

```
/* SAS program to perform multiple regressions, */
/* fitting two models and testing one against the */
/* other. Response variable Y is an invasive method */
/* for determining arterial lung pressure (potentially */
/* risky to patient). Predictor variables: */
/* X1=emptying rate of blood into pumping chamber of */
/* heart (radionuclide imaging), X2=ejection rate of */
/* blood pumped out of heart to lungs (radionuclide */
/* imaging), X3=a blood gas concentration. */
/* */
/* Data from A. T. Marmor et al. (1986) Chest 89:64-69 */
/* as adapted by Kutner et al. (2004) Applied linear */
/* regression models, fourth edition. McGraw-Hill. */
```

```
options nocenter ls=72;
```

```
data;
```

```
infile 'a:\lungpressure.txt';
```

```
input y x1 x2 x3;
```

```
x12=x1*x2;
```

```
x13=x1*x3;
```

```
x23=x2*x3;
```

```
proc reg;
```

```
model y=x1 x2 x3;
```

```
model y=x1 x2 x3 x12 x13 x23;
```

```
run;
```

Data set is in the form of a text file named lungpressure.txt stored on a computer drive labeled 'a':

49.0	45.0	36.0	45.0
55.0	30.0	28.0	40.0
85.0	11.0	16.0	42.0
32.0	30.0	46.0	40.0
26.0	39.0	76.0	43.0
28.0	42.0	78.0	27.0
95.0	17.0	24.0	36.0
26.0	63.0	80.0	42.0
74.0	25.0	12.0	52.0
37.0	32.0	27.0	35.0
31.0	37.0	37.0	55.0
49.0	29.0	34.0	47.0
38.0	26.0	32.0	28.0
41.0	38.0	45.0	30.0
12.0	38.0	99.0	26.0
44.0	25.0	38.0	47.0
29.0	27.0	51.0	44.0
40.0	37.0	32.0	54.0
31.0	34.0	40.0	36.0

The REG Procedure

Model: MODEL1

Dependent Variable: y

Number of Observations Read	19
Number of Observations Used	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	4966.67801	1655.55934	7.96	0.0021
Error	15	3121.00620	208.06708		
Corrected Total	18	8087.68421			

Root MSE	14.42453	R-Square	0.6141
Dependent Mean	43.26316	Adj R-Sq	0.5369
Coeff Var	33.34137		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	87.18750	21.55246	4.05	0.0011
x1	1	-0.56448	0.42791	-1.32	0.2069
x2	1	-0.51315	0.22449	-2.29	0.0372
x3	1	-0.07196	0.45457	-0.16	0.8763

The REG Procedure

Model: MODEL2

Dependent Variable: y

Number of Observations Read 19

Number of Observations Used 19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	6482.77125	1080.46187	8.08	0.0012
Error	12	1604.91296	133.74275		
Corrected Total	18	8087.68421			

Root MSE	11.56472	R-Square	0.8016
Dependent Mean	43.26316	Adj R-Sq	0.7023
Coeff Var	26.73110		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	144.97317	78.36891	1.85	0.0891
x1	1	-2.95130	2.76019	-1.07	0.3060
x2	1	-1.28415	0.72475	-1.77	0.1018
x3	1	-0.23106	1.84130	-0.13	0.9022
x12	1	0.03381	0.01017	3.33	0.0061
x13	1	0.02099	0.06416	0.33	0.7492
x23	1	-0.01247	0.01712	-0.73	0.4803