```
(ch5-1-castings-RE_HO.out) OPTIONS LS=80 PS=66 MPRINT NODATE PAGENO=1 NOCENTER;
DM      "LIST; CLEAR; LOG; CLEAR;";
*-------------------------------------------------------------------------------;
%let drive   =c: ;
%let mydocs  =&drive\Documents and Settings\Rich\My Documents;
%let course  =&mydocs\projects\teaching\stat231\S08;
%let kuehl   =&mydocs\projects2\Zoo-MyWeb\stat231\data\kuehl;
%let other   =&mydocs\projects2\Zoo-MyWeb\stat231\data\other;
libname out  "&course";
x "cd &course";            /* Set the Current Folder using x command */
*-------------------------------------------------------------------------------;
title1; title2; title3;title4;

%LET file_n1 = kuehl-table5-1.dat;

FILENAME file1 URL "http://www.uvm.edu/~rsingle/stat231/data/other/&file_n1";

 DATA a1;
   INFILE file1  FIRSTOBS=2 EXPANDTABS;
   INPUT casting strength;
   RUN;

 PROC GLM DATA=a1;
   CLASS  casting;
   MODEL  strength = casting;
   RANDOM casting;
  *OUTPUT OUT=a2 PREDICTED=pred RESIDUAL=resid;
   RUN;

*-------------------------------------------------------------------------------;

Class Level Information

Class         Levels    Values
casting            3    1 2 3

Number of Observations Used          30


Dependent Variable: strength

                                   Sum of
Source                     DF       Squares    Mean Square   F Value   Pr > F

Model                       2    147.8846667     73.9423333     12.71   0.0001
Error                      27    157.1020000      5.8185926
Corrected Total            29    304.9866667


R-Square     Coeff Var      Root MSE    strength Mean

0.484889      2.654632      2.412176         90.86667


Source                     DF      Type I SS    Mean Square   F Value   Pr > F

casting                     2    147.8846667     73.9423333     12.71   0.0001


Source                     DF    Type III SS    Mean Square   F Value   Pr > F

casting                     2    147.8846667     73.9423333     12.71   0.0001


Source                  Type III Expected Mean Square

casting                 Var(Error) + 10 Var(casting)
```

```
  DATA temp0;
    df = 27;
    alpha1 = 0.95;
    alpha2 = 0.05;
    quantile_Chisq1 = QUANTILE('CHISQ', alpha1, df);
    quantile_Chisq2 = QUANTILE('CHISQ', alpha2, df);
    RUN;
  PROC PRINT DATA=temp0;
    RUN;
```

| Obs | df | alpha1 | alpha2 | quantile_ Chisq1 | quantile_ Chisq2 |
|---|---|---|---|---|---|
| 1 | 27 | 0.95 | 0.05 | 40.1133 | 16.1514 |

```
*-------------------------------------------------------------------------------;


%MACRO doit_power(alpha=, lambda=, df1=, df2=);
  DATA temp1;
    lambda = &lambda;
    quantile_F = QUANTILE('F', 1-&alpha, &df1, &df2);
    x = ( (1/&lambda)**2 ) * quantile_F;
    power = 1 - CDF('F', x, &df1, &df2);
    RUN;
  PROC PRINT DATA=temp1;
  PROC DELETE DATA=temp1; RUN;
%MEND doit;

*Example 5.2;
 %doit_power(alpha=.05, lambda=3, df1=4, df2=45);
 %doit_power(alpha=.05, lambda=4, df1=4, df2=45);

/***
 > power = 1-pf( ((1/3)^2)*qf(.95,4,45), 4, 45)
                 \--------------------/
                          x
 > power
 [1] 0.8851946
***/

*-----------------------------------------------;
```

| Obs | lambda | quantile_F | x | power |
|---|---|---|---|---|
| 1 | 3 | 2.57874 | 0.28653 | 0.88519 |
| 2 | 4 | 2.57874 | 0.16117 | 0.95686 |