\*\*\*\*\* 14.23 page 942 \*\*\*\*\*\*;

**data** one;

input Diameters Calcium pH @@;

cards;

5.2 100 4 5.9 100 4 6.3 100 4 7.1 100 5

7.4 100 5 7.5 100 5 7.6 100 6 7.2 100 6

7.4 100 6 7.2 100 7 7.5 100 7 7.2 100 7

7.4 200 4 7.0 200 4 7.6 200 4 7.4 200 5

7.3 200 5 7.1 200 5 7.6 200 6 7.5 200 6

7.8 200 6 7.4 200 7 7.0 200 7 6.9 200 7

6.3 300 4 6.7 300 4 6.1 300 4 7.3 300 5

7.5 300 5 7.2 300 5 7.2 300 6 7.3 300 6

7.0 300 6 6.8 300 7 6.6 300 7 6.4 300 7

**run**;

**proc** **glm** data=one;

class Calcium pH;

model Diameters = Calcium pH Calcium\*pH;

**run**;

\*estimate the parameters in the model;

**proc** **glm** data=one;

class Calcium pH;

model Diameters = Calcium pH Calcium\*pH/solution;

contrast '100 & 200 vs. 300' Calcium **1** **1** -**2**;

contrast '100 & 200 vs. 300' Calcium -**1** -**1** **2**;

**run**;

**data** two; set one; if pH=**6**; **run**;

**proc** **anova** data=two;

class Calcium ;

model Diameters = Calcium ;

means Calcium / tukey;

**run**;

**quit**;

\*\*\*\* 14.8 page936 \*\*\*\*\*\*\*;

**data** one;

input Child A1P1 A2P1 A3P1 A1P2 A2P2 A3P2;

cards;

1 19 19 37 39 30 51

2 36 35 6 18 47 52

3 40 22 28 32 6 43

4 30 28 4 22 27 48

5 4 1 32 16 44 39

6 10 27 16 2 26 33

7 30 27 8 36 33 56

8 5 16 41 43 48 43

9 34 3 29 7 23 40

10 21 18 18 16 21 51

**run**;

**data** two; set one;

length age $**15**;

length prod $**15**;

age="5-6 years"; prod="breakfast"; attention\_span=A1P1; output;

age="7-8 years"; prod="breakfast"; attention\_span=A2P1; output;

age="9-10 years"; prod="breakfast"; attention\_span=A3P1; output;

age="5-6 years"; prod="video game"; attention\_span=A1P2; output;

age="7-8 years"; prod="video game"; attention\_span=A2P2; output;

age="9-10 years"; prod="video game"; attention\_span=A3P2; output;

keep child age prod attention\_span;

**run**;

**proc** **sort** data=two;

by age; **run**;

**proc** **means** data=two;

by age; var attention\_span;**run**;

**proc** **sort** data=two;

by prod; **run**;

**proc** **means** data=two;

by prod; var attention\_span;**run**;

\*model, assumption check and profile plot;

**proc** **glm** data=two;

class age prod;

\*model attention\_span = age | prod;

model attention\_span = age prod age\*prod;

output out=attention\_out r=residual;

**run**;

**quit**;

**proc** **univariate** normal plot data=attention\_out;

var residual;

**run**;

\*estimate the parameters in the model;

**proc** **glm** data=two;

class age prod;

model attention\_span = age prod age\*prod/solution;

**run**;

**quit**;

**proc** **means** data=two; var attention\_span; **run**;