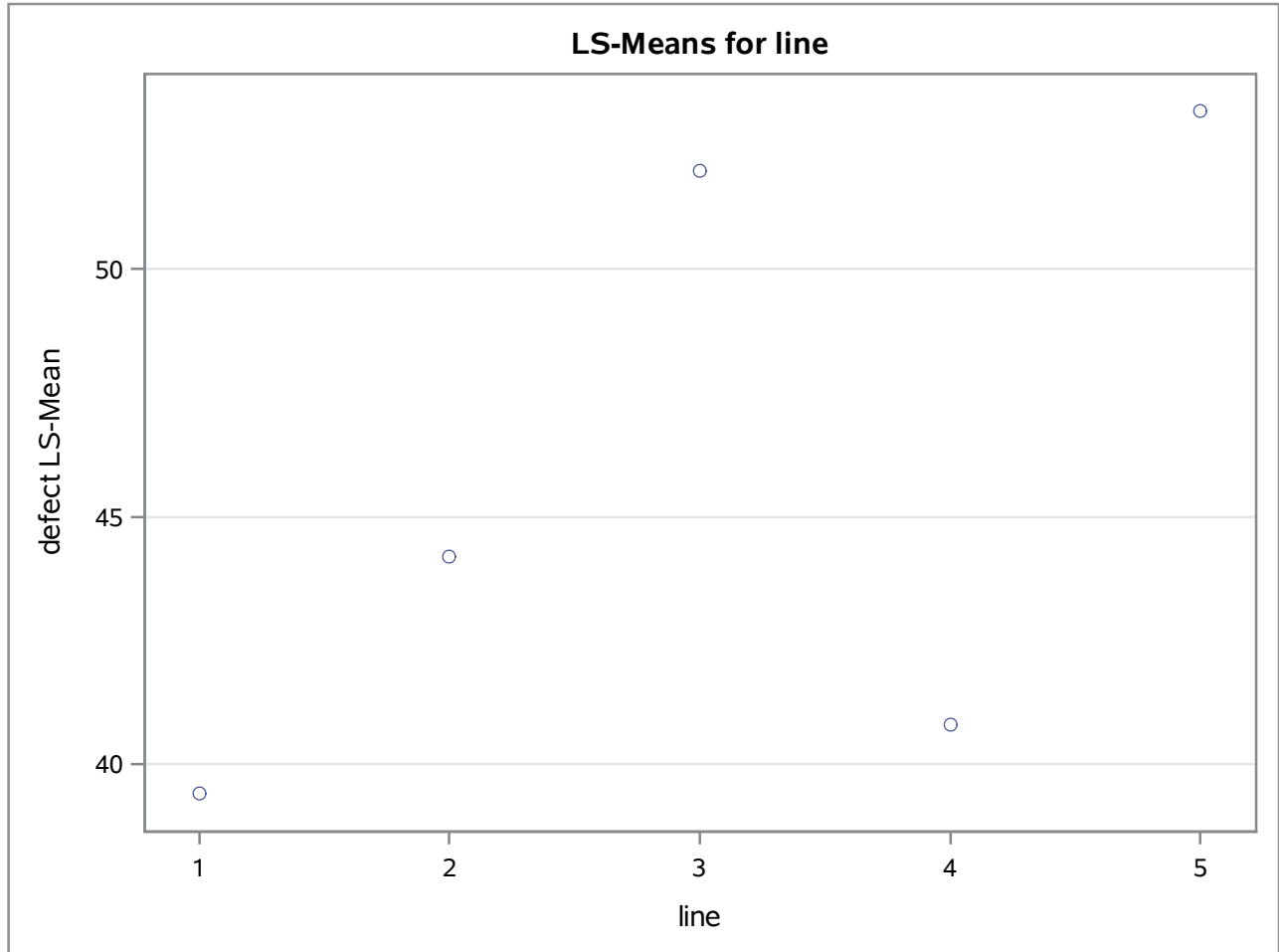
Source	DF	Type I SS	Mean Square	F Value	Pr > F
line	4	808.2400000	202.0600000	0.81	0.5360

Source	DF	Type III SS	Mean Square	F Value	Pr > F
line	4	808.2400000	202.0600000	0.81	0.5360



The GLM Procedure
Least Squares Means

line	defect LSMEAN
1	39.4000000
2	44.2000000
3	52.0000000
4	40.8000000
5	53.2000000

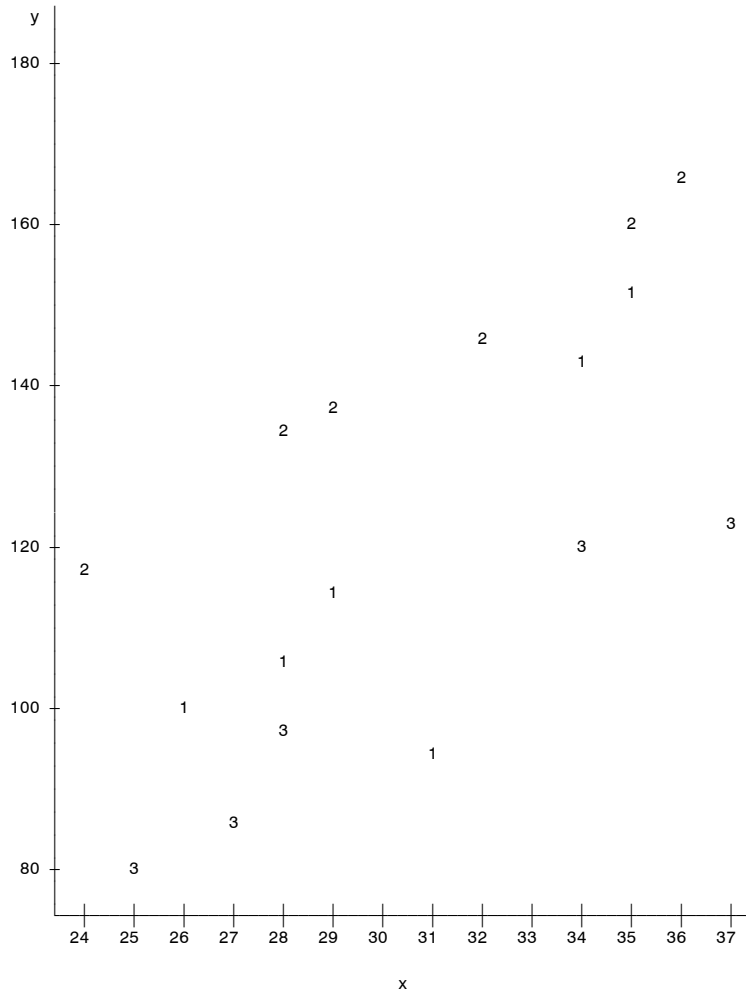


ANCOVA problem

Obs	x	y	process	pr1	pr2	pr1x	pr2x
1	26	100	1	1	0	26	0
2	35	150	1	1	0	35	0
3	28	106	1	1	0	28	0
4	31	95	1	1	0	31	0
5	29	113	1	1	0	29	0
6	34	144	1	1	0	34	0
7	24	118	2	0	1	0	24
8	28	134	2	0	1	0	28
9	29	138	2	0	1	0	29
10	32	147	2	0	1	0	32
11	36	165	2	0	1	0	36
12	35	159	2	0	1	0	35
13	37	124	3	0	0	0	0
14	31	95	3	0	0	0	0
15	34	120	3	0	0	0	0
16	27	86	3	0	0	0	0
17	28	98	3	0	0	0	0
18	25	81	3	0	0	0	0

ANCOVA problem

Plot of y*x. Symbol is value of process.



NOTE: 1 obs hidden.

The MEANS Procedure

Analysis Variable : x				
N	Mean	Std Dev	Minimum	Maximum
18	30.5000000	3.9741814	24.0000000	37.0000000

The REG Procedure
 Model: MODEL1
 Dependent Variable: y

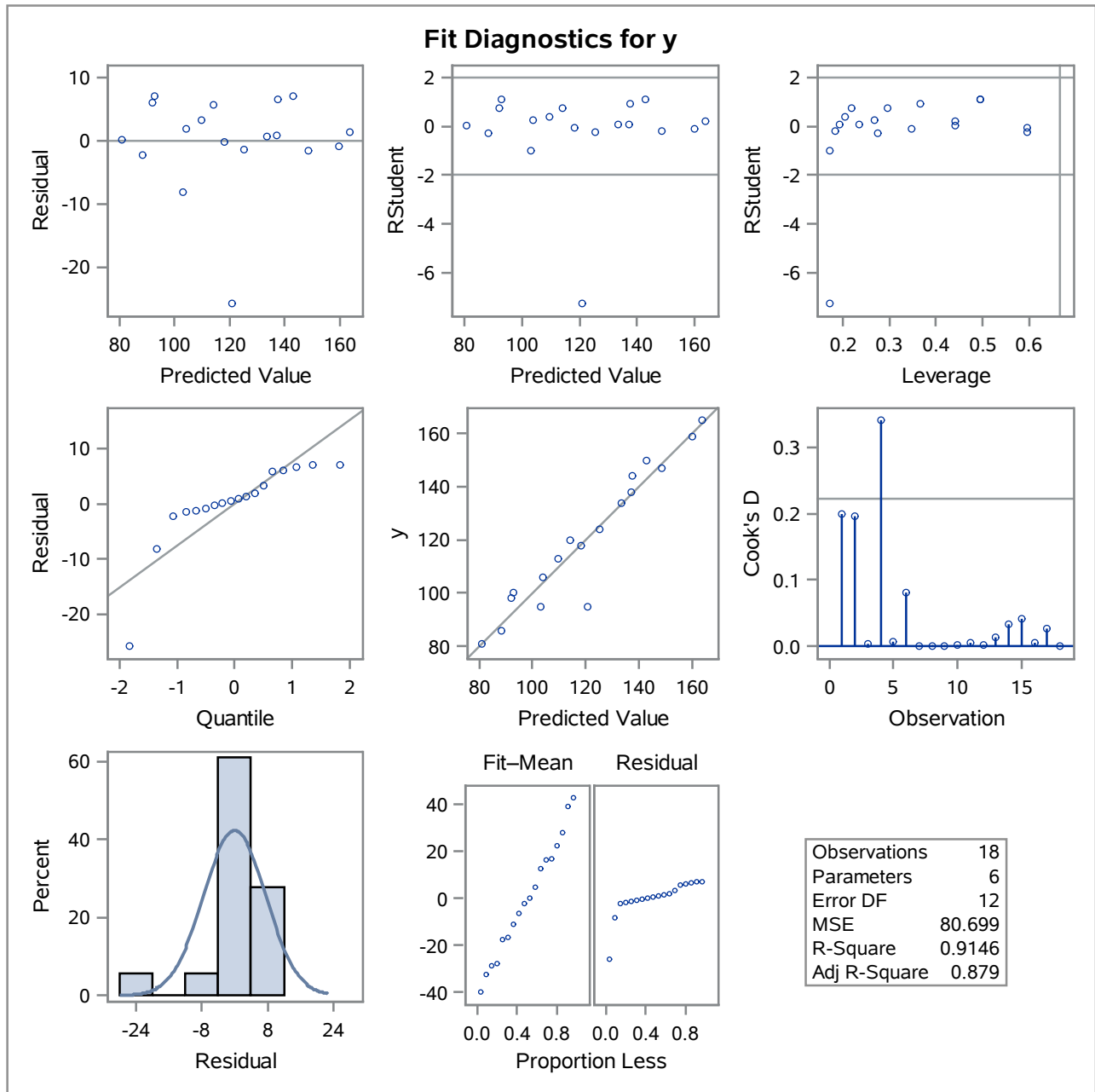
Number of Observations Read	18
Number of Observations Used	18

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	10369	2073.84521	25.70	<.0001
Error	12	968.38505	80.69875		
Corrected Total	17	11338			

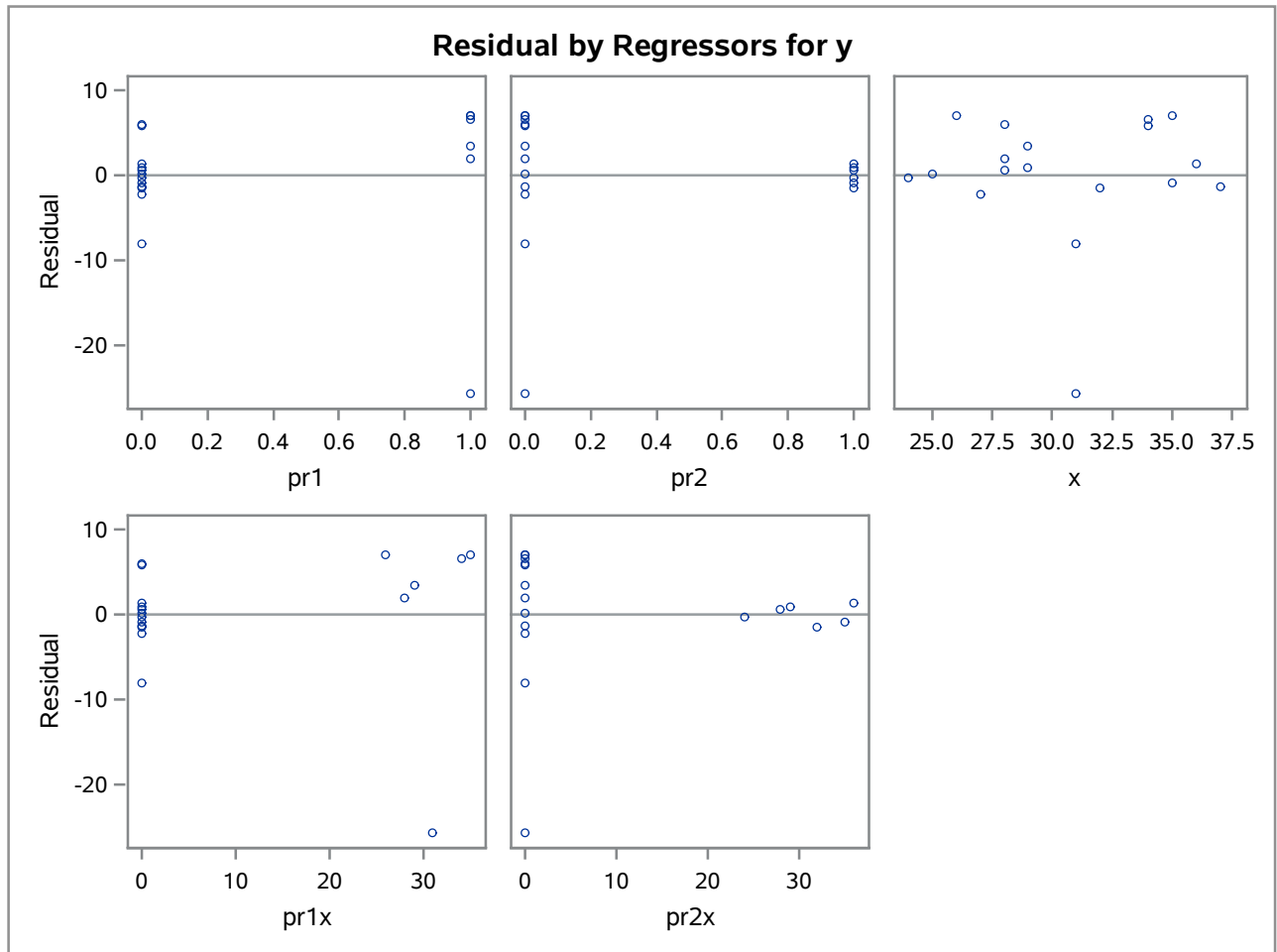
Root MSE	8.98325	R-Square	0.9146
Dependent Mean	120.72222	Adj R-Sq	0.8790
Coeff Var	7.44126		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-11.66452	27.05579	-0.43	0.6740
pr1	1	-39.94524	44.34091	-0.90	0.3854
pr2	1	39.12581	38.46961	1.02	0.3292
x	1	3.70323	0.88372	4.19	0.0013
pr1x	1	1.85775	1.44677	1.28	0.2234
pr2x	1	0.08065	1.24976	0.06	0.9496

The REG Procedure
 Model: MODEL1
 Dependent Variable: y



The REG Procedure
Model: MODEL1
Dependent Variable: y



The REG Procedure
 Model: MODEL2
 Dependent Variable: y

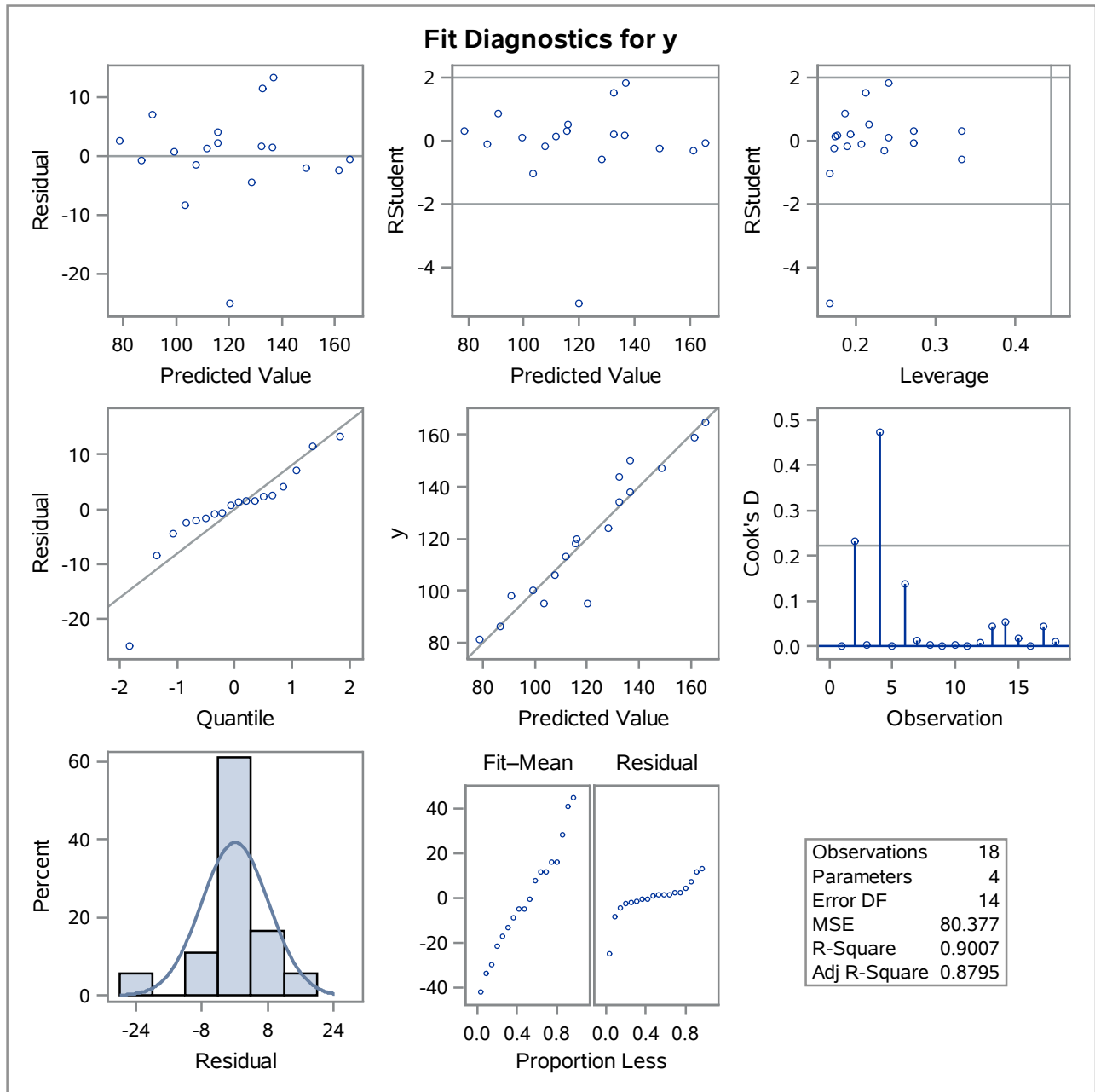
Number of Observations Read	18
Number of Observations Used	18

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	10212	3404.11314	42.35	<.0001
Error	14	1125.27170	80.37655		
Corrected Total	17	11338			

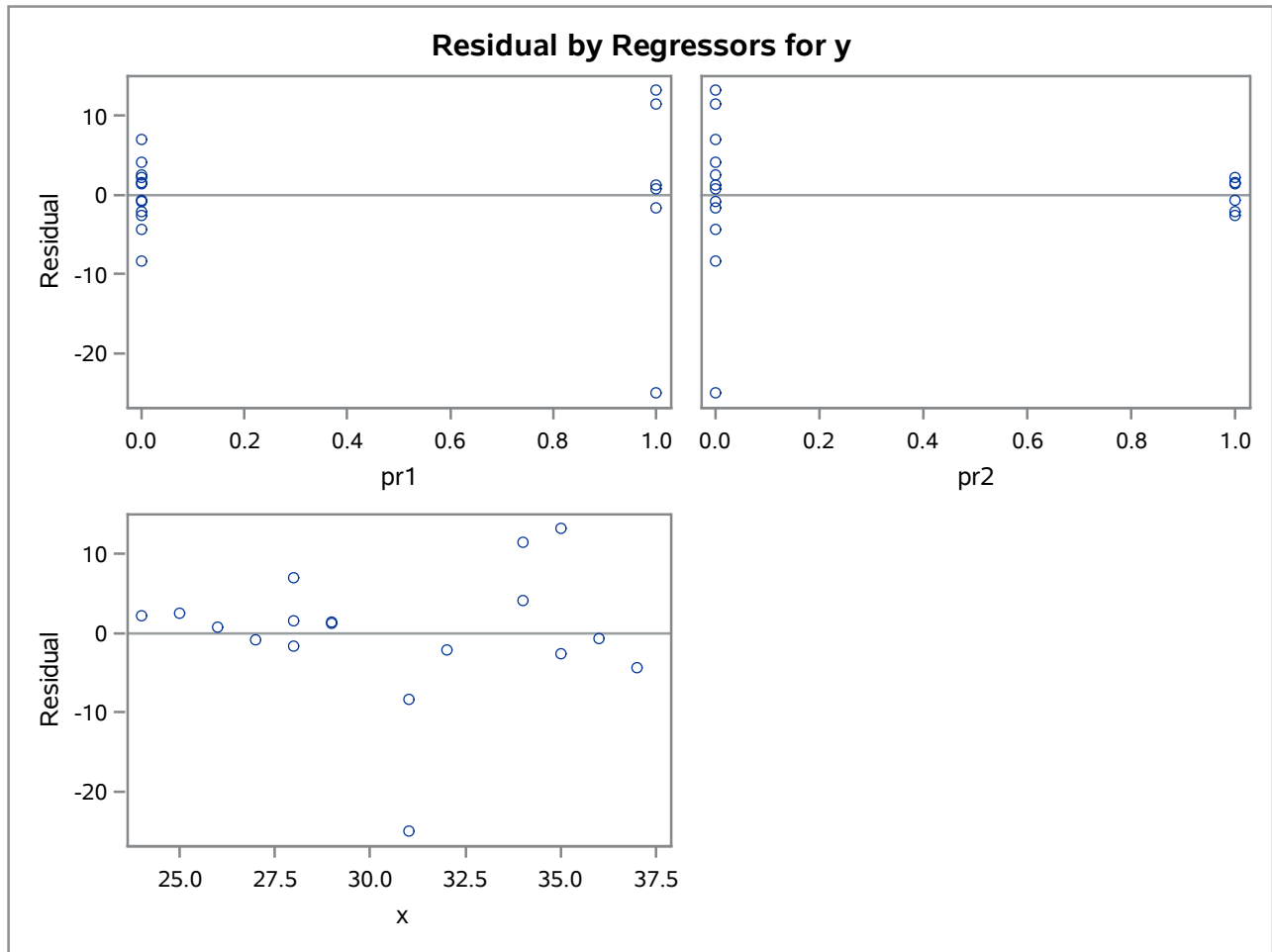
Root MSE	8.96530	R-Square	0.9007
Dependent Mean	120.72222	Adj R-Sq	0.8795
Coeff Var	7.42638		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-25.53056	17.00522	-1.50	0.1555
pr1	1	16.63994	5.17692	3.21	0.0062
pr2	1	41.44655	5.17933	8.00	<.0001
x	1	4.16035	0.54747	7.60	<.0001

The REG Procedure
 Model: MODEL2
 Dependent Variable: y



The REG Procedure
Model: MODEL2
Dependent Variable: y



The REG Procedure
 Model: MODEL3
 Dependent Variable: y

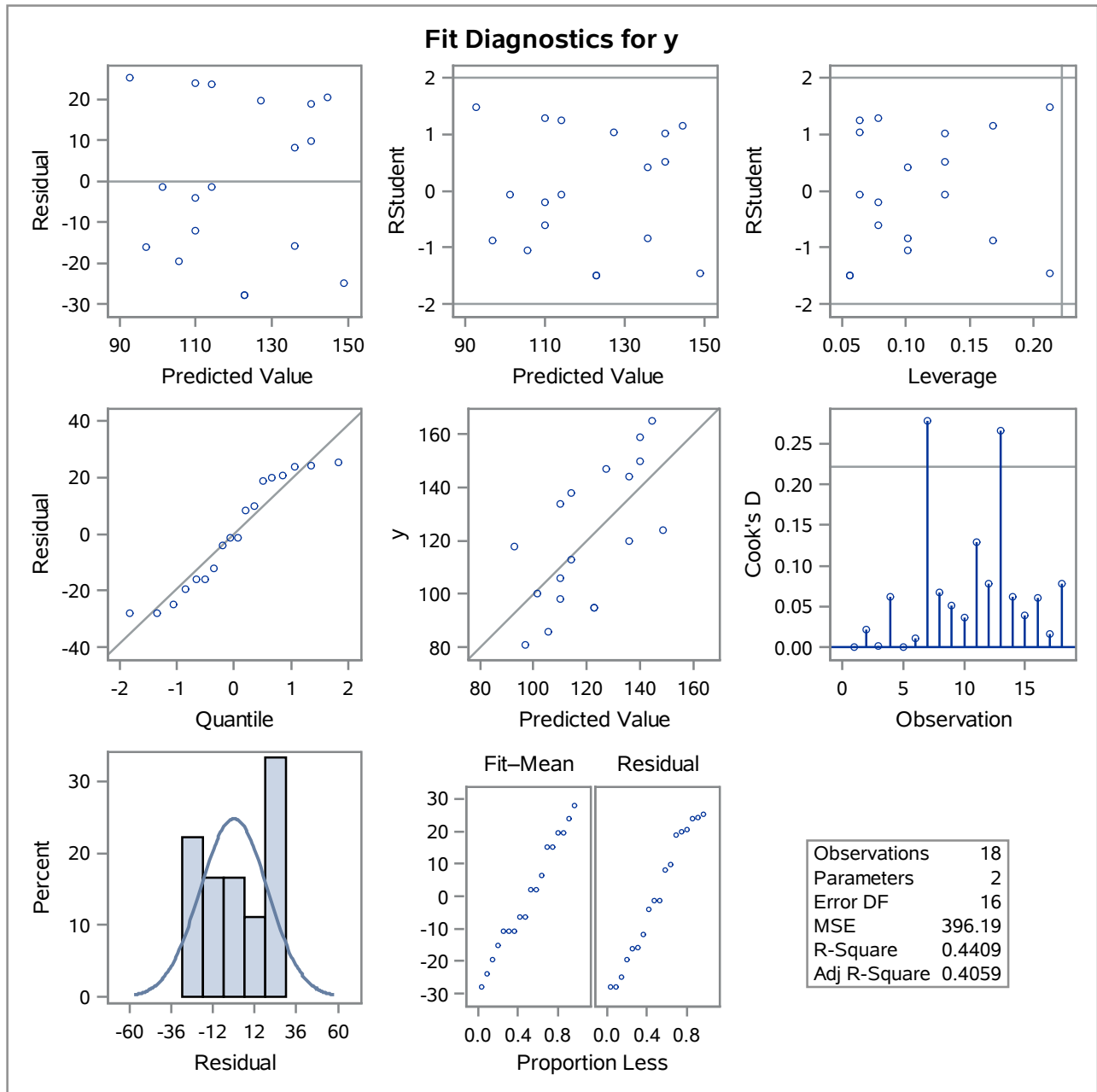
Number of Observations Read	18
Number of Observations Used	18

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	4998.59311	4998.59311	12.62	0.0027
Error	16	6339.01800	396.18863		
Corrected Total	17	11338			

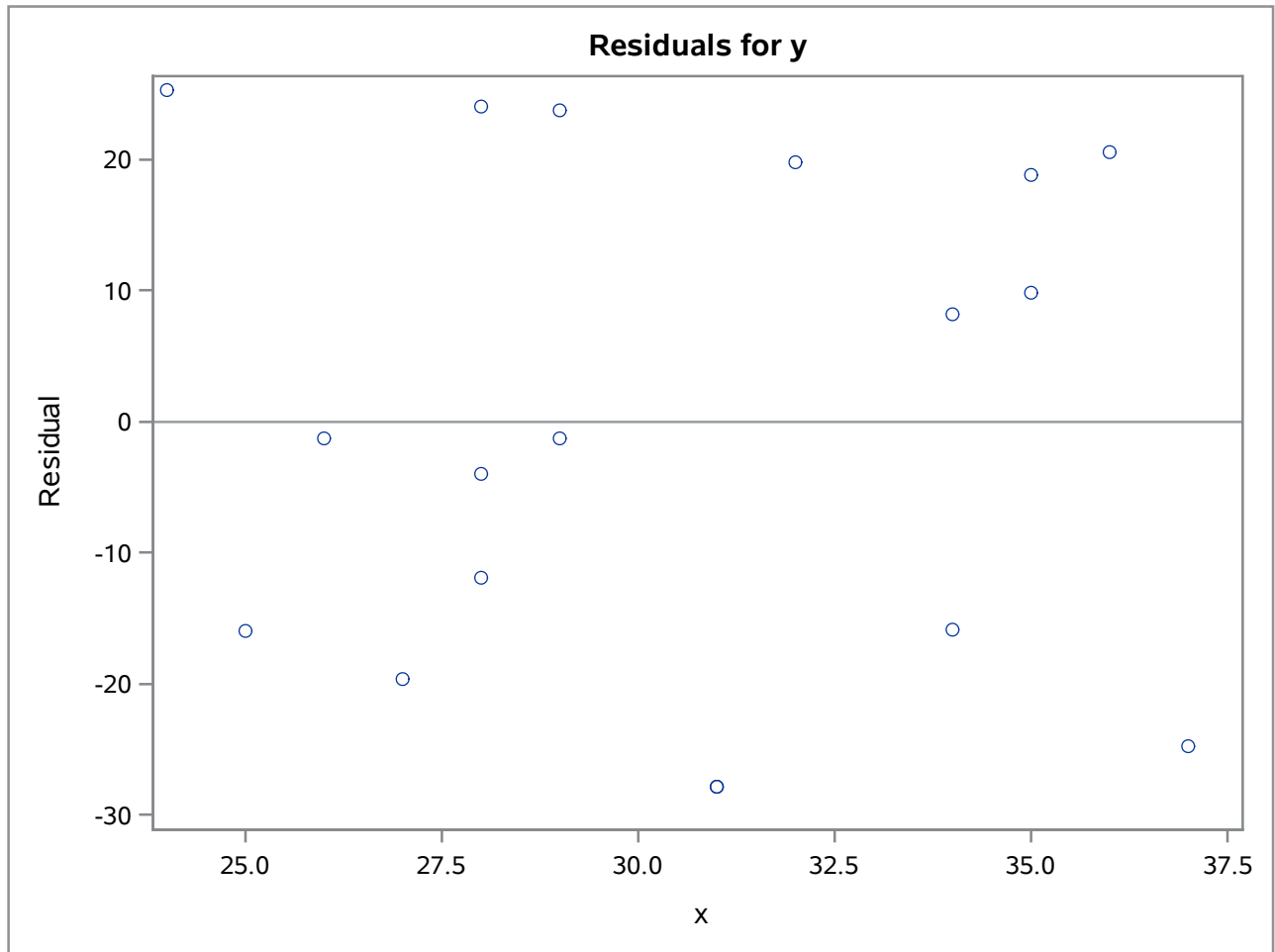
Root MSE	19.90449	R-Square	0.4409
Dependent Mean	120.72222	Adj R-Sq	0.4059
Coeff Var	16.48784		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-10.87647	37.34505	-0.29	0.7746
x	1	4.31471	1.21473	3.55	0.0027

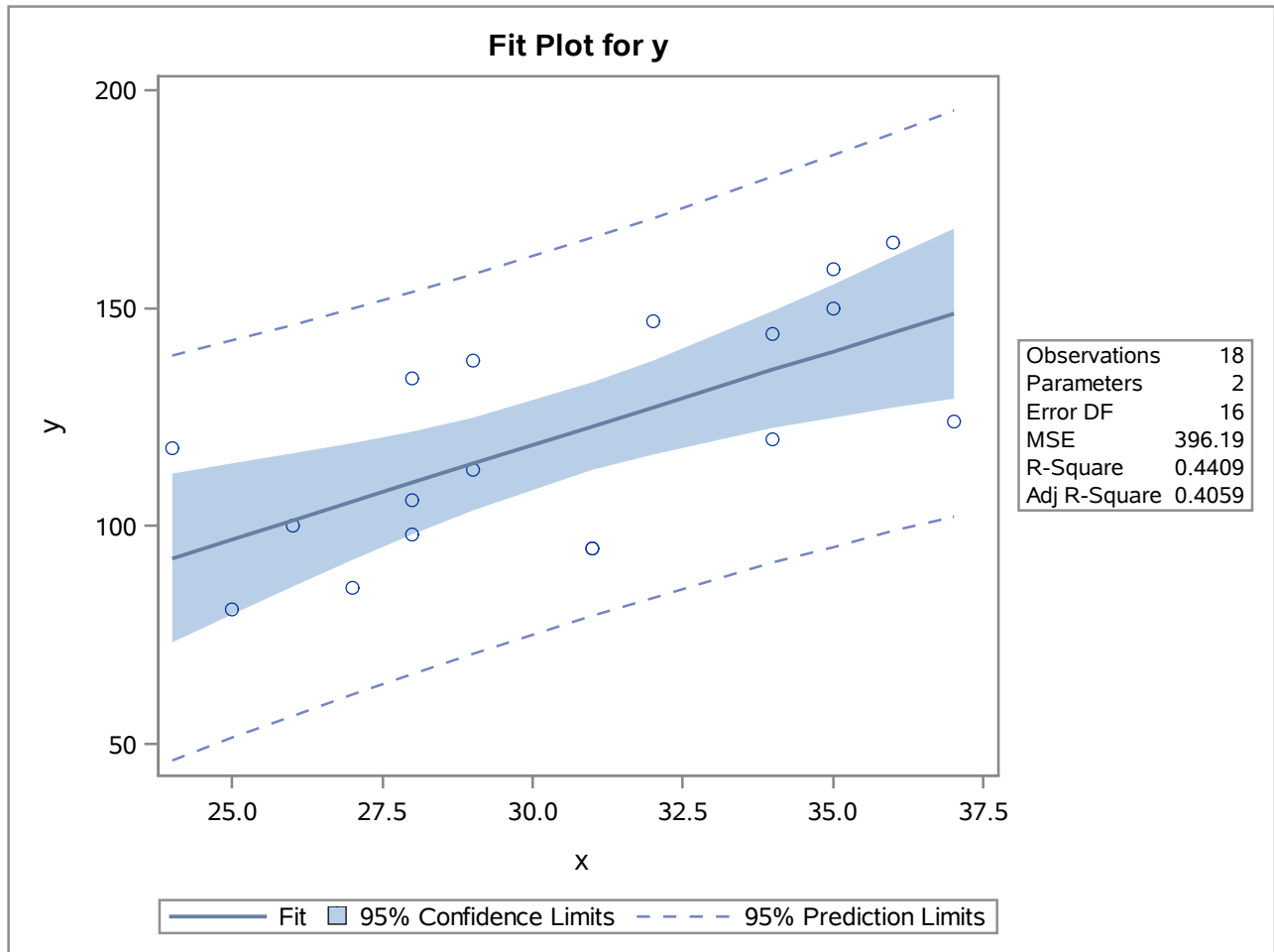
The REG Procedure
 Model: MODEL3
 Dependent Variable: y



The REG Procedure
Model: MODEL3
Dependent Variable: y



The REG Procedure
Model: MODEL3
Dependent Variable: y



The REG Procedure
 Model: MODEL1
 Dependent Variable: y

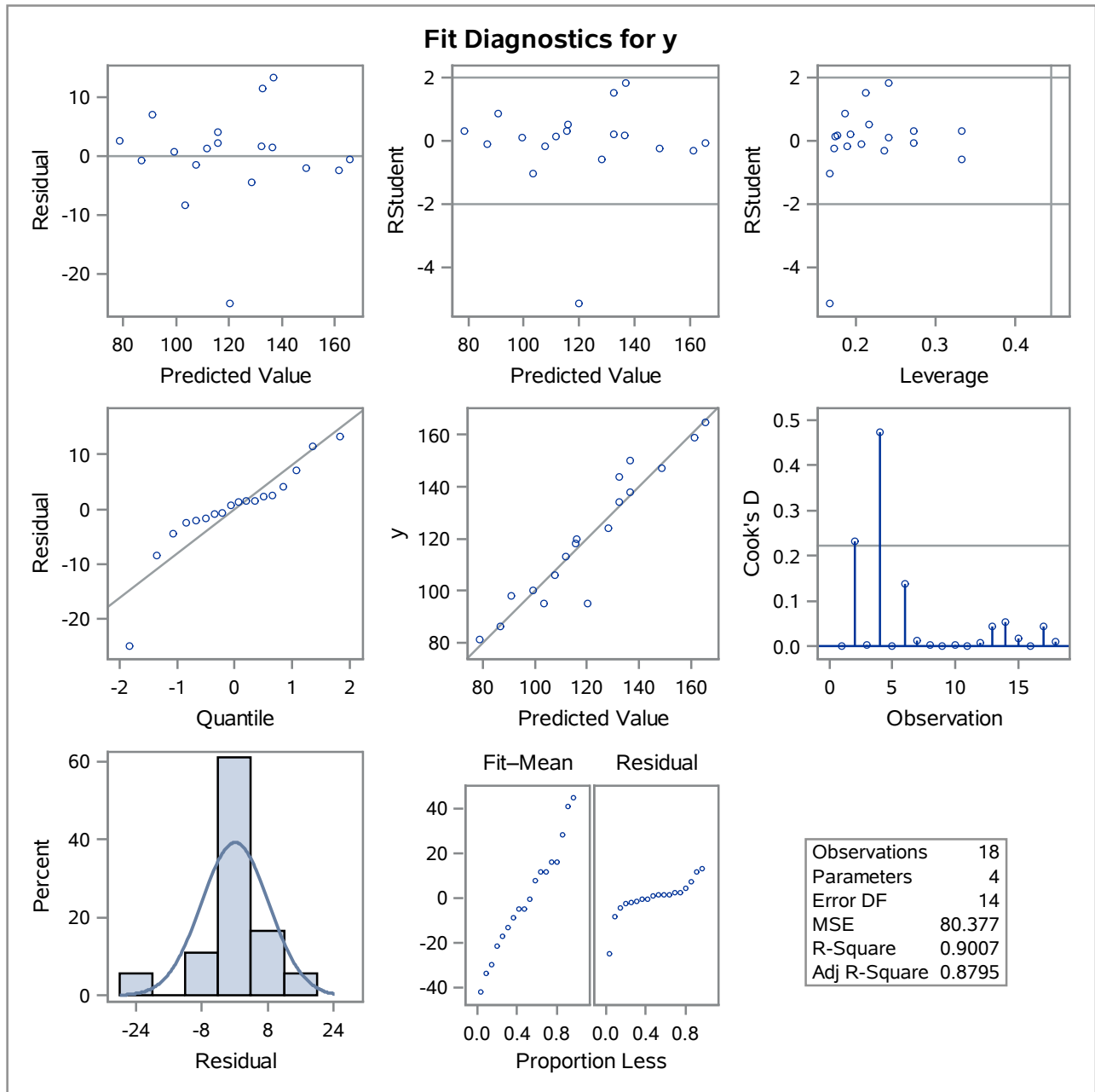
Number of Observations Read	18
Number of Observations Used	18

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	10212	3404.11314	42.35	<.0001
Error	14	1125.27170	80.37655		
Corrected Total	17	11338			

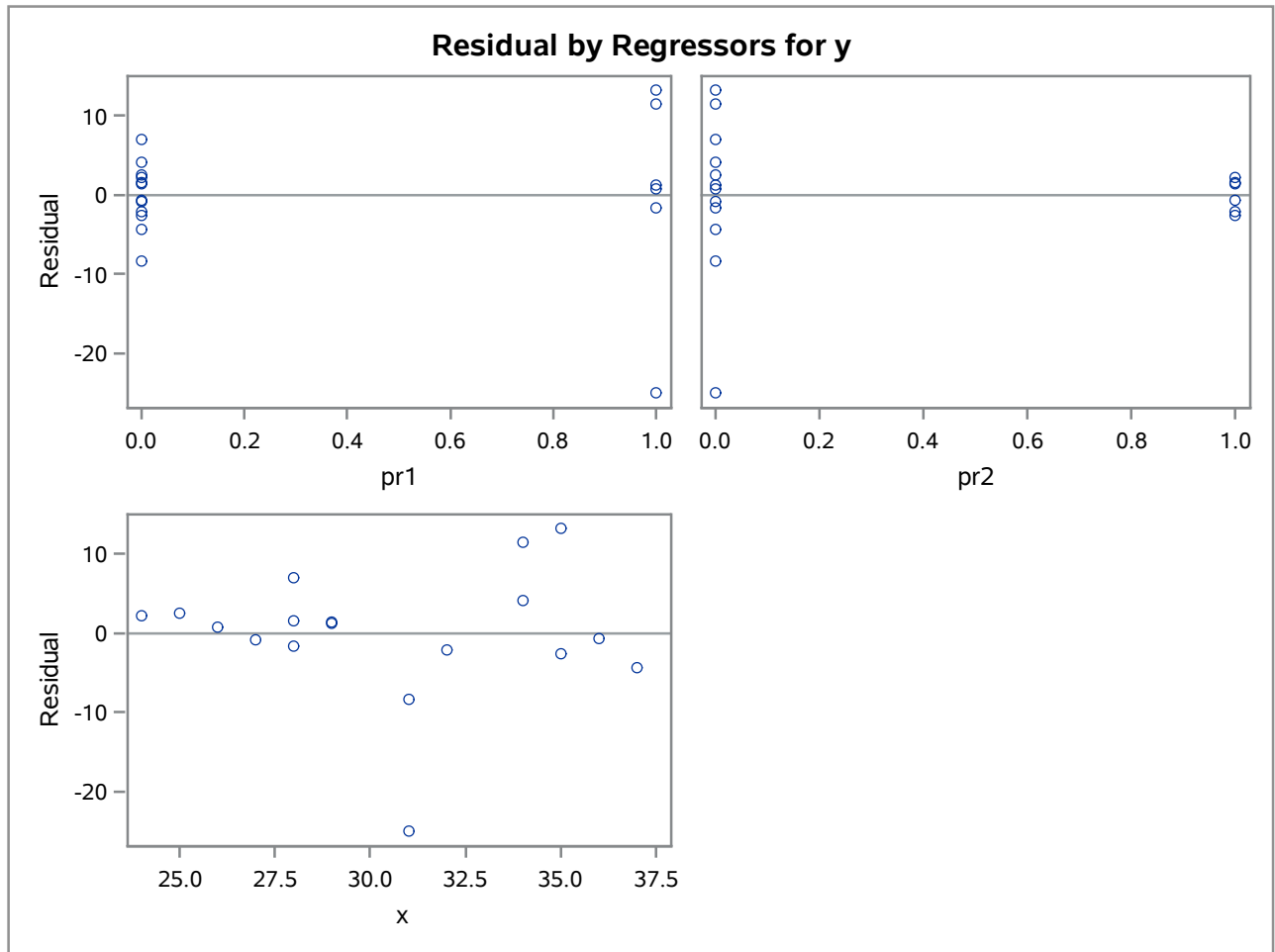
Root MSE	8.96530	R-Square	0.9007
Dependent Mean	120.72222	Adj R-Sq	0.8795
Coeff Var	7.42638		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-25.53056	17.00522	-1.50	0.1555
pr1	1	16.63994	5.17692	3.21	0.0062
pr2	1	41.44655	5.17933	8.00	<.0001
x	1	4.16035	0.54747	7.60	<.0001

The REG Procedure
 Model: MODEL1
 Dependent Variable: y

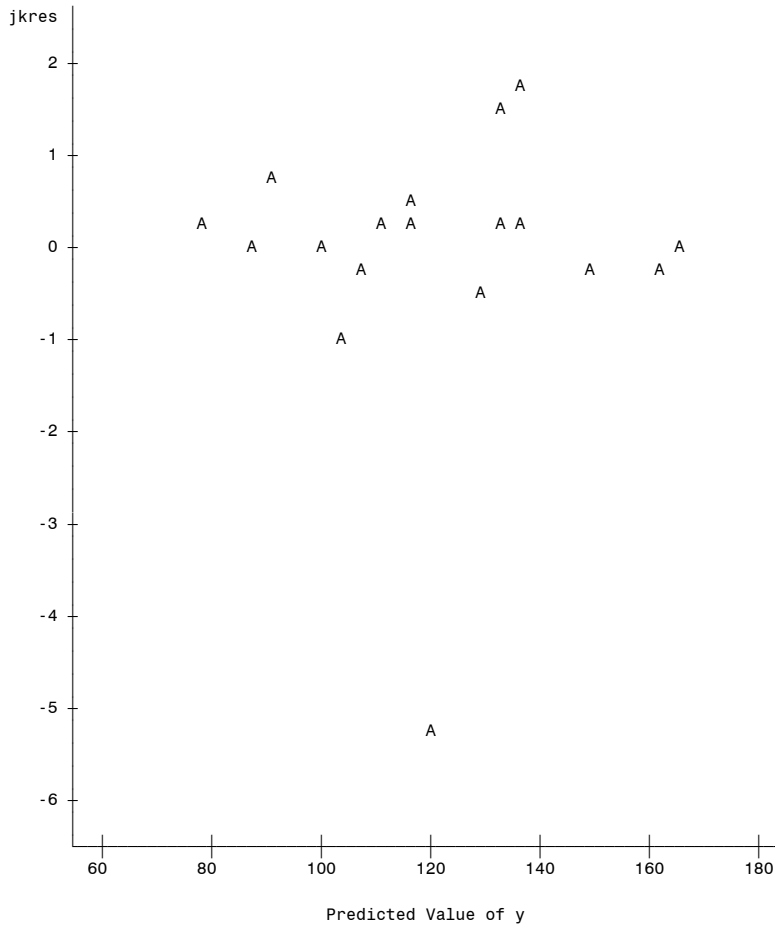


The REG Procedure
Model: MODEL1
Dependent Variable: y



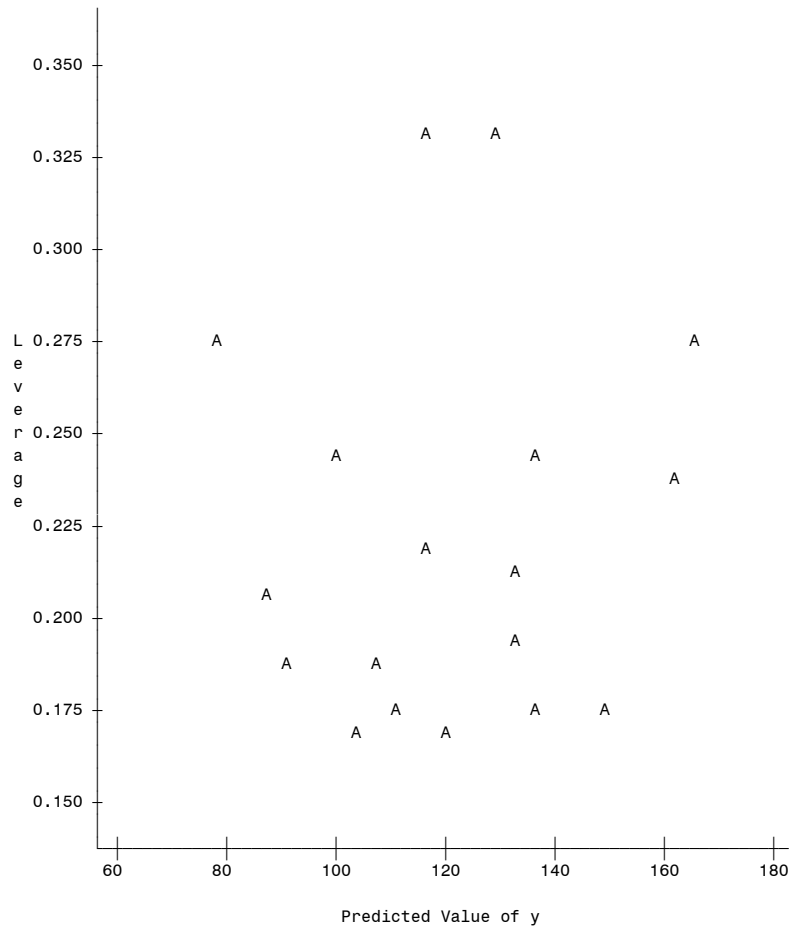
ANCOVA problem

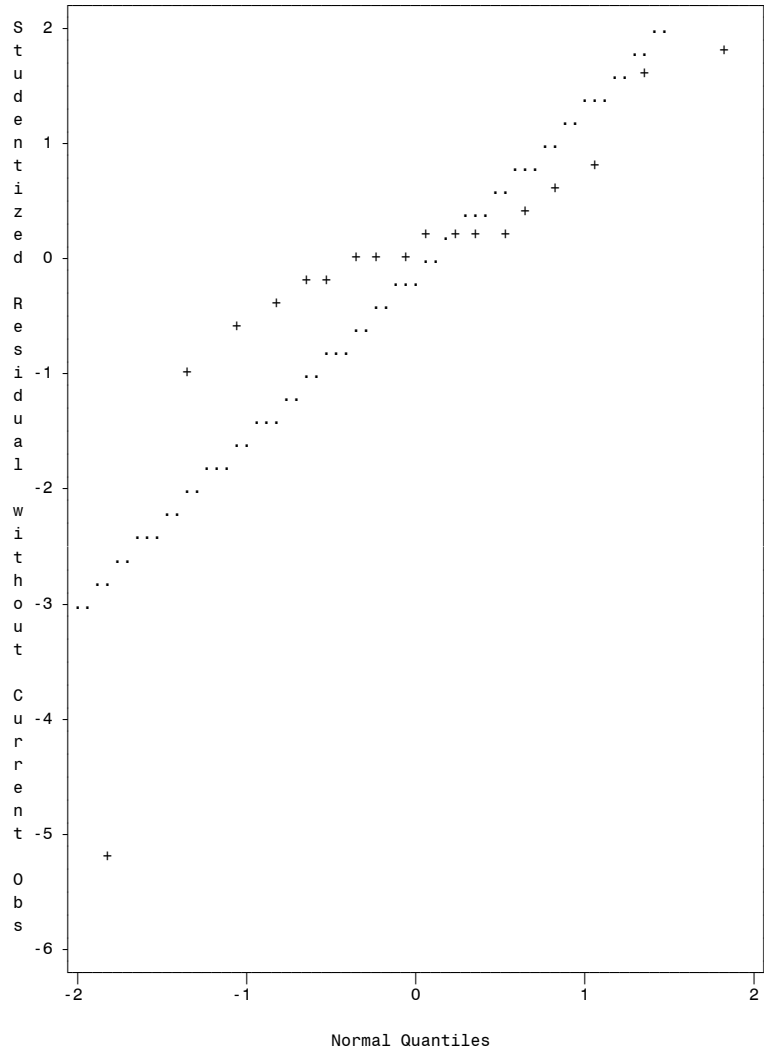
Plot of jkres*pred. Legend: A = 1 obs, B = 2 obs, etc.



ANCOVA problem

Plot of \hat{y} *pred. Legend: A = 1 obs, B = 2 obs, etc.





The GLM Procedure

Class Level Information		
Class	Levels	Values
process	3	1 2 3

Number of Observations Read	18
Number of Observations Used	18

The GLM Procedure

Dependent Variable: y

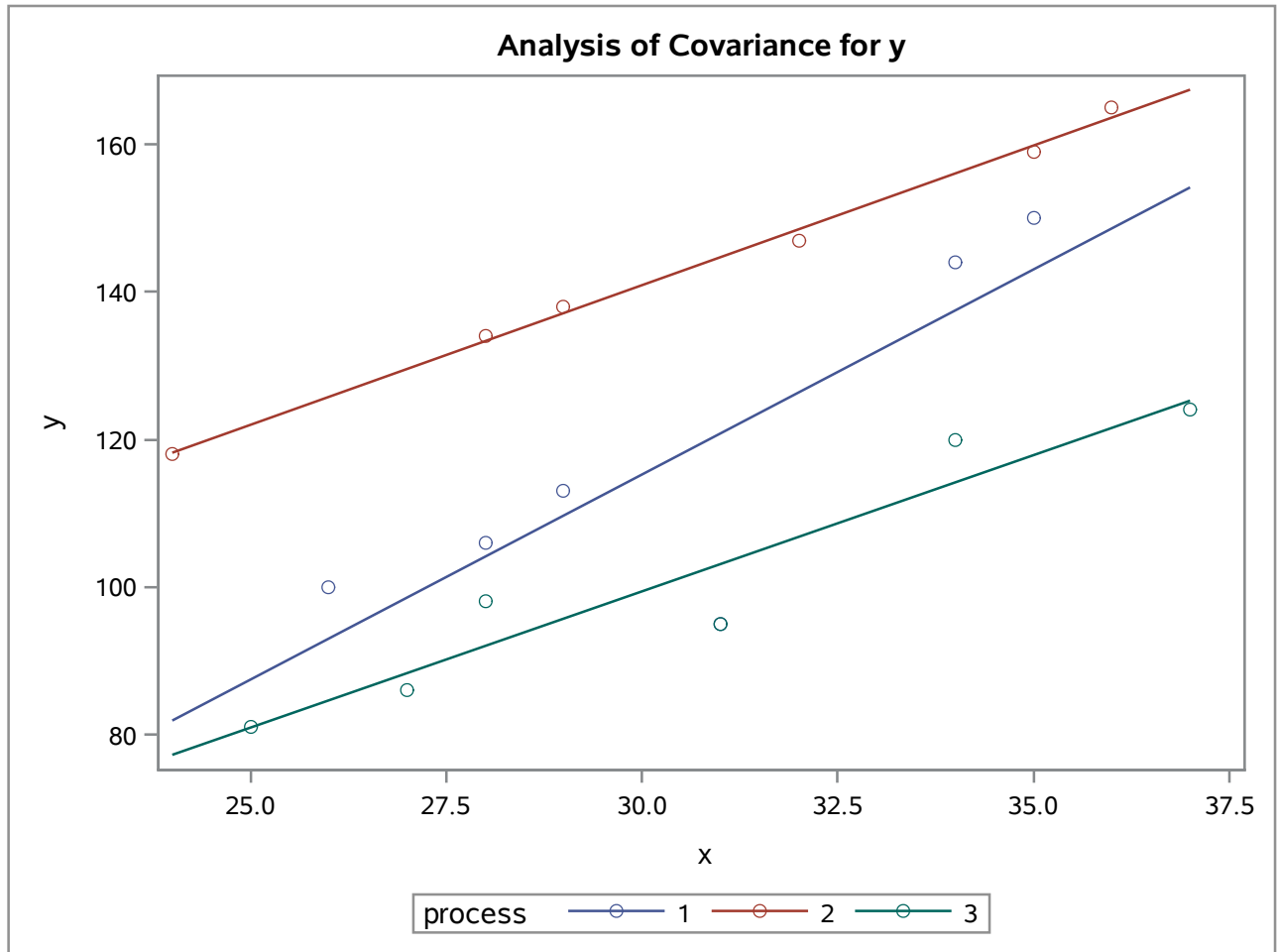
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	10369.22606	2073.84521	25.70	<.0001
Error	12	968.38505	80.69875		
Corrected Total	17	11337.61111			

R-Square	Coeff Var	Root MSE	y Mean
0.914586	7.441255	8.983249	120.7222

Source	DF	Type I SS	Mean Square	F Value	Pr > F
x	1	4998.593110	4998.593110	61.94	<.0001
process	2	5213.746300	2606.873150	32.30	<.0001
x*process	2	156.886650	78.443325	0.97	0.4062

Source	DF	Type III SS	Mean Square	F Value	Pr > F
x	1	4780.350601	4780.350601	59.24	<.0001
process	2	260.378732	130.189366	1.61	0.2396
x*process	2	156.886650	78.443325	0.97	0.4062

Dependent Variable: y



The GLM Procedure

Class Level Information		
Class	Levels	Values
process	3	1 2 3

Number of Observations Read	18
Number of Observations Used	18

The GLM Procedure

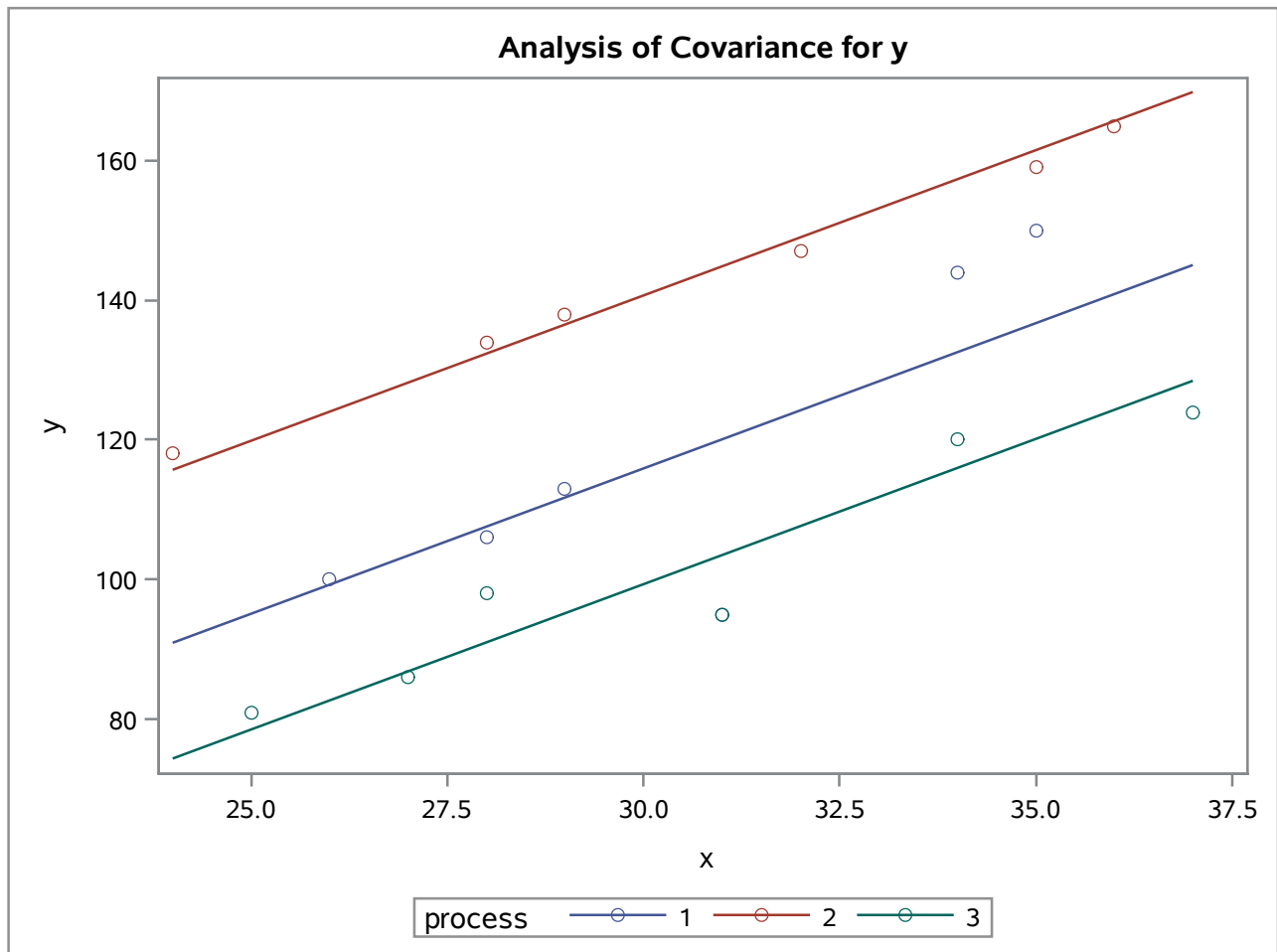
Dependent Variable: y

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	10212.33941	3404.11314	42.35	<.0001
Error	14	1125.27170	80.37655		
Corrected Total	17	11337.61111			

R-Square	Coeff Var	Root MSE	y Mean
0.900749	7.426385	8.965297	120.7222

Source	DF	Type I SS	Mean Square	F Value	Pr > F
x	1	4998.593110	4998.593110	62.19	<.0001
process	2	5213.746300	2606.873150	32.43	<.0001

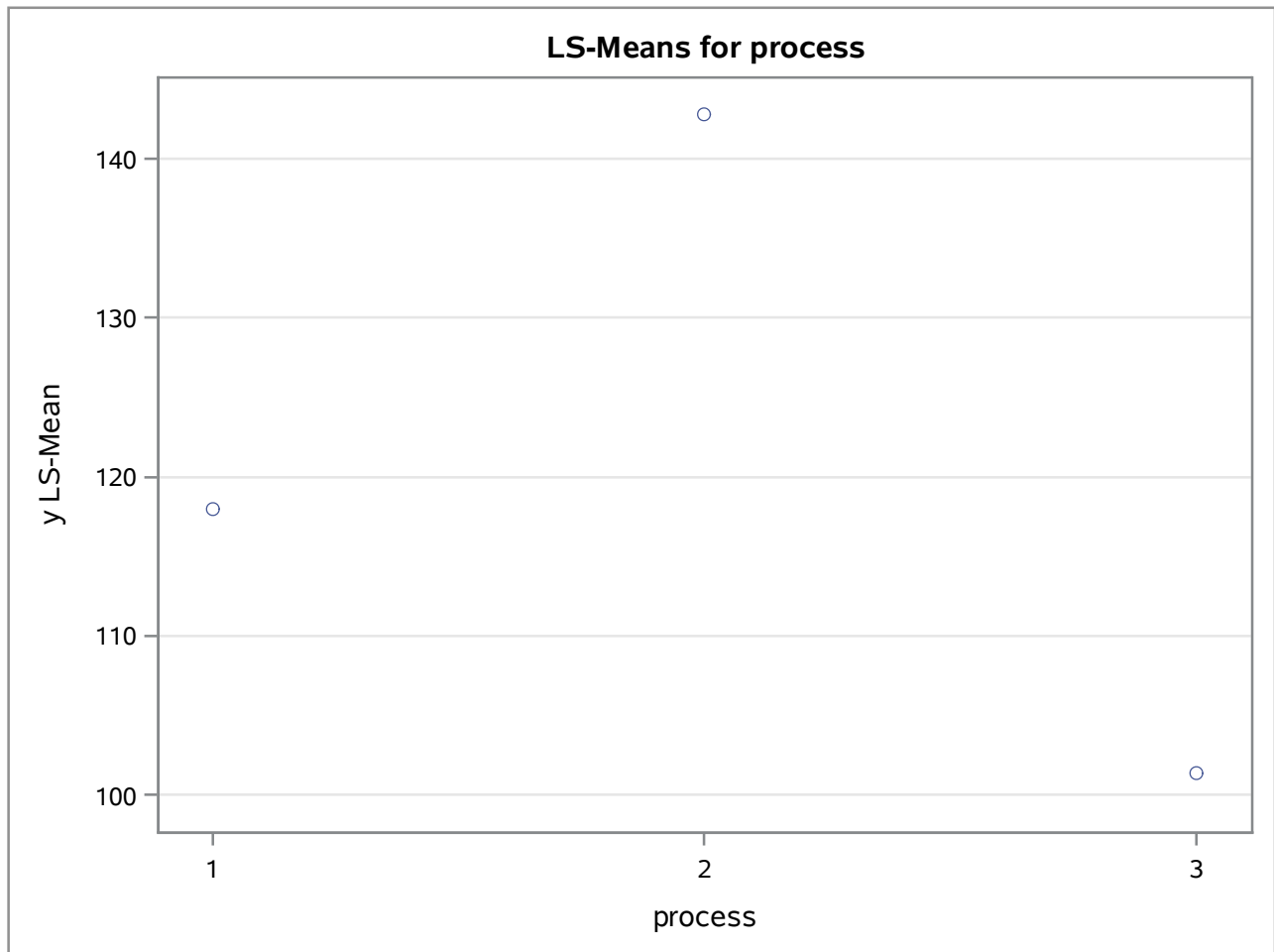
Source	DF	Type III SS	Mean Square	F Value	Pr > F
x	1	4641.561632	4641.561632	57.75	<.0001
process	2	5213.746300	2606.873150	32.43	<.0001



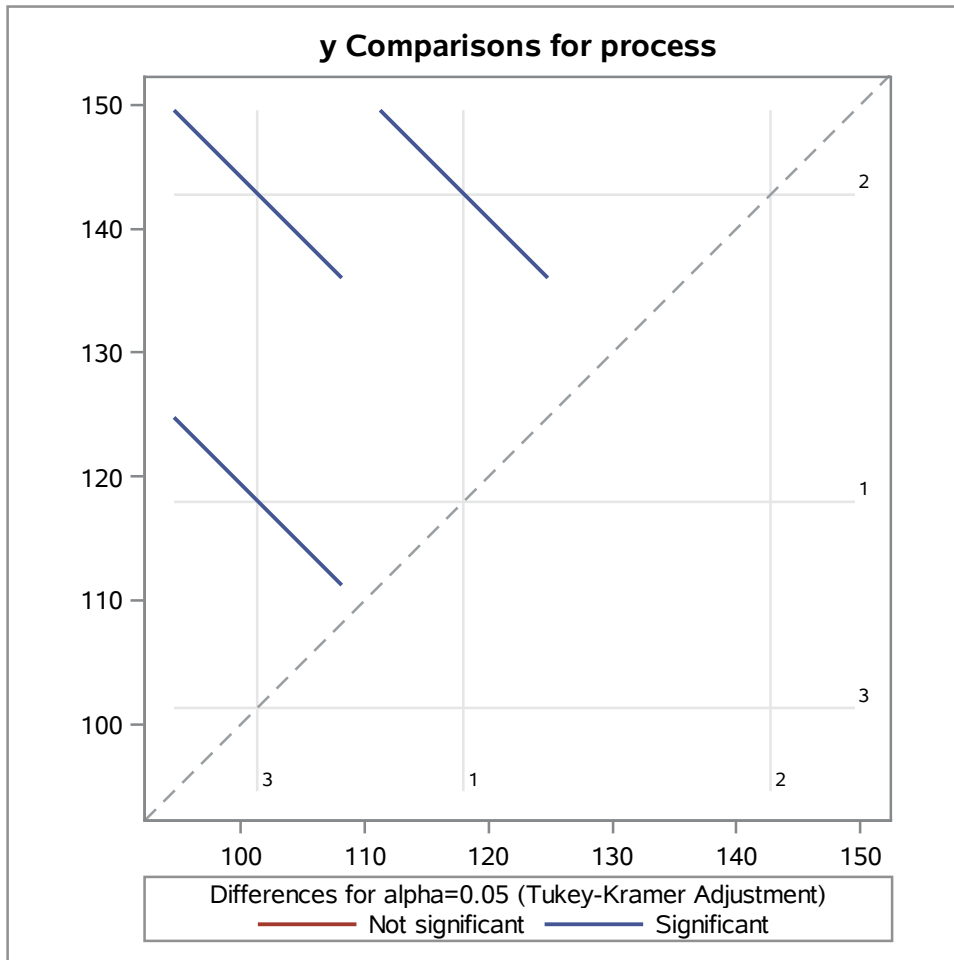
The GLM Procedure
 Least Squares Means
 Adjustment for Multiple Comparisons: Tukey-Kramer

process	y LSMEAN	LSMEAN Number
1	118.000000	1
2	142.806609	2
3	101.360058	3

Least Squares Means for effect process $Pr > t $ for $H_0: LS\text{Mean}(i)=LS\text{Mean}(j)$			
Dependent Variable: y			
i/j	1	2	3
1		0.0008	0.0161
2	0.0008		<.0001
3	0.0161	<.0001	

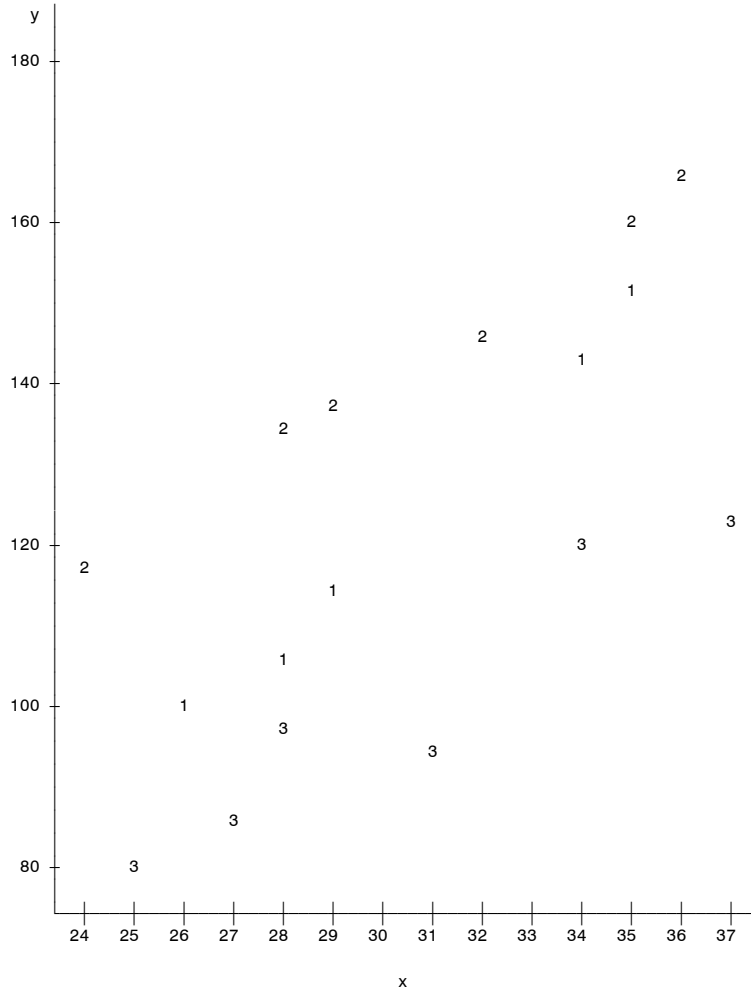


The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey-Kramer



ANCOVA problem

Plot of $y \times x$. Symbol is value of process.



The GLM Procedure

Class Level Information		
Class	Levels	Values
process	3	1 2 3

Number of Observations Read	17
Number of Observations Used	17

The GLM Procedure

Dependent Variable: y

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	10470.14364	2094.02873	138.00	<.0001
Error	11	166.91518	15.17411		
Corrected Total	16	10637.05882			

R-Square	Coeff Var	Root MSE	y Mean
0.984308	3.186801	3.895396	122.2353

Source	DF	Type I SS	Mean Square	F Value	Pr > F
x	1	5121.845666	5121.845666	337.54	<.0001
process	2	5145.604978	2572.802489	169.55	<.0001
x*process	2	202.693000	101.346500	6.68	0.0126

Source	DF	Type III SS	Mean Square	F Value	Pr > F
x	1	4956.249340	4956.249340	326.63	<.0001
process	2	275.703532	137.851766	9.08	0.0047
x*process	2	202.693000	101.346500	6.68	0.0126

The GLM Procedure

Dependent Variable: y

