**Recommendation:** read each problem and decide which method of analysis you will use e.g. summary statistics (proc freq and proc means), ANOVA or ANCOVA (proc ANOVA or proc GLM), tests of association (proc freq), logistic regression (proc logistic).

**Useful SAS documentation:**

Proc freq: <https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.4/statug/statug_freq_overview.htm>

Proc means:

<https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.5/proc/n0k7qr5c2ah3stn10g1lr5oytz57.htm>

Proc ANOVA: <https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.4/statug/statug_anova_overview.htm>

Proc GLM: <https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.4/statug/statug_glm_overview.htm>

Proc logistic: <https://documentation.sas.com/doc/en/pgmsascdc/9.4_3.4/statug/statug_logistic_overview.htm>

**For problem 1, see SAS workshops 1 and 2 sample code.**

\*This is the data step in SAS.

The first command is "data yourname"

the next command tells SAS the varibles names

the third command is "datalines" and tells SAS that the next information is data.

Notice that each command ends in a semicolon;

data hypertension;

input rat temp bp;

datalines;

1 26 152

2 26 157

3 26 179

4 26 182

5 26 176

6 26 149

7 5 384

8 5 369

9 5 354

10 5 375

11 5 366

12 5 423

;

run;

\*Check the SAS log now. You can see that the data have imported, and there are now 12 observations in the data set work.hypertension. The "work." prefix for the data set indicates the SAS library in which the data are contained.;

\*now view your data set;

proc print data=hypertension;

run;

\*now look at the attributes of your data set;

proc contents data=hypertension;

run;

\*proc means will calculate summary statistics for you;

\*list the statistics you'd like to see in the proc step;

\*after the var command, list the variables you want statistics for;

\*you can give the output table a title;

proc means data=hypertension n mean min Q1 median Q3 max range std;

var temp bp;

title â€˜Summary of Hypertension Dataâ€™;

run;

\*proc univariate will calculate summary statistics and a lot more;

\*you can easily make histograms and probability plots;

proc univariate data=hypertension;

var bp;

histogram;

probplot/normal (mu=est sigma=est);

inset normal;

run;

\*notice that until we change the title, all output has the previously specified title;

\*by default, SAS runs a hypothesis test that the mean is zero in proc univariate;

\*adjust the hypothesized mean by using the command mu0=;

\*add a confidence interval for the mean and standard deviation by using the command cibasic;

\*add a confidence interval for the median by using the command cipctldf;

\*you can change the level alpha of the test or CIs. The default is 5%;

\*note that the default hypothesis test in proc univariate is a two-sided test. Divide the p-value by two to obtain the p-value for a one-sided test.;

proc univariate data=hypertension cibasic cipctldf mu0=50 alpha=0.01;

var bp;

title 'Confidence Intervals and Hypothesis Test for Blood Pressure';

run;

\*now you try;

\*here is the dataset for the "now you try" exercise in SAS workshop 1;

\*

14.2

5.3

2.9

4.2

1.2

4.3

1.1

2.6

6.7

7.8

25.9

43.8

2.7

5.6

7.8

3.9

4.7

6.5

29.5

2.1

34.8

3.6

5.8

4.5

6.7

;

data hypertension;

input rat temp bp;

datalines;

1 26 152

2 26 157

3 26 179

4 26 182

5 26 176

6 26 149

7 5 384

8 5 369

9 5 354

10 5 375

11 5 366

12 5 423

;

run;

\*You can find hypothesis tests and CIs using proc univariate;

\*you can also find CIs and run a hypothesis test using the ttest procedure;

proc ttest data=hypertension alpha=0.01 H0=50;

title 'T Test for Blood Pressure Equal to 50';

var bp;

run;

\*proc ttest will also run tests separately for different classes. Include a class variable to run multiple t-tests;

\*a class variable will also automatically run tests/CIs for the difference between means;

\*the ci command will request a confidence interval for the standard deviation;

\*the sides command will give a one-sided hypothesis test;

proc ttest data=hypertension sides=U ci=equal;

title 'T Test for Blood Pressure by Temperature Setting';

class temp;

var bp;

run;

\*you can run a Wilcoxon Rank Sum test by using the npar1way procedure;

proc npar1way data=hypertension wilcoxon;

title 'Wilcoxon Rank Sum test for Difference in Blood Pressure by Temperature Setting';

class temp;

var bp;

exact wilcoxon;

run;

**For problems 2-6, see Stat 454 SAS workshop 3 code and *lead data SAS code***

\*note: for proc ANOVA, data must be stacked

e.g.

input pounds type semicolon

datalines semicolon

10.8 A1

11.3 A2

4.6 S

and so on;

\*link to SAS documentation about proc ANOVA: https://documentation.sas.com/?docsetId=statug&docsetVersion=15.1&docsetTarget=statug\_anova\_overview.htm&locale=en;

data kenton;

input sales design;

datalines;

11 1

17 1

16 1

14 1

15 1

12 2

10 2

15 2

19 2

11 2

23 3

20 3

18 3

17 3

27 4

33 4

22 4

26 4

28 4

;

run;

title 'ANOVA of Kenton Data';

proc anova data=kenton;

class design;

\*the command "class" will contain the varible that identifies groups;

model sales=design;

\*the model statement is always 'continuous variable = group variable';

run;

quit;

\*you can also get ANOVA output using the General Linear Models procedure;

\*here is a link to proc GLM documentation: https://documentation.sas.com/?cdcId=pgmsascdc&cdcVersion=9.4\_3.4&docsetId=statug&docsetTarget=statug\_glm\_overview.htm&locale=en;

\*note that the syntax is nearly identical to the ANOVA procedure;

title 'ANOVA of Kenton Data using GLM';

proc glm data=kenton;

class design;

model sales = design;

run;

quit;

\*in either Proc ANOVA or Proc GLM, a means statement requests a table of means by class;

\*add hovtest to request a test for homogeneity of variances;

title 'ANOVA of Kenton Data with Homogeneity of Variances Test';

proc anova data=kenton;

class design;

model sales=design;

means design/hovtest;

run;

quit;

title 'ANOVA of Kenton Data using GLM with Homogeneity of Variances Test';

proc glm data=kenton;

class design;

model sales = design;

means design/hovtest;

run;

quit;

\*notice that in both Proc GLM and Proc ANOVA, the means statement takes the class variable;

\*proc GLM can be used to create a dataset of residuals;

title â€˜ANOVA and Residual Datasetâ€™;

proc glm data=kenton;

class design;

model sales = design;

means design;

output out=resid\_data r=resid;

\*the name of this data set is resid\_data and it will contain all the variables of the original data set as well as a new variable called resid;

run;

quit;

\*now use the new data set to analyze the residuals;

title 'Residual Analysis of Kenton Data';

proc univariate data=resid\_data plot normal;

var resid;

run;

proc sgplot data=resid\_data;

vbox resid;

run;

\*proc npar1way is for one way nonparametric analysis. This code will run the Kruskal-Wallis test;

title 'Nonparametric Analysis of Kenton Data';

proc npar1way data=kenton;

class design;

var sales;

run;

\*create linear contrasts using Proc GLM and the contrast statement;

title 'Multiple Comparisons Using Contrasts';

proc glm data=kenton;

class design;

model sales = design;

contrast 'Compare cartoons to without cartoons' design 1 -1 1 -1;

contrast 'Compare 3 colors to 5 colors' design -1 -1 1 1;

\*notice the coefficients of contrasts are given as a list;

run;

quit;

\*look at pairwise comparisons using proc ANOVA and Tukey's method or Scheffe's method;

title 'Pairwise Comparisons using Tukeys Procedure';

proc anova data=kenton;

class design;

model sales=design;

means design/hovtest=bf;

means design/tukey cldiff lines alpha=0.01;

\*notice you can change the level of alpha for confidence intervals. LINES gives a visual display of differences;

run;

quit;

title 'Pairwise Comparisons using Scheffes Procedure';

proc anova data=kenton;

class design;

model sales=design;

means design/scheffe cldiff lines alpha=0.01;

run;

quit;

title 'Comparison to a Control Using Dunnetts Procedure';

proc anova data=kenton;

class design;

model sales=design;

means design/dunnettu('2') alpha=0.01;

\*dunnett requests a dunnett test. The default is a two-tailed test, but dunnettu will request a test that any group mean is higher than the control, and dunnettl will request a test that any group mean is lower than the control.;

\*('CONTROL') tells SAS which group is the control group. In the absence of this command, SAS will choose the first group.;

run;

quit;

data lead;

input id area$ ageyrs sex$ iqv\_inf iqv\_comp iqv\_ar iqv\_ds iqv\_raw iqp\_pc iqp\_bd iqp\_oa iqp\_cod iqp\_raw hh\_index iqv iqp iqf iq\_type$ lead\_grp$ Group$ ld72 ld73 fst2yrs$ totyrs pica$ colic$ clumsi$ irrit$ convul$ \_2plat\_r \_2plat\_l visrea\_r visrea\_l audrea\_r audrea\_l fwt\_r fwt\_l hyperact$ maxfwt ;

datalines;

101 3 11.08 1 3 4 3 5 15 10 8 8 5 31 77 61 85 70 1 1 1 25 18 2 11 2 2 2 2 2 16 16 36 38 27 25 72 52 . 72

102 3 9.42 1 7 9 7 6 29 8 7 10 9 34 77 82 90 85 1 1 1 31 28 2 6 2 2 2 2 2 17 16 23 19 18 28 61 48 0 61

103 3 11.08 1 4 9 5 3 21 10 7 7 20 44 30 70 107 86 1 1 1 30 29 2 5 2 2 2 2 2 16 17 20 24 16 17 46 49 . 49

104 2 6.92 1 4 6 6 6 22 5 8 5 13 31 77 72 85 76 1 1 1 29 30 2 5 2 2 2 1 2 11 9 34 42 35 30 48 41 2 48

105 1 11.25 1 5 4 8 5 22 5 10 13 12 40 62 72 100 84 1 1 1 2 34 1 11 2 2 2 1 2 17 16 26 34 31 33 51 42 . 51

106 2 6.5 1 5 12 11 9 37 14 7 7 10 38 72 95 97 96 1 1 1 29 25 2 6 2 2 2 2 2 16 14 29 26 28 27 49 35 0 49

107 3 6.92 1 7 9 10 7 33 10 8 7 16 41 54 89 101 94 1 1 1 25 24 2 6 2 2 2 2 2 10 13 29 29 30 27 50 39 0 50

108 1 15 2 3 1 3 6 13 6 2 3 8 19 73 57 64 56 1 1 1 24 15 1 15 2 2 1 1 2 19 14 30 32 33 24 58 58 . 58

109 2 7.17 2 13 10 14 13 50 8 15 14 9 46 22 116 111 115 1 1 1 24 16 2 7 2 2 2 2 2 15 13 31 28 31 29 50 40 0 50

110 2 7.25 1 7 9 12 9 37 6 9 12 13 40 77 95 100 97 1 1 1 31 24 2 7 2 2 2 2 2 16 11 26 25 27 21 51 37 0 51

111 1 13.67 2 6 10 6 7 29 6 8 3 9 26 63 82 76 77 1 1 1 21 19 2 12 2 1 2 2 2 17 16 19 19 16 19 59 44 . 59

112 2 10.33 2 11 14 14 11 50 13 13 15 20 61 48 116 136 128 1 1 1 29 27 1 10 2 2 2 1 2 17 17 22 24 22 23 65 48 1 65

113 2 12.58 1 11 12 8 8 39 8 9 11 12 40 48 99 100 99 1 1 1 32 29 1 12 2 2 2 1 1 15 14 19 17 18 20 57 47 . 57

114 1 12.08 1 6 4 5 8 23 9 7 6 12 34 48 74 90 80 1 1 1 36 32 1 12 2 1 2 1 2 23 21 26 23 25 28 44 53 . 53

115 2 15 1 9 11 11 9 40 14 17 13 16 60 48 100 135 118 1 1 1 30 25 1 10 2 2 2 1 2 19 20 17 16 17 16 74 63 . 74

116 1 10.58 1 4 6 4 8 22 9 8 13 12 42 48 72 104 86 1 1 1 29 23 1 10 2 1 2 2 2 17 18 21 25 21 23 50 42 2 50

117 2 15.92 1 13 17 13 14 57 16 16 16 20 68 48 126 149 141 1 1 1 28 28 1 15 2 2 2 2 1 19 17 19 19 18 18 84 74 . 84

118 1 9.67 2 4 6 5 12 27 11 9 8 11 39 63 80 99 88 1 1 1 28 19 1 9 2 2 2 2 2 16 14 25 27 25 23 46 31 0 46

119 1 8 1 5 8 9 9 31 8 13 12 11 44 63 86 107 96 1 1 1 34 22 1 8 2 2 2 2 2 14 13 25 26 23 28 52 41 1 52

120 1 11.08 1 8 7 9 12 36 10 9 10 10 39 63 94 99 96 1 1 1 21 22 1 11 2 2 2 2 2 15 14 22 20 15 18 64 50 . 64

121 1 7.75 1 10 8 12 10 40 9 13 16 9 47 55 100 113 107 1 1 1 35 27 1 7 2 2 2 2 2 14 13 26 25 32 27 59 51 0 59

122 1 11.33 2 6 3 9 4 22 12 9 7 14 42 63 72 104 86 1 1 1 39 38 2 10 2 2 2 2 2 15 14 26 25 20 21 55 43 . 55

123 2 6.67 1 2 4 6 5 17 11 5 11 14 41 70 63 101 80 1 1 1 36 31 2 5 2 2 2 2 2 . . . . . . . . 1 99

124 1 6.08 1 9 13 12 7 41 7 12 15 12 46 70 101 111 107 1 1 1 19 25 2 2 2 2 2 1 2 9 8 41 41 33 38 46 31 1 46

125 2 9.42 1 8 7 7 8 30 9 15 15 11 50 63 85 118 101 1 1 1 29 24 2 2 1 1 2 2 2 15 15 23 21 22 19 52 44 0 52

126 1 13.5 2 6 5 9 10 30 6 11 10 12 39 77 85 99 91 1 1 1 1 24 2 2 1 2 1 2 2 21 15 20 23 22 21 63 52 . 63

127 2 9.58 2 12 11 13 19 55 11 12 13 17 53 44 124 122 125 1 1 1 22 20 2 9 2 1 2 2 1 17 18 28 25 20 23 52 45 0 52

128 2 6.17 1 11 12 8 12 43 7 12 9 5 33 41 105 87 96 1 1 1 23 18 2 1 2 2 2 2 2 9 11 40 37 28 36 42 31 0 42

129 2 13.33 1 7 6 8 7 28 11 9 12 18 50 41 81 118 99 1 1 1 21 18 2 1 2 2 2 2 2 16 13 16 15 19 16 57 50 . 57

130 1 6.58 1 7 13 7 5 32 14 10 13 10 47 77 87 113 99 1 1 1 32 26 1 5 2 2 2 1 2 11 12 31 27 30 29 23 23 2 23

131 1 12.75 2 9 10 11 10 40 11 15 15 15 56 77 100 128 115 1 1 1 26 27 2 5 2 2 2 1 2 21 18 18 21 17 17 65 62 . 65

132 1 8.17 2 7 9 9 9 34 11 16 11 14 52 77 91 121 106 1 1 1 20 24 2 5 2 2 2 2 2 16 12 29 27 25 21 38 32 1 38

133 1 9.92 1 7 12 12 13 39 9 14 13 10 46 70 99 111 105 1 1 1 2 22 2 6 2 2 2 2 2 15 18 25 20 24 21 59 51 0 59

134 2 7.33 2 5 11 11 12 33 10 10 11 11 42 58 89 104 96 1 1 1 36 31 1 6 2 2 1 2 2 14 11 32 29 40 26 26 25 0 26

135 2 12.83 1 2 4 4 3 13 2 1 4 5 12 91 57 51 50 1 1 1 24 34 2 12 2 2 2 2 2 14 11 24 21 20 18 53 49 . 53

136 2 6.33 2 10 9 9 10 39 15 8 9 8 40 91 99 100 99 1 1 1 38 37 2 6 2 2 2 2 2 12 12 29 19 25 25 50 38 0 50

137 1 9.33 2 4 7 7 5 17 11 11 10 15 47 77 58 113 85 1 1 1 14 25 2 2 2 2 2 2 2 13 16 21 21 18 19 56 47 0 56

138 2 14.25 2 6 10 10 13 38 9 8 5 7 29 77 97 82 88 1 1 1 18 20 2 11 2 2 2 2 2 17 11 27 24 20 21 49 44 . 49

139 3 15.42 1 9 7 7 11 36 16 20 16 14 66 70 94 146 120 1 1 1 24 16 2 9 2 2 2 2 2 23 18 18 18 15 17 76 62 . 76

140 3 14.08 1 7 5 5 9 29 9 11 12 12 44 70 82 107 93 1 1 1 20 21 2 9 2 2 2 2 2 17 18 18 26 14 13 68 60 . 68

141 1 9.83 2 8 10 10 8 35 6 9 2 13 30 77 92 83 87 1 1 1 33 34 2 10 2 2 2 2 2 16 15 23 23 21 21 60 58 1 60

142 1 7.08 2 9 8 8 11 33 13 9 10 13 45 77 89 108 98 1 1 1 36 27 2 6 2 2 2 2 2 13 13 20 24 23 21 45 46 1 46

143 2 12.83 2 4 6 6 5 20 5 10 11 10 36 77 69 93 78 1 1 1 18 22 2 3 2 1 2 1 2 16 13 28 22 24 18 57 46 . 57

144 2 8.08 1 7 11 11 9 32 12 12 15 9 48 77 87 114 100 1 1 1 31 26 2 3 2 2 1 1 2 12 9 38 32 32 29 45 30 1 45

145 3 7.25 1 12 12 12 11 38 14 12 8 13 47 77 97 113 105 1 1 1 33 30 2 5 2 2 2 1 2 16 12 30 33 28 28 46 39 0 46

146 2 15.42 2 5 6 6 9 29 7 8 12 10 37 58 82 94 87 1 1 1 27 33 2 15 2 2 2 2 2 19 19 23 25 23 23 64 56 . 64

147 2 6.92 2 5 8 8 6 30 13 11 5 14 43 58 85 106 94 1 1 1 28 26 2 6 2 1 2 2 2 14 10 30 33 29 32 40 37 1 40

148 1 14.25 2 8 7 7 12 33 7 7 5 16 35 63 89 92 89 1 1 1 24 23 1 14 2 2 2 2 2 20 18 21 22 18 19 62 50 . 62

149 1 7.33 1 6 9 9 8 30 9 6 7 6 28 91 85 79 80 1 1 1 30 23 2 6 2 2 2 2 2 32 34 28 28 24 27 11 13 1 13

150 1 13.33 1 8 12 12 9 35 10 15 19 13 57 77 92 129 111 1 1 1 24 23 2 5 2 2 2 2 2 18 18 18 19 17 16 79 65 . 79

151 1 12.08 1 8 6 13 10 37 11 13 13 11 48 77 95 114 104 1 1 1 29 24 2 5 1 2 2 2 2 15 15 18 21 22 25 61 50 . 61

152 3 6.17 1 6 3 6 10 25 14 12 6 7 39 70 76 99 85 1 1 1 38 31 2 3 2 1 2 1 2 7 10 35 29 37 36 46 27 1 46

153 3 7.17 1 6 2 10 9 27 11 10 15 10 46 70 80 110 94 1 1 1 31 39 2 3 2 2 2 2 2 12 10 30 26 29 26 50 37 0 50

154 1 9.58 1 6 5 3 4 18 9 3 10 12 34 70 66 90 75 1 1 1 28 32 2 8 2 2 2 2 2 22 19 31 30 27 28 48 45 1 48

155 1 12.83 2 4 3 5 7 19 8 6 6 11 31 70 67 85 73 1 1 1 22 23 2 8 2 2 2 2 2 18 18 24 28 21 24 65 48 . 65

156 1 15.25 1 6 5 4 2 17 9 8 12 8 37 70 63 94 76 1 1 1 22 16 2 8 2 2 2 2 2 21 18 22 21 22 19 62 53 . 62

157 3 10.58 1 8 6 9 9 32 11 11 16 17 55 77 87 127 107 1 1 1 27 28 2 7 2 2 2 2 2 18 21 19 19 19 21 51 56 0 56

158 1 9.75 1 7 6 8 5 26 14 7 7 13 41 73 79 101 88 1 1 1 24 33 2 2 2 2 1 2 2 18 11 25 28 27 24 54 47 1 54

159 1 13.92 2 8 4 9 8 29 12 6 11 10 39 44 82 99 89 1 1 1 36 34 2 6 2 2 2 2 2 14 17 24 21 15 20 72 50 . 72

160 1 12.5 2 5 12 7 5 29 9 14 10 14 47 44 82 113 96 1 1 1 10 38 2 6 2 2 2 2 2 16 17 23 22 22 20 57 54 . 57

161 2 6.33 2 5 7 4 5 21 7 6 6 10 29 66 70 80 72 1 1 1 30 21 2 6 2 2 2 2 2 11 9 77 93 82 61 50 39 0 50

162 2 11.83 2 7 9 7 5 28 12 8 12 17 49 66 81 115 97 1 1 1 27 31 2 8 2 1 2 2 2 17 19 20 19 19 15 65 55 . 65

163 1 15 2 5 5 6 6 22 9 8 5 9 31 73 72 85 76 1 1 1 34 33 2 15 2 2 2 2 2 18 17 23 27 19 18 56 51 . 56

201 1 10.08 1 4 5 6 9 24 11 8 8 9 36 79 75 93 82 1 2 2 68 53 1 10 2 2 1 1 2 16 15 26 28 24 24 54 46 2 54

202 1 10.42 2 6 8 9 9 32 8 10 10 12 40 79 87 100 93 1 2 2 53 49 1 11 2 2 2 1 2 19 15 27 23 20 20 57 48 0 57

203 1 9.92 1 4 8 5 8 25 8 6 12 12 38 77 76 97 85 1 2 2 48 40 2 9 2 1 2 2 2 13 12 31 32 22 33 48 33 1 48

204 1 6.83 1 5 5 6 9 25 5 3 6 14 28 77 76 79 75 1 2 2 41 40 2 6 2 1 1 2 2 10 12 39 37 35 36 41 35 1 41

205 1 5.08 1 5 3 9 8 25 14 8 9 7 38 63 76 97 85 1 2 2 45 47 1 4 2 2 2 2 2 11 10 40 38 29 30 34 33 0 34

206 1 12.75 2 9 5 9 12 35 5 4 6 8 23 62 92 71 80 1 2 2 62 45 1 12 2 2 2 1 2 20 16 24 24 29 23 54 47 . 54

207 2 6.17 1 6 9 12 7 34 11 13 16 6 46 41 91 111 101 1 2 2 49 43 1 6 2 1 2 2 2 11 9 36 37 29 28 33 38 0 38

208 2 7.42 2 6 8 5 10 29 9 13 9 8 39 41 82 99 89 1 2 2 52 58 1 7 2 2 2 2 1 17 8 29 35 30 27 49 33 0 49

209 1 12 2 5 5 7 10 27 6 8 6 11 31 52 80 85 80 1 2 2 61 48 1 6 2 2 2 1 2 16 15 17 18 17 16 56 58 . 58

210 1 8.58 1 7 10 10 7 34 10 7 13 9 39 52 91 99 94 1 2 2 41 50 2 6 2 2 2 1 2 50 49 31 27 21 22 13 14 2 14

211 1 6.75 1 5 9 8 6 28 10 11 13 4 38 77 81 97 88 1 2 2 59 40 2 5 1 2 2 2 2 11 12 33 41 38 36 33 40 1 40

212 1 6.92 1 7 9 13 9 38 15 11 8 12 46 52 97 111 104 1 2 2 57 58 1 6 2 1 2 2 2 30 31 43 43 36 41 13 7 0 13

213 1 8.17 1 5 7 7 7 25 6 14 11 11 42 70 76 104 88 1 2 2 58 57 1 7 2 1 2 2 2 14 15 27 31 25 35 51 48 0 51

214 1 11.25 2 7 8 5 10 30 8 11 9 8 36 70 85 93 88 1 2 2 40 51 1 10 2 1 1 1 2 11 9 27 28 28 32 44 31 . 44

215 1 13.58 1 15 13 10 12 50 9 12 10 11 42 70 116 104 112 1 2 2 . 47 1 12 2 2 2 2 2 13 11 19 20 12 14 52 46 . 52

216 1 9.5 1 6 5 10 6 27 8 7 10 9 34 70 80 90 83 1 2 2 57 48 1 8 2 1 2 1 2 17 9 27 29 25 24 42 32 3 42

217 2 8.75 1 8 10 9 13 40 12 10 11 11 44 77 100 107 104 1 2 2 48 43 2 8 2 2 2 2 1 13 13 25 22 20 22 55 52 0 55

218 1 6.5 1 8 13 8 7 36 13 13 7 12 45 44 94 108 101 1 2 2 . 54 2 6 2 2 2 2 2 13 16 31 29 29 29 40 44 1 44

219 1 15 2 6 8 5 9 28 11 12 10 10 43 44 81 106 92 1 2 2 . 52 2 8 1 2 2 2 2 19 14 25 22 18 17 48 44 . 48

301 2 14 1 4 6 6 6 22 8 5 6 8 27 58 72 78 72 1 3 2 42 38 2 14 2 2 2 2 2 20 19 23 20 13 17 53 62 . 62

302 2 7 2 7 11 6 6 30 11 7 8 12 38 73 85 97 90 1 3 2 40 34 2 7 2 2 2 2 2 12 13 31 34 32 32 37 34 1 37

303 3 7.5 1 5 9 7 6 27 14 11 11 8 44 91 80 107 92 1 3 2 40 34 2 5 1 2 2 1 2 14 12 42 33 29 27 46 40 1 46

304 1 13.33 2 5 5 6 3 19 3 7 10 9 29 79 67 80 71 1 3 2 41 33 1 12 2 1 1 1 2 13 18 24 24 17 17 55 59 . 59

305 2 6.17 1 6 7 10 7 30 7 12 9 6 34 77 85 90 86 1 3 2 41 32 2 6 2 2 2 2 1 10 12 29 31 30 29 35 31 0 35

306 3 15.25 1 7 5 4 10 26 5 8 10 7 30 77 79 83 79 1 3 2 41 30 2 15 2 2 2 2 2 22 18 24 27 22 20 70 64 . 70

307 3 12.08 1 4 5 5 7 21 13 7 13 8 41 91 70 101 83 1 3 2 43 32 2 12 2 1 1 2 2 14 17 27 24 22 24 56 44 . 56

308 1 9.58 1 13 5 12 13 43 9 16 14 13 52 77 105 121 114 1 3 2 66 25 2 5 2 2 2 2 2 17 13 19 18 23 22 45 45 0 45

309 3 9.08 2 5 11 11 8 35 12 9 8 16 45 58 92 108 100 1 3 2 51 39 2 9 2 2 2 2 2 15 15 29 24 27 24 50 41 0 50

310 2 8.17 1 5 10 11 7 33 11 14 5 10 40 70 89 100 93 1 3 2 44 31 2 8 2 2 2 1 2 14 14 18 28 24 24 52 44 0 52

311 3 14 2 4 6 7 6 23 9 11 14 12 46 51 74 110 91 1 3 2 64 38 2 1 2 2 2 2 2 18 16 22 21 23 22 52 47 . 52

312 2 9.33 1 4 10 7 10 31 8 14 11 13 46 70 86 111 98 1 3 2 43 32 2 3 2 2 2 2 2 15 15 26 26 23 25 83 54 0 83

313 1 11.17 2 7 8 8 9 32 6 5 9 18 38 73 87 97 91 1 3 2 43 24 1 11 2 2 2 2 2 17 15 22 22 18 15 57 55 . 57

314 2 7.17 1 2 0 4 3 9 4 0 6 2 12 70 51 51 46 1 3 2 40 37 2 6 2 2 2 2 2 6 5 48 47 29 30 38 37 1 38

315 3 9.5 2 7 4 8 8 27 10 7 8 12 37 48 80 94 85 1 3 2 40 35 2 9 1 2 2 1 2 11 15 26 24 24 24 40 32 1 40

401 3 4.33 1 6 13 13 9 41 11 11 11 14 47 48 101 112 107 2 1 1 35 34 2 3 2 2 2 1 2 . . . . . . . . 1 99

402 2 4.83 2 9 7 13 8 37 11 12 12 12 47 66 95 112 104 2 1 1 27 27 2 4 2 2 2 1 2 . . . . . . . . 1 99

403 1 3.92 1 5 6 10 7 28 12 8 6 9 35 63 81 92 85 2 1 1 23 26 1 3 2 2 2 2 2 . . . . . . . . 0 99

404 1 4.58 1 6 3 4 2 15 12 7 7 12 38 70 61 97 76 2 1 1 27 20 1 4 2 2 2 2 2 . . . . . . . . 1 99

405 1 4.5 1 6 9 9 12 36 8 9 8 13 38 77 94 97 95 2 1 1 2 27 1 4 2 2 2 2 2 . . . . . . . . 0 99

406 2 3.75 1 9 4 10 7 30 8 11 6 9 34 29 85 91 86 2 1 1 32 28 2 4 2 1 2 1 2 . . . . . . . . 3 99

407 3 4.25 1 7 4 8 6 25 10 12 10 11 43 62 76 105 89 2 1 1 33 31 2 4 1 2 1 1 2 . . . . . . . . 3 99

408 3 4.33 1 7 6 4 5 22 9 6 7 8 30 62 72 84 76 2 1 1 32 28 2 4 2 2 2 2 2 . . . . . . . . 1 99

409 2 4.33 2 8 8 11 11 38 11 9 6 11 37 91 97 95 96 2 1 1 35 37 2 4 2 2 2 2 2 . . . . . . . . 0 99

410 2 5.58 1 7 12 8 10 37 12 11 11 11 45 73 95 108 101 2 1 1 35 34 2 3 2 1 2 1 2 10 11 34 27 27 28 48 46 1 48

411 2 4.33 2 8 9 14 7 38 14 9 13 14 50 66 97 118 108 2 1 1 30 34 2 4 2 2 2 1 2 . . . . . . . . 0 99

412 3 4.75 2 7 7 10 8 32 13 13 7 17 50 77 87 118 102 2 1 1 34 23 2 4 2 2 2 2 2 . . . . . . . . 0 99

413 1 5.42 2 6 6 9 2 23 6 7 9 9 31 91 74 86 77 2 1 1 18 25 2 5 2 2 2 2 2 . . . . . . . . 1 99

414 1 4.5 1 6 3 7 2 18 6 8 8 11 33 91 66 89 74 2 1 1 38 25 2 4 2 2 2 1 2 . . . . . . . . 1 99

415 2 6.5 2 10 5 8 8 31 8 9 11 12 40 91 86 100 92 2 1 1 36 23 2 6 2 2 2 2 2 15 12 31 31 32 32 50 41 0 50

501 1 4.17 1 11 7 8 5 31 11 10 11 13 45 79 86 108 96 2 2 2 57 43 1 4 2 2 2 1 2 . . . . . . . . 2 99

502 3 4.58 1 7 7 9 3 26 10 3 7 7 27 58 79 78 76 2 2 2 51 49 2 4 2 2 2 2 2 . . . . . . . . 0 99

503 2 4 1 6 4 8 3 21 9 13 5 10 37 41 70 95 80 2 2 2 59 47 1 4 2 2 2 1 2 . . . . . . . . 2 99

504 2 3.75 1 8 7 8 7 30 8 7 5 7 27 58 84 78 79 2 2 2 44 45 2 3 1 1 2 1 2 . . . . . . . . 1 99

505 2 3.75 2 6 5 6 3 20 8 12 3 9 32 91 69 86 75 2 2 2 42 45 2 3 2 2 2 1 2 . . . . . . . . 0 99

601 2 4.33 1 9 6 9 8 32 8 9 1 10 28 77 87 80 82 2 3 2 47 22 2 4 1 2 2 2 2 . . . . . . . . 2 99

602 2 3.75 2 6 11 8 11 36 11 10 10 10 41 77 94 101 97 2 3 2 44 34 2 3 2 2 2 1 2 . . . . . . . . 1 99

603 1 5.58 2 5 9 10 10 34 8 8 10 9 35 58 91 92 91 2 3 2 45 29 2 5 2 2 2 2 2 . . . . . . . . 1 99

604 2 4.58 1 7 10 6 12 35 9 11 6 14 40 77 92 100 92 2 3 2 41 34 2 3 1 1 2 2 2 . . . . . . . . 1 99

605 2 5.17 2 6 7 7 8 28 8 0 8 10 26 58 81 77 77 2 3 2 51 30 2 5 2 1 2 1 2 8 6 64 56 61 63 42 27 1 42

606 3 3.83 1 12 9 18 8 47 12 10 13 10 45 70 111 108 111 2 3 2 42 32 2 3 2 2 2 2 2 . . . . . . . . 0 99

607 1 3.92 1 8 4 11 1 24 13 7 7 4 31 73 75 85 78 2 3 2 50 36 1 4 2 2 2 1 2 . . . . . . . . 1 99

run;

title 'Summary Statistics and Frequency Tables for Lead Data';

proc means data=lead min mean max std range n nmiss;

var ageyrs iqf iqp iqv totyrs ld73;

run;

proc sort data=lead;

by lead\_grp;

run;

proc means data=lead min mean max std range n nmiss;

by lead\_grp;

var ageyrs iqf iqp iqv totyrs ld73;

run;

proc sort data=lead;

by lead\_grp sex;

run;

proc freq data=lead;

tables lead\_grp sex lead\_grp\*sex;

run;

title 'Impact of Lead Exposure on IQ score (total)';

proc glm data=lead;

class lead\_grp;

model iqf=lead\_grp;

means lead\_grp / t hovtest;

run;

quit;

title 'Impact of Lead Exposure on IQ score (performance)';

proc glm data=lead;

class lead\_grp sex;

model iqp=lead\_grp;

means lead\_grp / t hovtest;

output out=lead\_resid3 r=resid;

run;

quit;

proc univariate data=lead\_resid3 plot normal;

var resid;

run;

proc sgplot data=lead\_resid3;

vbox resid;

run;

title 'Impact of Lead Exposure on IQ score (performance) with covariates';

proc glm data=lead;

class lead\_grp sex;

model iqp = lead\_grp ageyrs sex;

means lead\_grp sex/t;

lsmeans lead\_grp sex/pdiff;

run;

quit;

**For creating new variables (problems 4, 7, and 10), see the *creating new variables* sample code below.**

DATA temp;

INPUT y x1 x2 x3;

CARDS;

21 35 1 5

17 50 2 3

33 45 6 4

49 24 5 2

65 52 3 1

81 44 4 3

25 34 1 4

18 40 6 2

34 47 2 1

50 35 5 5

51 31 3 1

55 25 4 4

58 55 1 3

59 25 6 2

;

RUN;

data newtemp;

set temp;

if x2 <3 then x4=1;

else x4 = 0;

run;

**For frequency tables and logistic regression (problems 1, 7, 8, 9, 10), see *more logistic regression peri* sample code below.**

data peri;

input id peri$ sex$ age maxchg;

datalines;

30.5 2 2 57 2.32

127 2 2 52 1.66

194.5 2 2 53 2.57

201.5 2 1 75 2.92

224.5 2 2 88 0.84

229 1 2 37 0

238.1 2 2 34 0.84

240 2 2 33 5.41

600 1 2 62 1

601 2 2 59 3.36

604.5 1 2 42 0

605.5 2 2 52 3.74

606 2 2 52 2.91

606.5 2 2 74 4.25

608 2 2 65 2.08

609.5 2 1 69 4.38

610 2 2 54 2.42

612 2 2 38 2.54

613 2 2 34 2.7

614 2 1 71 4.1

615.5 2 2 59 2.88

616 2 2 59 5

617 1 1 46 3.5

619 1 2 36 1.2

620 2 2 35 3.17

620.5 2 2 50 4.18

621 2 2 50 2.71

622 2 2 40 1.87

627 2 1 66 6.25

628 2 1 78 4.04

630 2 2 72 4.48

631 2 1 39 3.11

632 1 2 44 0

633 2 1 68 3.35

634 2 2 47 2.71

637 1 2 43 0

639 2 2 77 2.76

642 2 2 64 1.66

643 2 1 71 3.67

644 2 2 36 2.5

645.5 2 1 79 1.25

646 2 1 79 1.25

648 2 2 69 6.21

649 2 2 53 1.67

650 1 2 38 0

651 2 1 38 2.15

654 2 2 68 2.29

658 2 1 63 5.24

660 2 1 70 4.78

663 2 2 57 1.45

664 2 2 42 2.51

664.5 2 2 64 2.49

667 2 2 47 1.67

668 2 2 82 6.01

669 2 1 50 0.42

670 2 2 53 2.71

671 2 2 55 1.67

672 2 2 46 4.17

674 2 2 66 1.66

675.5 2 2 51 2.49

676 2 2 51 2.49

677 2 2 49 3.52

677.5 2 2 52 4.59

678 2 2 33 1.46

681 2 2 73 1.66

683 2 2 48 5.42

684 2 2 44 3.34

692 2 2 53 4.55

693 2 2 41 2.28

695 2 2 61 3.13

696 2 2 60 3.95

697 1 1 74 0

698 2 2 78 3.33

702 2 2 47 2.08

703 2 2 67 3.24

704 2 2 66 3.7

706 2 2 69 3.08

803 1 2 25 0

804 2 1 30 2.17

805 2 2 54 1.87

806 2 2 21 2.91

807 2 1 69 3.35

808 2 2 58 1.46

809 1 2 29 1.36

810 1 2 68 1.36

812 1 2 42 5.63

813 1 2 28 1.25

815 2 1 18 3.13

818 1 1 69 3.85

820 2 1 71 1.42

823 2 2 41 1.92

825 2 1 75 6.04

826 2 2 35 3.53

827 2 2 42 3.34

829 2 2 42 3.12

831 2 2 47 3.66

832 2 2 49 1.87

833 2 2 58 2.09

835 2 1 57 2.52

836 2 1 66 2.5

840 1 1 63 0.42

841 1 2 36 0.83

842 2 1 33 2.7

843 2 1 34 4.99

846 2 1 52 6.46

847 1 1 67 1.46

848 2 1 33 2.08

849 2 1 56 2.91

850 2 2 47 1.24

851 2 2 43 7.92

852 2 1 54 5.63

853 2 2 63 3.01

853.5 2 2 77 3.12

855 2 2 77 2.8

856 2 2 49 1.66

857 1 1 30 0

858 1 1 55 0.62

859 1 2 31 0

863 2 1 59 1.87

864 1 2 64 0

866 2 2 49 3.32

867 2 1 39 2.91

868 2 2 78 3.54

869 2 1 43 5.66

871 2 1 69 3.13

872 1 2 49 0

874 2 2 59 7.06

876 2 2 70 4.38

879 2 2 45 3.5

880 2 2 51 1.66

881 2 2 22 2.69

884 2 2 70 1.66

887 2 2 26 3.31

888 2 2 69 5.54

889 2 2 73 2.51

892 2 2 49 1.66

893 2 1 72 5

896 2 2 74 4.17

897 2 2 74 4.17

898 2 1 83 4.58

899 2 2 53 4.27

901 2 2 49 4.83

905 2 1 61 2.29

906 2 1 65 3.49

907 2 2 77 2.29

908 2 2 72 4.54

910 1 1 40 0

911 1 1 31 1.25

913 2 2 36 2.6

914 2 2 32 1.46

916 2 2 47 2.3

917 1 2 45 0

918 2 2 53 1.25

919 2 2 47 1.78

922 2 2 46 27

923 2 1 58 5.52

924 1 2 47 0

925 2 1 78 4.59

926 2 2 42 2.92

927 2 2 47 4.77

928 1 2 51 0.21

929 1 1 74 0

930 2 1 73 3.75

933 2 2 41 3.74

934 2 2 57 2.96

935 1 2 70 0.42

937 2 2 73 2.39

938 2 2 70 2.1

941 2 2 70 2.06

942 2 2 47 3.33

943 2 1 61 2.92

944 2 2 35 2.28

945 2 2 47 3.56

947 2 1 74 2.09

949 2 1 87 2.24

950 2 2 30 0.83

952 2 2 46 4.12

953 2 2 69 3.33

954 2 2 28 4.83

955 2 2 63 3.17

956 2 2 49 1.83

957 2 1 67 2.83

958 1 2 39 1.17

959 1 2 71 0

960 2 2 35 2.09

962 2 2 37 1.83

963 1 2 46 0.14

965 2 2 70 7.27

966 2 2 46 4.05

967 2 1 60 3.33

968 2 2 32 6

972 2 1 40 2.08

973 2 1 60 5.19

974 1 2 24 1.67

976 2 1 51 3.54

978 2 1 40 2.28

980 2 1 81 1.68

982 2 2 33 0.21

983 2 1 62 3.15

984 2 1 60 2.09

985 2 1 67 5.19

986 2 2 42 2.16

988 2 1 75 3.34

1000 1 1 51 0.45

1002 2 1 48 3.54

1003 2 1 59 4.67

1004 2 1 52 2.61

1007 2 1 74 1.87

1008 2 1 62 3.42

1009 2 1 62 4.69

1010 2 2 55 4.49

1011 2 1 35 5.59

1012 2 1 50 2.71

1013 2 1 49 5.63

1015 2 1 84 5.83

1016 2 2 53 6.46

1018 2 2 29 3.96

1021 2 1 48 5.21

1022 2 1 67 2.83

1023 2 2 61 4.58

1024 2 2 48 2.4

1027 2 2 71 3.15

1028 2 2 36 2.29

1029 2 2 34 2.99

1031 1 2 62 0

1032 2 2 47 4.17

1037 1 1 75 0

1038 1 2 69 0

1039 2 2 48 3.33

1040 2 2 37 2.71

1041 2 1 54 2.3

1042 2 1 42 2.48

1043 2 1 70 8.55

1046 2 1 77 5.34

1052 2 2 63 1.88

1053 1 1 55 0

1054 2 2 49 2.92

1055 2 2 53 1.2

1057 1 1 68 0

1058 2 2 77 3.57

1060 2 2 52 1.08

1061 1 1 54 0.82

1062 1 2 51 0

1065 2 2 58 1.88

1066 2 1 35 1.86

1070 2 2 47 9.17

1071 2 1 50 1.7

2148 1 2 30 0

3000 2 2 50 2.92

3004 2 2 30 1.87

3009 2 2 69 3.13

3010 2 2 71 4.68

3019 2 2 47 3.08

3021 2 2 69 3.96

3024 2 2 54 4.62

3025 2 2 61 3.33

3026 2 2 54 2.71

3027 2 2 85 2.92

3028 2 1 72 3.36

3028 2 2 46 2.5

3029 2 1 61 4.38

3035 2 2 44 3.54

3036 2 2 30 2.29

3038 2 2 38 1.87

3039 1 2 31 1.49

3042 2 2 72 2.75

3042 1 1 38 4.54

3043 1 2 30 0

3043 1 1 38 2.08

3044 2 2 73 3.54

3046 2 2 26 3.11

3047 2 2 59 2.5

3047 2 1 77 1.93

3049 2 1 29 3.14

3053 2 2 70 3.96

3057 1 1 60 0

3057 1 2 76 0.63

3060 2 2 83 3.33

3062 1 1 47 0

3063 2 2 48 2.91

3064 2 1 57 2.08

3064 2 2 62 4.58

3072 2 2 39 2.08

3073 2 2 36 2.75

3083 2 2 47 2.12

3084 1 2 70 0.62

3087 2 1 42 3.08

3088 2 1 38 4.94

3089 2 2 39 2.08

3089 1 1 28 0

3101 1 1 64 0

3105 2 2 43 4.16

3106 1 1 47 0

3109 1 2 83 0

3117 1 2 62 0

3122 1 1 64 0

3131 1 2 74 0

3154 2 2 68 1.67

3155 2 2 33 1.87

3156 2 1 36 2.29

3166 1 1 74 1.66

3171 2 1 55 1.66

3185 1 1 35 0

3187 2 1 79 5.25

3189 2 1 48 5.63

3190 1 2 48 0

3195 2 2 54 2.5

3198 2 2 66 5.97

3204 2 1 64 6.24

3205 2 2 74 2.08

3210 2 2 52 4.87

3211 1 2 52 0

3213 2 2 32 2.7

3214 2 1 51 1.69

3215 2 1 88 1.75

3218 2 2 61 2.49

3221 2 2 61 4.03

3224 2 2 49 1.45

3225 1 2 52 0.98

3243 1 2 69 0.58

3244 1 2 51 -0.41

3250 1 1 74 1.25

3252 2 2 84 4.37

3253 2 2 72 4.5

3256 2 2 84 2.07

3298 2 1 37 2.7

3317 2 1 61 3.33

3328 2 1 65 2.49

3333 2 1 44 1.05

3334 1 1 42 0

3348 2 1 64 4.78

3351 1 2 59 0

3355 2 1 88 3.12

3358 1 1 43 1.45

3373 2 1 62 3.33

3376 2 2 87 3.33

3377 2 1 88 6.45

3386 2 2 60 3.53

3391 2 2 45 5.41

3428 2 1 43 3.12

3428 1 1 67 0

3442 2 2 23 3.11

3454 2 1 59 2.9

3464 2 2 32 2.08

3469 1 2 80 0.21

3471 1 2 61 3.74

3474 1 1 67 0.62

3475 2 1 53 3.23

3482 1 2 56 0.83

3485 2 2 47 3.12

3489 2 2 44 2.5

3506 2 1 54 1.87

3531 1 2 65 0

3533 2 2 80 2.7

3534 2 1 87 4.94

3537 2 1 70 1.46

3544 2 1 38 5.38

3553 2 2 56 2.28

3555 2 2 62 1.25

3560 2 2 51 2.5

3573 2 1 44 3.95

3619 2 1 47 3.59

3629 1 1 72 0

3675 1 2 55 1.46

3817 2 2 27 2.6

3818 1 1 68 0.62

3840 2 2 63 2.3

3849 2 1 48 5.58

3870 2 1 74 3

3885 2 1 32 5.21

3895 2 1 44 2.71

3946 2 1 71 2.25

4000 2 2 52 3.12

4002 2 2 71 2.55

4027 2 2 71 1.88

4033 2 1 33 6.66

4068 2 2 46 2.49

4140 1 1 72 2.5

4233.5 2 2 67 2.7

4234.5 2 2 67 1.96

5365 2 1 69 4.58

5378 2 2 25 3.12

5397 2 2 54 4.79

5406 2 2 46 1.25

5408 1 2 22 0

5415 1 2 86 0

5438 2 2 32 4.25

5443 1 1 31 0

5458 2 1 80 1.35

5459 1 2 54 0

5465 1 1 64 1.5

5470 2 2 69 -1.47

5471 2 1 35 2.81

5473 2 1 21 4.01

5515 1 2 51 0.83

5518 2 2 52 1.88

5542 2 1 49 2.5

5546 1 2 68 0

5556 2 1 78 1.67

5558 2 2 50 2.09

5561 2 1 46 2.54

5562 1 2 45 0.84

5564 1 2 62 1.04

5566 1 2 47 0.2

5572 2 2 73 1.61

5589 2 2 39 3.75

5597 2 2 65 3.24

5601 2 2 46 2.51

5606 2 2 79 2.5

5609 1 2 71 0.42

5610 2 2 34 2.29

5614 2 2 67 3.17

5636 1 2 38 0

5637 1 2 66 1.04

5644 2 2 81 2.17

5676 1 2 40 0

5688 1 2 77 1.46

5689 2 2 48 1.67

5702 2 2 70 2.92

5738 2 1 83 5.01

5741 2 1 27 1.25

5763 1 1 50 1.25

5765 2 2 44 5.83

5822 2 2 76 0

5823 1 2 33 0

5866 1 2 81 1.66

5921 1 1 76 0.63

6029 2 1 70 3.33

6053 1 1 43 0.37

6084 1 2 51 0.41

6997 2 2 42 3.75

4 1 1 73 0

8 2 2 64 1.87

10 2 2 34 4.58

11 1 2 70 0.83

12 2 2 42 4.38

13 2 2 48 2.29

14 2 1 48 3.38

15 2 2 49 2.72

17 1 1 34 2.08

19 2 1 48 2.08

22 2 1 60 2.91

23 2 1 68 5.14

24 1 2 46 2.1

25 1 2 48 1.04

26 1 1 55 2.08

27 2 1 61 2.29

32 2 1 42 3.87

34 2 2 52 2.15

38 2 2 35 7.12

39 2 1 39 5

40 2 2 21 2.71

41 1 2 63 -0.41

43 2 1 83 5.21

44 2 2 32 3.71

45 2 2 57 5.83

46 2 1 26 1.88

49 1 1 64 0

50 1 2 76 0

53 1 2 65 -1.04

55 2 1 67 1.88

56 1 2 61 0.83

58 2 2 65 5.01

60 2 1 64 4.06

61 2 2 68 3.3

62 2 2 40 2.5

63 2 1 74 4.07

65 2 1 73 3.72

66 2 1 72 12.48

68 2 2 59 2.5

69 1 1 43 3.12

71 2 2 46 3

72 1 1 63 0.42

73 1 2 61 0

77 2 2 39 3.33

81 2 2 67 2

82 1 2 59 0.6

85 2 2 57 3.7

87 2 2 65 2.08

88 2 2 62 6.66

89 2 1 60 6.25

90 2 1 51 3.13

91 2 2 89 3.42

92 2 1 83 5.21

93 2 1 67 5.14

94 2 2 37 2.58

95 2 1 61 2.38

96 2 2 39 1.85

97 2 2 73 2.5

98 2 2 56 3.53

100 2 2 69 4.96

101 2 2 74 2.5

103 2 1 40 4.67

104 1 2 72 0.83

105 2 2 58 3.65

106 2 2 43 5.2

109 2 2 47 5

110 2 1 56 3.53

111 2 2 58 1.87

114 1 2 92 -1.05

115 2 1 46 4.78

116 2 2 40 3.77

117 2 1 68 3.52

118 2 2 69 2.29

119 1 2 61 2

122 1 1 57 1.25

124 2 2 50 3.74

125 2 1 71 4

128 1 1 67 0

129 2 1 55 3.5

130 2 2 77 2.08

131 2 1 57 1.66

133 2 2 76 1.5

134 2 2 59 3

135 1 1 39 0

136 1 1 75 1.04

138 2 1 63 3.54

139 1 1 88 3.5

141 2 2 54 5.83

142 2 2 63 3.75

144 2 2 55 1.4

145 2 1 28 2.48

148 2 2 50 3.4

149 2 2 59 3.58

150 1 2 66 1.48

154 2 2 30 2.9

155 2 1 48 2.29

156 2 2 37 3.95

158 2 2 67 3.13

159 2 1 36 1.7

160 2 1 68 2.71

161 1 2 51 2.71

163 2 2 50 4.16

164 2 2 44 3.33

166 2 2 38 3.54

167 2 1 47 6.29

168 2 1 86 4.99

169 2 2 73 4.16

170 1 1 39 0.42

171 2 2 73 1.25

176 2 1 46 3.38

177 1 1 54 0

180 1 2 54 0

181 2 2 48 5.42

183 1 2 69 1.25

187 2 2 60 1.5

188 2 2 44 5.63

192 2 2 67 4.38

194 2 2 53 5.46

195 2 2 78 3.75

196 2 2 69 4

197 2 2 77 1.88

199 2 2 66 3.54

200 2 1 75 1.16

201 2 1 88 2.92

204 1 1 53 0.83

208 2 2 40 1.8

210 2 2 45 1.04

211 1 2 46 1.87

212 2 1 30 4.62

215 2 2 40 1.62

216 2 2 77 4.87

217 2 2 46 3.5

218 1 2 63 0.21

222 2 1 51 4.79

223 2 1 64 2.5

225 2 1 49 0.62

227 2 2 72 2.08

228 1 2 27 0.83

230 2 1 23 5.42

231 1 2 59 3.54

235 2 1 34 0.5

236 2 2 42 2.69

237 2 2 41 3.87

238 2 2 31 6.46

239 1 1 31 3.53

242 2 2 43 2

243 1 2 50 0

246 1 2 72 3.58

248 2 1 49 3.12

249 2 2 79 4.57

250 2 2 71 3.53

252 2 2 70 5.62

252.5 2 2 32 1.88

253 2 2 42 2.3

254 2 2 44 5

255 2 1 30 2.08

256 1 1 53 1.72

257 2 2 58 1.87

259 2 1 73 4.17

260 2 1 28 1.66

261 2 2 59 4.57

262 2 2 72 2.29

264 2 1 46 2.89

265 1 2 81 0

266 2 1 47 8.76

268 2 2 26 0

269 2 2 64 2.09

270 2 2 34 5.49

271 2 2 72 3.69

272 2 2 67 2.67

273 2 2 45 4.17

274 2 2 33 3.33

275 2 2 56 4.58

276 2 2 64 3.12

277 2 1 47 3.22

282 2 2 40 4.85

283 2 2 36 2.08

287 1 2 48 2.76

288 2 2 39 2.09

288.5 2 1 41 3.12

292 2 2 47 3.66

293 2 1 68 3.74

294 2 2 56 3.13

296 2 1 56 2.08

297 2 2 57 4.79

299 2 2 69 2.08

301 1 2 68 1.24

302 1 1 77 0.42

304 2 2 65 2.5

305 2 2 62 3.01

306 2 2 67 1.95

307 2 2 66 3.7

5458.5 2 2 84 3.54

5518.5 2 1 80 6.26

5001 2 1 47 0

5002 2 2 41 4.14

4009 2 2 64 2.51

4014 2 2 52 3.75

4015 2 2 67 2.71

4023 2 2 24 3.12

;

run;

title 'Summary Statistics and Frequency Table for Periformus Syndrome Data';

proc means data=peri min mean max std range n miss;

var age maxchg;

run;

proc sort data=peri;

by peri;

run;

proc means data=peri min mean max std range n miss;

by peri;

var age maxchg;

run;

proc sort data=peri;

by peri sex;

run;

proc freq data=peri;

tables peri sex peri\*sex/chisq;

run;

title 'Logistic regression';

proc logistic data=peri;

class peri sex(ref="1");

model peri(event='2') = age sex maxchg/expb;

run;