```
/** THIS PAGE IS THE REGRESSION APPROACH CREATING ONE DUMMY VARIABLE – THIS IS AN INCORRECT APPROACH.  **/
/** HERE THE DUMMY VARIABLE TAKES ON THE VALUES 0, 1, OR 2, FOR TREATMENT P, A, N, RESPECTIVELY.       **/
data one;
        input trt $ minutes @@;
        if trt='N' then trtnum=2;
        else if trt='A' then trtnum=1;
        else if trt='P' then trtnum=0;
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
run;
*************************************************************************************************************************************;
proc means;
        class trt;
        var minutes;
run;
```

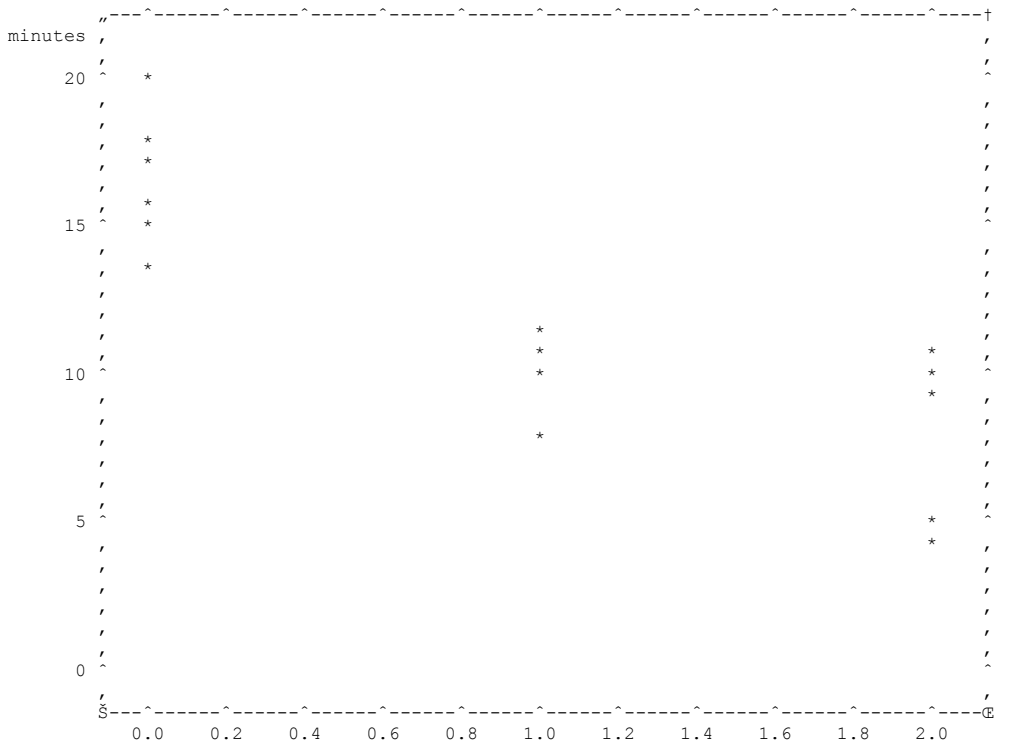
trt	N Obs	N	Mean	Std Dev	Minimum	Maximum
A	6	6	10.5083333	1.2839847	8.1100000	11.5300000
N	7	7	7.4714286	2.8953148	4.0400000	10.6700000
P	7	7	16.3471429	2.0558511	13.6500000	19.8700000

```
*************************************************************************************************************************************;
proc reg data=one;
        model minutes=trtnum;
        plot minutes*trtnum='*';
run;
quit;
```

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	275.72406	275.72406	53.86	<.0001
Error	18	92.14252	5.11903		
Corrected Total	19	367.86658			

Root MSE	2.26253	R-Square	0.7495
Dependent Mean	11.48900	Adj R-Sq	0.7356
Coeff Var	19.69299		

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	15.92686	0.78841	20.20	<.0001
trtnum	1	-4.43786	0.60469	-7.34	<.0001



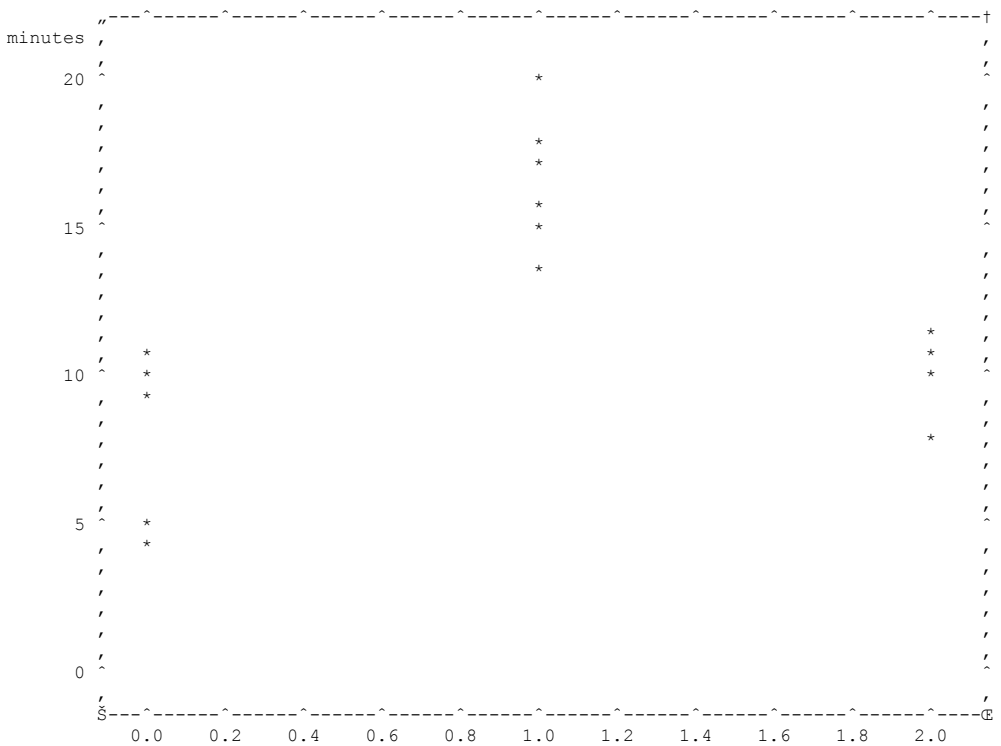
```
/** THIS PAGE IS THE REGRESSION APPROACH CREATING ONE DUMMY VARIABLE – THIS IS AN INCORRECT APPROACH.  **/
/** HERE THE DUMMY VARIABLE TAKES ON THE VALUES 0, 1, OR 2, FOR TREATMENT N, P, A, RESPECTIVELY.       **/
data one;
        input trt $ minutes @@;
        if trt='N' then trtnum=0;
        else if trt='A' then trtnum=2;
        else if trt='P' then trtnum=1;
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
run;

*************************************************************************************************************************;
proc reg data=one;
        model minutes=trtnum;
        plot minutes*trtnum='*';
run;
quit;
```

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	38.19097	38.19097	2.09	0.1659
Error	18	329.67561	18.31531		
Corrected Total	19	367.86658			

Root MSE	4.27964	R-Square	0.1038
Dependent Mean	11.48900	Adj R-Sq	0.0540
Coeff Var	37.24988		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	9.85757	1.48060	6.66	<.0001
trtnum	1	1.71730	1.18925	1.44	0.1659



```
/** THIS PAGE IS THE REGRESSION APPROACH CREATING 3 DUMMY VARIABLES AS OUTLINED IN THE IF-THEN STATEMENTS **/
/** BELOW - THIS IS NOT AN ENTIRELY CORRECT APPROACH AS IT CREATES AN X MATRIX THAT IS NOT OF FULL RANK.  **/
data two;
        set one;
        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;
run;

*************************************************************************************************************;
proc reg data=two;
        model minutes=x1 x2 x3;
run;
```

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		

NOTE: Model is not full rank. Least-squares solutions for the parameters are not unique. Some statistics will be misleading. A reported DF of 0 or B means that the estimate is biased.
NOTE: The following parameters have been set to 0, since the variables are a linear combination of other variables as shown.

x3 = Intercept - x1 - x2

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	B	16.34714	0.83966	19.47	<.0001
x1	B	-8.87571	1.18746	-7.47	<.0001
x2	B	-5.83881	1.23595	-4.72	0.0002
x3	0	0	.	.	.

```
/** THIS PAGE IS THE REGRESSION APPROACH USING 2 DUMMY VARIABLES (THE VARIABLES X1 AND X2 CREATED IN THE **/
/** PROGRAM ON THE PREVIOUS PAGE.  THESE 2 VARIABLES UNIQUELY IDENTIFY THE PATIENT'S GROUP.              **/
/** THIS IS THE CORRECT REGRESSION APPROACH TO COMPARING THREE TREATMENTS ON A CONTINUOUS OUTCOME!       **/
*************************************************************************************************************************;
proc reg data=two;
       model minutes=x1 x2;
run;
```

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	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