```
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;
......
             N
                                  Std Dev
                                               Minimum
trt
                      Mean
                                                             Maximum
Α
              6
                 10.5083333 1.2839847 8.1100000
                                                         11.5300000
                                2.8953148
N
             7
                    7.4714286
                                              4.0400000
                                                           10.6700000
Р
                                              13.6500000
              7
                   16.3471429
                                 2.0558511
                                                            19.8700000
proc reg data=one;
      model minutes=x1 x2/p;
Number of Observations Read
Number of Observations Used
                              20
                        Analysis of Variance
                             Sum of
                                           Mean
                    DF
                             Squares
                                                  F Value
Source
                                          Square
                                                           Pr > F
                           283.96727
                                       141.98363
Model
                     2
                                                    28.77
                                                            < .0001
                           83.89931
                                         4.93525
                    17
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
                             Standard
Variable
          DF
                               Error
                 Estimate
                                       t Value Pr > |t|
Intercept
                  16.34714
                               0.83966
                                          19.47
                                                   <.0001
           1
х1
           1
                  -8.87571
                               1.18746
                                          -7.47
                                                   <.0001
x2
                  -5.83881
                               1.23595
                                          -4.72
                                                   0.0002
           1
         Dependent Predicted
    0bs
          Variable
                     Value
                              Residual
           4.5200
                      7.4714
                                -2.9514
                      7.4714
           4.7900
     2
                                 -2.6814
     3
           4.0400
                      7.4714
                                 -3.4314
     4
                       7.4714
            9.0100
                                  1.5386
                      7.4714
     5
           10.6700
                                 3.1986
                      7.4714
     6
           9.0600
                                  1.5886
     7
           10.2100
                      7.4714
                                 2.7386
     8
          11.1100
                     10.5083
                                 0.6017
                    10.5083
     q
           8.1100
                                 -2.3983
                     10.5083
     10
           10.2600
                                 -0.2483
     11
           11.5300
                      10.5083
                                  1.0217
     12
           11.5200
                      10.5083
                                  1.0117
           10.5200
                     10.5083
    13
                                 0.0117
    14
          15.3200
                     16.3471
                                 -1.0271
     15
          19.8700
                     16.3471
                                 3.5229
                     16.3471
     16
           15.9400
                                 -0.4071
                      16.3471
     17
           16.9500
                                 0.6029
                      16.3471
     18
           17.7800
                                  1.4329
     19
           13.6500
                      16.3471
                                 -2.6971
           14.9200
    20
                      16.3471
                                 -1.4271
Sum of Residuals
                                  0
Sum of Squared Residuals
                            83.89931
Predicted Residual SS (PRESS)
                           114.84657
```

options nocenter nodate nonumber;

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

		Sum of	Mean		
Source	DF	Squares	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

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

### Test 1 Results for Dependent Variable minutes

		Mean		
Source	DF	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

## Analysis of Variance

20

		Sum of	Mean		
Source	DF	Squares	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	, oq			

#### Parameter Estimates

		Parameter	Standard		
Variable	DF	Estimate	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

0bs	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: v1=1: v2

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 Α minutes 6 10.5083333 1.2839847 8.1100000 11.5300000 age 6 55.1666667 3.1885211 52.0000000 61.0000000 minutes 7 7.4714286 2.8953148 4.0400000 10.6700000 7 49.1428571 6.4917530 41.0000000 61.0000000 age minutes 7 16.3471429 2.0558511 13.6500000 19.8700000 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

		Parameter	Standard		
Variable	DF	Estimate	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

Mean

 Source
 DF
 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

		Sum of	Mean		
Source	DF	Squares	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

		Parameter	Standard		
Variable	DF	Estimate	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

Dependent	Predicted	
Variable	Value	Residual
4.5200	5.4539	-0.9339
4.7900	7.1883	-2.3983
4.0400	5.9495	-1.9095
9.0100	7.9316	1.0784
10.6700	7.4360	3.2340
9.0600	7.9316	1.1284
10.2100	10.4092	-0.1992
11.1100	9.9715	1.1385
8.1100	10.2193	-2.1093
10.2600	11.9536	-1.6936
11.5300	9.7238	1.8062
11.5200	10.4670	1.0530
10.5200	10.7148	-0.1948
15.3200	16.3825	-1.0625
19.8700	16.6303	3.2397
15.9400	16.1348	-0.1948
16.9500	16.8781	0.0719
17.7800	15.3915	2.3885
13.6500	16.1348	-2.4848
14.9200	16.8781	-1.9581
	Variable  4.5200 4.7900 4.0400 9.0100 10.6700 9.0600 10.2100 11.1100 8.1100 10.2600 11.5300 11.5200 10.5200 15.3200 19.8700 15.9400 16.9500 17.7800 13.6500	Variable         Value           4.5200         5.4539           4.7900         7.1883           4.0400         5.9495           9.0100         7.9316           10.6700         7.4360           9.0600         7.9316           10.2100         10.4092           11.1100         9.9715           8.1100         10.2193           10.2600         11.9536           11.5300         9.7238           11.5200         10.4670           10.5200         10.7148           15.3200         16.6303           15.9400         16.1348           16.9500         16.8781           17.7800         15.3915           13.6500         16.1348

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