```
options nocenter nodate nonumber;
data one;
       input trt $ minutes @@;
       if trt='N' then do; x1=1; x2=0; x3=0; end;
       else if trt='A' then do; x1=0; x2=1; x3=0; end;
       else if trt='P' then do; x1=0; x2=0; x3=1; end;
cards;
N 4.52  N 4.79  N 4.04  N 9.01  N 10.67  N 9.06  N 10.21  A 11.11  A 8.11 A 10.26
A 11.53 A 11.52 A 10.52 P 15.32  P 19.87 P 15.94  P 16.95  P 17.78 P 13.65 P 14.92
proc means data=one;
       class trt;
       var minutes;
run;
```

trt	N	Mean	Std Dev	Minimum	Maximum
A	6	10.5083333	1.2839847	8.1100000	11.5300000
N	7	7.4714286	2.8953148	4.0400000	10.6700000
P	7	16.3471429	2.0558511	13.6500000	19.8700000

```
proc reg data=one;
       model minutes=x1 x2/p;
run;
```

```
Number of Observations Read          20
Number of Observations Used          20
```

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	283.96727	141.98363	28.77	<.0001
Error	17	83.89931	4.93525		
Corrected Total	19	367.86658			

Root MSE	2.22154	R-Square	0.7719
Dependent Mean	11.48900	Adj R-Sq	0.7451
Coeff Var	19.33626		

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	16.34714	0.83966	19.47	<.0001
x1	1	-8.87571	1.18746	-7.47	<.0001
x2	1	-5.83881	1.23595	-4.72	0.0002

Obs	Dependent Variable	Predicted Value	Residual
1	4.5200	7.4714	-2.9514
2	4.7900	7.4714	-2.6814
3	4.0400	7.4714	-3.4314
4	9.0100	7.4714	1.5386
5	10.6700	7.4714	3.1986
6	9.0600	7.4714	1.5886
7	10.2100	7.4714	2.7386
8	11.1100	10.5083	0.6017
9	8.1100	10.5083	-2.3983
10	10.2600	10.5083	-0.2483
11	11.5300	10.5083	1.0217
12	11.5200	10.5083	1.0117
13	10.5200	10.5083	0.0117
14	15.3200	16.3471	-1.0271
15	19.8700	16.3471	3.5229
16	15.9400	16.3471	-0.4071
17	16.9500	16.3471	0.6029
18	17.7800	16.3471	1.4329
19	13.6500	16.3471	-2.6971
20	14.9200	16.3471	-1.4271

```
Sum of Residuals                     0
Sum of Squared Residuals            83.89931
Predicted Residual SS (PRESS)      114.84657
```

```
options nocenter nodate nonumber;
data one;
      input trt $ minutes @@;
      if trt='N' then do; x1=1; x2=0; x3=0; end;
      else if trt='A' then do; x1=0; x2=1; x3=0; end;
      else if trt='P' then do; x1=0; x2=0; x3=1; end;
cards;
N 4.52  N 4.79  N 4.04  N 9.01  N 10.67  N 9.06  N 10.21  A 11.11  A 8.11 A 10.26
A 11.53 A 11.52 A 10.52 P 15.32  P 19.87 P 15.94  P 16.95  P 17.78 P 13.65 P 14.92
proc reg data=one;
      model minutes=x1 x2 x3/noint;
      test x1=x2=x3;
run;
```

Number of Observations Read 20
Number of Observations Used 20

NOTE: No intercept in model. R-Square is redefined.

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2923.90969	974.63656	197.48	<.0001
Error	17	83.89931	4.93525		
Uncorrected Total	20	3007.80900			

Root MSE	2.22154	R-Square	0.9721
Dependent Mean	11.48900	Adj R-Sq	0.9672
Coeff Var	19.33626		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
x1	1	7.47143	0.83966	8.90	<.0001
x2	1	10.50833	0.90694	11.59	<.0001
x3	1	16.34714	0.83966	19.47	<.0001

Test 1 Results for Dependent Variable minutes

Source	DF	Mean Square	F Value	Pr > F
Numerator	2	141.98363	28.77	<.0001
Denominator	17	4.93525		

```
options nocenter nodate nonumber;
data one;
       input trt $ minutes @@;
       if trt='N' then do; x1=1; x2=0; end;
       else if trt='A' then do; x1=0; x2=1; end;
       else if trt='P' then do; x1=-1; x2=-1; end;
cards;
N 4.52  N 4.79  N 4.04  N 9.01  N 10.67  N 9.06  N 10.21  A 11.11  A 8.11 A 10.26
A 11.53 A 11.52 A 10.52 P 15.32  P 19.87 P 15.94  P 16.95  P 17.78 P 13.65 P 14.92
proc reg data=one;
       model minutes=x1 x2/p;
run;
```

Number of Observations Read 20
Number of Observations Used 20

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	283.96727	141.98363	28.77	<.0001
Error	17	83.89931	4.93525		
Corrected Total	19	367.86658			

Root MSE	2.22154	R-Square	0.7719
Dependent Mean	11.48900	Adj R-Sq	0.7451
Coeff Var	19.33626		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	11.44230	0.49806	22.97	<.0001
x1	1	-3.97087	0.69504	-5.71	<.0001
x2	1	-0.93397	0.72267	-1.29	0.2135

Obs	Dependent Variable	Predicted Value	Residual
1	4.5200	7.4714	-2.9514
2	4.7900	7.4714	-2.6814
3	4.0400	7.4714	-3.4314
4	9.0100	7.4714	1.5386
5	10.6700	7.4714	3.1986
6	9.0600	7.4714	1.5886
7	10.2100	7.4714	2.7386
8	11.1100	10.5083	0.6017
9	8.1100	10.5083	-2.3983
10	10.2600	10.5083	-0.2483
11	11.5300	10.5083	1.0217
12	11.5200	10.5083	1.0117
13	10.5200	10.5083	0.0117
14	15.3200	16.3471	-1.0271
15	19.8700	16.3471	3.5229
16	15.9400	16.3471	-0.4071
17	16.9500	16.3471	0.6029
18	17.7800	16.3471	1.4329
19	13.6500	16.3471	-2.6971
20	14.9200	16.3471	-1.4271

Sum of Residuals	0
Sum of Squared Residuals	83.89931
Predicted Residual SS (PRESS)	114.84657

```
options nocenter nodate nonumber;
data one;
       input trt $ minutes age @@;
       if trt='N' then do; x1=1; x2=0; end;
       else if trt='A' then do; x1=0; x2=1; end;
       else if trt='P' then do; x1=0; x2=0; end;
       x1age=x1*age;
       x2age=x2*age;
cards;
N 4.52 41  N 4.79 48  N 4.04 43  N 9.01 51   N 10.67 49 N 9.06 51  N 10.21 61 A 11.11 53 A 8.11 54  A
10.26 61
A 11.53 52 A 11.52 55 A 10.52 56 P 15.32  63 P 19.87 64 P 15.94 62 P 16.95 65 P 17.78 59 P 13.65 62 P
14.92 65
proc means;
       class trt;
       var minutes age;
run;
```

trt	Variable	N	Mean	Std Dev	Minimum	Maximum
A	minutes	6	10.5083333	1.2839847	8.1100000	11.5300000
	age	6	55.1666667	3.1885211	52.0000000	61.0000000
N	minutes	7	7.4714286	2.8953148	4.0400000	10.6700000
	age	7	49.1428571	6.4917530	41.0000000	61.0000000
P	minutes	7	16.3471429	2.0558511	13.6500000	19.8700000
	age	7	62.8571429	2.1157009	59.0000000	65.0000000

```
proc reg data=one;
       model minutes=x1 x2 age x1age x2age;
       test x1age=x2age=0;
run;
```

```
Number of Observations Read          20
Number of Observations Used          20
```

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	313.45767	62.69153	16.13	<.0001
Error	14	54.40891	3.88635		
Corrected Total	19	367.86658			

```
Root MSE              1.97138    R-Square     0.8521
Dependent Mean       11.48900    Adj R-Sq     0.7993
Coeff Var            17.15887
```

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	18.10915	23.92250	0.76	0.4616
x1	1	-27.35157	24.69735	-1.11	0.2868
x2	1	-3.96705	28.38322	-0.14	0.8908
age	1	-0.02803	0.38040	-0.07	0.9423
x1age	1	0.36814	0.40009	0.92	0.3731
x2age	1	-0.03784	0.47027	-0.08	0.9370

Test 1 Results for Dependent Variable minutes

Source	DF	Mean Square	F Value	Pr > F
Numerator	2	4.59964	1.18	0.3350
Denominator	14	3.88635		

```
proc reg data=one;
       model minutes=x1 x2 age/p;
       test x1=x2=0;
run;
```

Number of Observations Read 20
Number of Observations Used 20

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	304.25839	101.41946	25.51	<.0001
Error	16	63.60819	3.97551		
Corrected Total	19	367.86658			

Root MSE	1.99387	R-Square	0.8271
Dependent Mean	11.48900	Adj R-Sq	0.7947
Coeff Var	17.35459		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	0.77349	6.93448	0.11	0.9126
x1	1	-5.47783	1.84335	-2.97	0.0090
x2	1	-3.93340	1.39350	-2.82	0.0123
age	1	0.24776	0.10967	2.26	0.0382

Obs	Dependent Variable	Predicted Value	Residual
1	4.5200	5.4539	-0.9339
2	4.7900	7.1883	-2.3983
3	4.0400	5.9495	-1.9095
4	9.0100	7.9316	1.0784
5	10.6700	7.4360	3.2340
6	9.0600	7.9316	1.1284
7	10.2100	10.4092	-0.1992
8	11.1100	9.9715	1.1385
9	8.1100	10.2193	-2.1093
10	10.2600	11.9536	-1.6936
11	11.5300	9.7238	1.8062
12	11.5200	10.4670	1.0530
13	10.5200	10.7148	-0.1948
14	15.3200	16.3825	-1.0625
15	19.8700	16.6303	3.2397
16	15.9400	16.1348	-0.1948
17	16.9500	16.8781	0.0719
18	17.7800	15.3915	2.3885
19	13.6500	16.1348	-2.4848
20	14.9200	16.8781	-1.9581

Sum of Residuals	0
Sum of Squared Residuals	63.60819
Predicted Residual SS (PRESS)	93.37206