Problem #1
a) SAS Program

libname mylib "U:\Documents\Stat479\";

title "Scatterplot of Crude Birth Rate vs per capita GNP";
proc sgplot data=mylib.world;
   scatter x=Percgnp y=Birthrat/datalabel=Country
   markerattrs=(color=darkmagenta size= 3 px symbol=circlefilled);
run;

Output

b) SAS Program

libname mylib "U:\Documents\Stat479\" ;

title "Histogram of Life Expectancy";
proc sgplot data=mylib.world;
   histogram Lifeexp/binstart=30 binwidth=4 scale=count
   density Lifeexp/type=normal;
   fillattrs=(color=cadetblue);
run;
c) **SAS Program**

libname mylib "U:\Documents\Stat479\";

title "Regression Fit of Life Expectancy on Birth Rate";
proc sgplot data=mylib.world;
reg x=Birtrat y=Lifeexp/CLM CLI;
run;

**Output**
d) **SAS Program**

```sas
libname mylib "U:\Documents\Stat479";

title "Scatter Plot Matrix of Demographic Variables";
proc sgscatter data=mylib.world;
  matrix Birthrat Deathrat Infmort Lifeexp/group=Techgrp;
run;
```

**Output**

```
Scatter Plot Matrix of Demographic Variables

Crude Birth Rate
Crude Death Rate
Infant Mortality Rate
Life Expectancy in yrs
```

```
Level of Technology  1  2
```

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10 20 30 40
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10 20 30 40
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7.5 12.5 17.5 20.0
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7.5 12.5 17.5 20.0
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40 50 60 70 80
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40 50 60 70 80
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150
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0 50 100 150
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0 50 100 150
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Problem #2

SAS Program

data insulin;
input Week @;
do i=1 to 9;
   input Prod @;
   output;
end;
drop i;
label Week='Week Measured'
   Prod='Amount of Insulin Produced';
datalines;
Discussion

(a) The first two-weeks distributions are right-skewed while the last two weeks distributions are fairly symmetric. The insulin production has a large spread during the last two-weeks while they are much narrowly distributed during the first two-week period, as observed by the relative sizes of the boxes as well as the whiskers.

(b) As observed above, the median insulin production increased substantially during the last two weeks. The same trend is observed in the dispersion or variation of the insulin production.

(c) Normality assumption clearly do not seem feasible during the first two weeks. The homogeneity of variance assumption also do appear to be valid because of the differences in dispersion. The trend in dispersion appears to be related to the locations of the distribution which are elevated during the last two weeks as measured by the respective medians. Thus a variance stabilizing transformation such as square root transformation may be helpful before using anova methods.
Problem #3

SAS Program

libname mylib "U:\Documents\Stat479";

proc format;
  value if 1='Low'
          2='Moderate'
          3='High' ;
  value tf 1='Low-Tech'
          2='High-Tech' ;
run;

title "Horizontal Barchart of Per Capita GNP by Technology";
proc sgplot data=mylib.world;
  hbar Techgrp/response=Percgnp stat=mean group=Infgrp;
  keylegend /title='Infant Mortality'location=inside position=topright;
  yaxis offsetmin=.2;
  format Infgrp if. Techgrp tf.;
run;

Output

[Image of the horizontal bar chart]
Problem #4

SAS Program

libname mylib "U:\Documents\Stat479\";

proc format;
    value if 1='Low'
        2='Moderate'
        3='High' ;
    value tf 1='Low-Tech'
        2='High-Tech' ;
run;

title "Vertical BarCharts of Birth Rate by Infant Mortality";
proc sgpanel data=mylib.world;
    panelby Techgrp/rows=1;
    vbar Infgrp/response=Birthrat stat=mean;
    format Infgrp if.  Techgrp tf.;
run;

Output