Statistics 147 Practice Exam I Solution

1 R

From R Console window: (R script included after output.)

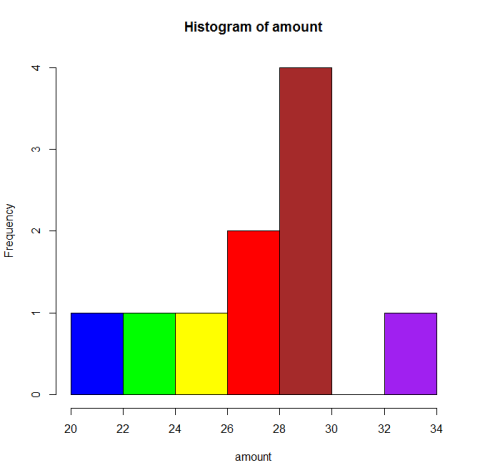
```
> ###################################################################
> ###################################################################
> # Statistics 147 Practice Exam 1, Part 1: R
> # Summer 2020
> # Your name
> # Question 1: Let X = number that receive a free tablet
> # X ~b(x,n=20,p=0.15)
> # Part (i) P(X = 4) = dbinom(4,0.15,20)
> # Part (i) P(X = 4) = dbinom(4,20,0.15)
>  exactly4 <- dbinom(4,20,0.15)
> # Print the value
>  exactly4
[1] 0.1821217
> # ANSWER: P(X = 4) = 0.1821217
> ###################################################################
> # Part (ii) P(2 <= X <= 5) = P(X <= 5) - P(X < 2) = P(X <= 5) - P(X <= 1)
>  p2thru5 <- pbinom(5,20,0.15) - pbinom(1,20,0.15)
> # Print the value
>  p2thru5
[1] 0.7571341
> # ANSWER: P(2 <= X <= 5) = 0.7571341
> ###################################################################
> # Part (iii) P(X  4) <- pbinom(4,20,0.15,lower=FALSE)
> morethan4 <- pbinom(4,20,0.15,lower=FALSE)
> # Print the value
> morethan4
[1] 0.1701532
> # ANSWER: P(X > 4) = 0.1701532
> ###################################################################
> # Part (iv) mu1 = n*p
> mu1 = 20*0.15
> # Print the value
> mu1
[1] 3
> # ANSWER: mu = 3
> ###################################################################
> ###################################################################
> # Question 2
> # Let X = time a client stays logged on to the internet
> # X ~ N(mu = 45,sigma^2 = 25),  sigma = 5
> # Part (i) P(X <= 43) = pnorm(43,45,5)
> atmost43 <- pnorm(43,45,5)
```

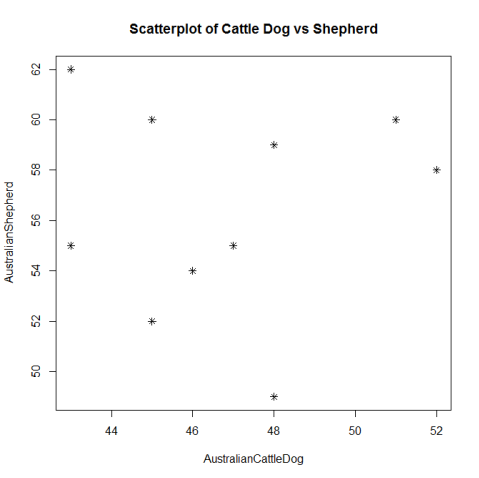
```
> # Print the value
> atmost43
[1] 0.3445783
> # ANSWER: P(X <= 43) = 0.3445783
> ###################################################################
> # Part (ii) P(X  43) = pnorm(43,45,5,lower=False)
> morethan43 <- pnorm(43,45,5,lower=FALSE)
> # Print the value
> morethan43
[1] 0.6554217
> # ANSWER: P(X > 43) = 0.6554217
> ###################################################################
> # Part (iii) P(42 < X < 47) = P(X < 47) - P(X <= 42)
> p42thru47 <- pnorm(47,45,5) - pnorm(42,45,5)
> # Print the value
> p42thru47
[1] 0.3811686
> # ANSWER: P(42 < X < 47) = 0.3811686
> ###################################################################
> # Subpart (iv) Find x such that P(X <= x) = 0.975 = qnorm(0.975,45,5)
> p975 <- qnorm(0.975,45,5)
> # Print the value
> p975
[1] 54.79982
> # ANSWER: 97.5 percentile = 54.79982
> ###################################################################
> # Question 3
> # Part (i) Generate sequence 0 to 6
> x <- seq(0,6)
> # Print the values
> x
[1] 0 1 2 3 4 5 6
> ###################################################################
> # Part (ii) Calculate y
> y = 2 * x**3 + 4
> # Print the values
> y
[1]   4   6  20  58 132 254 436
> ###################################################################
> # Question 4 # Part (i) Read in and print the data (Be sure to change the path!)
> hallmk <- read.table("c:/linda/summer2020/su20147/datafiles/hallmk.dat",header= TRUE)
> # Print the data
> hallmk
   amount
1   23.75
2   26.88
3   21.50
4   32.50
5   28.50
6   29.00
7   30.00
```

```
8   27.45
9   29.56
10  26.00
> # Get column name
> names(hallmk)
[1] "amount"
> # Separate columns
> attach(hallmk)
> ######################################################################
> # Part (ii) Method 1: Using stat.desc from the pastecs package
> stat.desc(hallmk)
                 amount
nbr.val       10.0000000
nbr.null       0.0000000
nbr.na         0.0000000
min           21.5000000 ****
max           32.5000000 ****
range         11.0000000
sum          275.1400000
median        27.9750000 ****
mean          27.5140000 ****
SE.mean        1.0079740
CI.mean.0.95   2.2801956
var           10.1601156 ****
std.dev        3.1874936 ****
coef.var       0.1158499
> ######################################################################
> # Part (ii) mean1 using mean() function
> mean1 <- mean(amount)
> # Print the value
>  mean1
[1] 27.514
> # ANSWER: mean =  27.514
> ######################################################################
> # Part (iii) median using median() function
> median1 <-median(amount)
> # Print the value
> median1
[1] 27.975
> # ANSWER: median = 27.975
> ######################################################################
> # Part (iv) standard deviation using sd() function
> stddev <- sd(amount)
> # Print the value
> stddev
[1] 3.187494
> # ANSWER: standard deviation = 3.187494
> ######################################################################
> # Part (v) variance using var() function
> variance1 <- var(amount)
> # Print the value
```

```
> variance1
[1] 10.16012
> # ANSWER: variance = 10.16012
> ################################################################
> # Part (vi) minimum using min() function
> min1 <- min(amount)
> # Print the value
> min1
[1] 21.5
> # ANSWER: minimum = 21.5
> ################################################################
> # Part (vii) maximum using the max() function
> max1 <- max(amount)
> max1
[1] 32.5
> # ANSWER: maximum = 32.5
> ################################################################
> # Part (viii) Histogram
> # Create colors
> colors1 <- c("blue","green","yellow","red","brown","gray","purple")
> # Print the colors
> colors1
[1] "blue"   "green"  "yellow" "red"    "brown"  "gray"   "purple"
> # Create breaks
> breaks1 <- seq(20,34,2)
> # Print breaks
>  breaks1
[1] 20 22 24 26 28 30 32 34
> # Use hist() function to generate histogram
> hist(amount,col = colors1,breaks = breaks1,main="Histogram of amount")
> ################################################################
> ################################################################
> # Question 5
> # Part (i) Read in and print out data from aussie.dat (Be sure to change the path!)
> aussie1 <- read.table("c:/linda/summer2020/su20147/datafiles/aussie.dat", header = TRUE)
> # Print the data
> # Use the names() function to obtain column names
> names(aussie1)
[1] "ACD" "AS"
> # Use the attach() function to make columns individually accessible
> attach(aussie1)
> ################################################################
> # Part(ii)
> # Use the plot() function to generate scatterplot
> # main = main title, xlab = x-axis label, ylab = y-axis label
> plot(ACD,AS,xlab = "AustralianCattleDog",ylab="AustralianShepherd", main= "Scatterplot of
Cattle Dog vs Shepherd",pch=8)
> ################################################################
> ################################################################
> # Question 6
> # Read in and print out the data
```

```
> agedata1 <- read.table("c:/linda/summer2020/su20147/datafiles/agegroup.dat", header = TRUE)
> # Print the data
> agedata1
   G1 G2 G3 G4
1  29 20 37 28
2  33 21 25 29
3  26 30 22 34
4  27 28 33 36
5  39 20 28 21
6  35 23 26 20
7  33 23 30 25
8  29 23 34 24
9  36 21 27 33
10 22 25 33 32
> # Use the names() function to obtain column names
> names(agedata1)
[1] "G1" "G2" "G3" "G4"
> # Use the attach() function to make columns individually accessible
> attach(agedata1)
> ######################################################################
> ######################################################################
```





R Script

```
#####################################################################
#####################################################################
# Statistics 147 Practice Exam 1, Part 1: R
# Summer 2020
# Your name
# Question 1: Let X = number that receive a free tablet
# X ~b(x,n=20,p=0.15)
# Part (i) P(X = 4) = dbinom(4,0.15,20)
# Part (i) P(X = 4) = dbinom(4,20,0.15)
 exactly4 <- dbinom(4,20,0.15)
# Print the value
 exactly4
#####################################################################
# Part (ii) P(2 <= X <= 5) = P(X <= 5) - P(X < 2) = P(X <= 5) - P(X <= 1)
 p2thru5 <- pbinom(5,20,0.15) - pbinom(1,20,0.15)
# Print the value
 p2thru5
#####################################################################
# Part (iii) P(X  4) <- pbinom(4,20,0.15,lower=FALSE)
morethan4 <- pbinom(4,20,0.15,lower=FALSE)
# Print the value
morethan4
#####################################################################
# Part (iv) mu1 = n*p
mu1 = 20*0.15
# Print the value
mu1
#####################################################################
```

```
#####################################################################
# Question 2
# Let X = time a client stays logged on to the internet
# X ~ N(mu = 45,sigma^2 = 25),  sigma = 5
# Part (i) P(X <= 43) = pnorm(43,45,5)
atmost43 <- pnorm(43,45,5)
# Print the value
atmost43
#####################################################################
# Part (ii) P(X  43) = pnorm(43,45,5,lower=False)
morethan43 <- pnorm(43,45,5,lower=FALSE)
# Print the value
morethan43
#####################################################################
# Part (iii) P(42 < X < 47) = P(X < 47) - P(X <= 42)
p42thru47 <- pnorm(47,45,5) - pnorm(42,45,5)
# Print the value
p42thru47
#####################################################################
# Subpart (iv) Find x such that P(X <= x) = 0.975 = qnorm(0.975,45,5)
p975 <- qnorm(0.975,45,5)
# Print the value
p975
#####################################################################
# Question 3
# Part (i) Generate sequence 0 to 6
x <- seq(0,6)
# Print the values
x
#####################################################################
# Part (ii) Calculate y
y = 2 * x**3 + 4
# Print the values
y
#####################################################################
# Question 4 # Part (i) Read in and print the data (Be sure to change the path!)
hallmk <- read.table("c:/linda/summer2020/su20147/datafiles/hallmk.dat",header= TRUE)
# Print the data
hallmk
# Get column name
names(hallmk)
# Separate columns
attach(hallmk)
#####################################################################
# Part (ii) Method 1: Using stat.desc from the pastecs package
stat.desc(hallmk)
#####################################################################
# Part (ii) mean1 using mean() function
mean1 <- mean(amount)
# Print the value
 mean1
```

```
#####################################################################
# Part (iii) median using median() function
median1 <-median(amount)
# Print the value
median1
#####################################################################
# Part (iv) standard deviation using sd() function
stddev <- sd(amount)
# Print the value
stddev
#####################################################################
# Part (v) variance using var() function
variance1 <- var(amount)
# Print the value
variance1
#####################################################################
# Part (vi) minimum using min() function
min1 <- min(amount)
# Print the value
min1
#####################################################################
# Part (vii) maximum using the max() function
max1 <- max(amount)
max1
#####################################################################
# Part (viii) Histogram
# Create colors
colors1 <- c("blue","green","yellow","red","brown","gray","purple")
# Print the colors
colors1
# Create breaks
breaks1 <- seq(20,34,2)
# Print breaks
 breaks1
# Use hist() function to generate histogram
hist(amount,col = colors1,breaks = breaks1,main="Histogram of amount")
#####################################################################
#####################################################################
# Question 5
# Part (i) Read in and print out data from aussie.dat (Be sure to change the path!)
aussie1 <- read.table("c:/linda/summer2020/su20147/datafiles/aussie.dat", header = TRUE)
# Print the data
# Use the names() function to obtain column names
names(aussie1)
# Use the attach() function to make columns individually accessible
attach(aussie1)
#####################################################################
# Part(ii)
# Use the plot() function to generate scatterplot
# main = main title, xlab = x-axis label, ylab = y-axis label
plot(ACD,AS,xlab = "AustralianCattleDog",ylab="AustralianShepherd", main= "Scatterplot of
```

```
Cattle Dog vs Shepherd",pch=8)
#################################################################
#################################################################
# Question 6
# Read in and print out the data
agedata1 <- read.table("c:/linda/summer2020/su20147/datafiles/agegroup.dat", header = TRUE)
# Print the data
agedata1
# Use the names() function to obtain column names
names(agedata1)
# Use the attach() function to make columns individually accessible
attach(agedata1)
#################################################################
#################################################################


      ************************************
      ** END Practice Exam I R Portion  **
      ************************************
```

2 SAS

SAS Program

```
/* Set up format of the output */

options ls=78 nocenter nodate ps=55 nonumber formdlim = '*';
DM log "odsresults; clear; out; clear; log; clear;";
ods graphics off;
/* Set up some options for gchart */
goptions reset = global colors=(red,blue,green,yellow,pink,purple);
ods graphics off;

/* Create temporary SAS dataset named quest1 */
data quest1;
  input x @@;
/* Set up titles */
  title1 'Statistics 147 Practice Exam 1, SAS';
  title2 'Summer 2020';
  title3 'Linda M. Penas';
  title4 'Question 1';
/* Create new variable y = 2x^3 +4 */
  y = 2*x**3 + 4;
/* Input values of x */
datalines;
11 12 13 14 15 16 20
;
/* Print x and y  */
proc print;
/* Create temporary SAS dataset named quest2 */
data quest2;
```

```
   /* Revise title4 */
   title4 'Question 2';
/* Use nested Do loops to enter the values of m and n and
calculate the values of y */
/* Loop for values of m */
   do m = 1 to 2;
/* Loop for values of n */
      do n = 1 to 3;
/* Formula for y */
         y = sqrt(m**2 + n**2);
/* Output the values  */
         output;
/* End the loops */
     end;
   end;
/* Print m, n, and y */
proc print;

/* Create temporary SAS dataset named quest3 */
data quest3;
/* Input x and y */
   input x y;
   /* Revise title4 */
   title4 'Question 3';
datalines;
1 1
3 8
5 24
7 40
9 80
11 20
13 150
;
/* Print x and y as a check */
proc print;
/* Use the symbol option to change the symbol that will be used on the plot */
       symbol1 color=black
        value=dot  height=2;

/* Plot y vs x    */
proc gplot;
   plot y*x;
/* Create temporary SAS dataset named quest4
   Be sure to change the path to the data file. */
data quest4;
   infile 'c:\linda\summer2020\su20147\datafiles\hallmk.dat' firstobs=2;
   input  amount @@;
   /* Revise title4 */
   title4 'Question 4';

/* Print as a check */
proc print;
/* Generate descriptive statistics*/
proc means mean median stddev var min max;
   var amount;
```

```
/* Create histograms using hbar  option */
proc gchart;
  vbar3d amount / midpoints = 20 to 36 by 4
                  caxis = orange
                  cfr=verylightpurplishblue
                  coutline = verydarkblue
                  shape = hexagon
                  ctext = red;

/* Use pattern command to change the colors of the bars */

    pattern color = pink;

   vbar3d amount / midpoints = 20 to 34 by 1
                  caxis = orange
                  cfr=verylightpurplishblue
                  coutline = verydarkblue
                  shape = hexagon
                  ctext = red;

/* Create temporary SAS dataset named quest5 */
data quest5;
   /* Revise title4 */
   title4 'Question 5';
   infile 'c:\linda\summer2020\su20147datafiles\aussie.dat' firstobs = 2;
 /* Read in data using nested do loops
     2 columns, 10 rows in each column */
/* Set up do loop for the rows */
      do rows = 1 to 10;
/* Set up do loop for columns and name columns */
         do dogs = 1 to 2;
            if dogs = 1 then breed = 'Cattle Dog';
            else             breed = 'Shepherd  ';
/* Input and output the data */
               input weight @@;
               output;
/* Close do loops */
         end;
      end;

/* Print as a check */
proc print;

/* Sort by breed */
proc sort;
   by breed;

/* Use proc means to generate means and variances */
proc means mean var;
   by breed;
   var weight;

/* Create temporary SAS dataset with just Asutralian Shepherd data */
data just_shep;
   set quest5;
```

```
/* Add title5*/
   title5 'Australian Shepherd Dogs';
   if breed = 'Shepherd  ';
/* Print the data as a check */
   proc print;

/* Create temporary SAS dataset named quest6 */
data quest6;
/* Revise title5 and title6 */
   title4 'Question 6';
   title5 'Part (i) All Groups';
/* Use infile statement to open the data file */
   infile 'C:\linda\summer2020\su20147\datafiles\agegroup.dat' firstobs = 2;
/* Use nested do loops to read in and output the data */
   /* Do loop for the rows */
   do rows = 1 to 10;
   /* Do loop for thecolumns */
       do group = 1 to 4;
/* Use if-then-else structure to name the columns */
                  if group = 1 then GrName = '10 to 19';
             else if group = 2 then GrName = '20 to 39';
             else if group = 3 then GrName = '40 to 59';
             else                   GrName = '60 to 69';
/* Input and output the data */
                           input heartrate @@;
                           output;
  /* Close the do loops */
      end;
   end;
   /* Print the data */
   proc print;

/* Create temporary SAS dadset with only Group 2 */
   data just2;
 /* Use set command to bring entire SAS dataset */
      set quest6;
  /* Add title5 */
      title5 'Group 2 Data';
/* Use if structure to subset the data to only include Group 2 */
      if GrName = '20 to 39';
/* Print the data*/
proc print;

 /* Create temporary SAS dadset with only Group 2 and Group 3*/
 data just2and3;
   /* Use set command to bring entire SAS dataset */
      set quest6;
 /* Revise title5 */
      title5 'Group 2 and Group 3 Data';
/* Use if structure to subset the data to only include Group 2 */
      if GrName = '20 to 39' or GrName = '40 to 59';
/* Print the data*/
proc print;

/* Create temporary SAS dataset */
```

```
   data quest7;
/* Revise title4 and title5 */
   title4 'Question 7';
   title5 ' ';
   input n p;
/* X = # that receive free tablet. Then X ~ b(x;n=20,p=0.15) */
/* Part (i) P(X = 4)
   Use pdf function to calculate probability: pdf('Binomial',x,p,n)   */
p1 = pdf('Binomial',4,0.15,20);

/* Part (ii) P(2 <= X <= 5) = P(X <= 5) - P(X <= 1)
    Use  cdf function to calculate probabilities:  cdf('Binomial',x,p,n) */

p2 = cdf('Binomial',5,0.15,20) - cdf('Binomial',1,0.15,20);

/* Part (iii) P(X > 4) = 1 - P(X <= 4)
Use cdf function to calculate probability: cdf('Binomial',x,p,n) */

p3 = 1 - cdf('Binomial',4,0.15,20);
/* OR use sdf function */
p3a = sdf('Binomial',4,0.15,20);

/* Part (iv)  Calculate mean of binomial = np */
mean_binomial = 20*0.15;
datalines;
20 0.015
;
/* Print the results */
proc print noobs;
/* Revise title5 */
   title5 'Part (i)  P(X = 4)';
   var p1;

proc print noobs;
/* Revise title5 */
   title5 'Part (ii) P(2 <= X <= 5) = P(X <= 5) - P(X <= 1)';
   var p2;

proc print noobs;
/* Revise title5 */
   title5 'Part (iii)  P(X > 4)';
   var p3a;

proc print noobs;
/* Revise title5 */
   title5 'Part (iv)  mean = np';
   var mean_binomial;

/* Create temporary SAS dataset */
data quest8;
 title4 'Question 8';
/* X is Normal with mu and sigma */
   input mu sigma ;
/* Part (i)  P(X<=x) = P(X <= 43) */
 /* Use cdf function to generate probability */
```

```
p1 = cdf('Normal',43,mu,sigma);
/* Part (ii)
Add line to code to get p2 = P(X >= 43) = 1  P(X < 43) = 1  p1 */
p2 = 1 - p1;
/* Part (iii) P(42 < X < 47) = P(X < 47) - P(X <= 42)
Use cdf function to generate probability */
p3 = cdf('Normal',47,mu,sigma) - cdf('Normal',42,mu,sigma);
/* Part (iv) Find x such that P(X <= x) = 0.975
/* Use quantile function */
x3 = quantile('Normal',0.975,mu,sigma);
datalines;
45 5
proc print noobs;
/* Revise title5 */
   title5 'Part (i)  P(X<=x) = P(X <= 43)';
   var p1;
proc print noobs;
/* Revise title5 */
   title5 'Part (ii)  P(X >= 43)';
   var p2;
proc print noobs;
/* Revise title5 */
   title5 'Part (iii)  P(42 < X < 47) = P(X < 47) - P(X <= 42)';
   var p3;
proc print noobs;
/* Revise title5 */
   title5 'Part (iv) 97.5th percentile';
   var x3;
run;
quit;
```

3 SAS Output & Solution

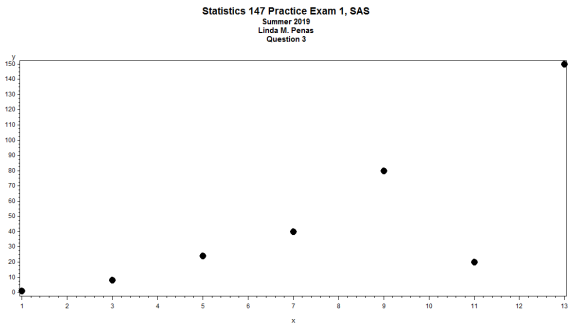
```
Statistics 147 Practice Exam 1, SAS
Linda M. Penas
Summer 2020
Question 1
Obs     x      y
 1     11     2666
 2     12     3460
 3     13     4398
 4     14     5492
 5     15     6754
 6     16     8196
 7     20    16004
```

Question 2

OBS	M	N	Y
1	1	1	1.41421
2	1	2	2.23607
3	1	3	3.16228
4	2	1	2.23607
5	2	2	2.82843
6	2	3	3.60555

Question 3

OBS	X	Y
1	1	1
2	3	8
3	5	24
4	7	40
5	9	80
6	11	20
7	13	150



****
****
** QUESTION 3, Part (ii) The point (11,20) does not seem to fit the trend of the data. **
****
****

Question 4
The MEANS Procedure

Analysis Variable : amount

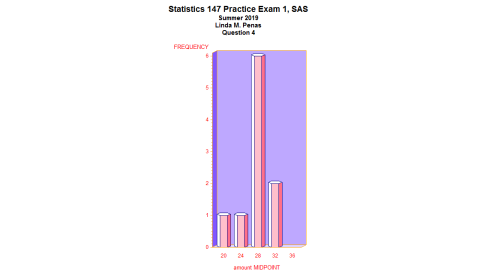
Mean	Median	Std Dev	Variance	Minimum
27.5140000	27.9750000	3.1874936	10.1601156	21.5000000

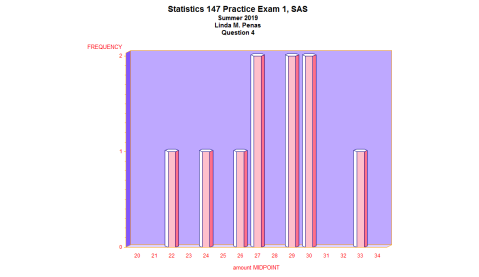
Analysis Variable : amount

Maximum
32.5000000

****

```
*******************************************************************************************
**  QUESTION 4                                                                           **
**  ANSWER: Subpart(i) The average amount spent by the customers is $27.514 (or $27.51). **
**  ANSWER: Subpart (ii) The median amount spent by the customers is $27.975 (or $7.98). **
**  ANSWER: Subpart (iii) The standard deviation for the amount spent by the customers   **
**          is   $3.18749362 ($3.19).                                                    **
**  ANSWER: Subpart (iv) The variance for the amount spent by the customers is 10.16012. **
**  ANSWER: Subpart (v)  The minimum amount spent bythe customers is $21.50              **
**  ANSWER: Subpart (vi) The maximum amount spent by the customers is $32.50.            **
*******************************************************************************************
*******************************************************************************************
```






```
*******************************************************************************************
*******************************************************************************************
**  QUESTION 4                                                                           **
**  ANSWER: Subpart(ix): The first histogram seems more appropriate since it does not **
**  have a lot of empty classes.                                                         **
*******************************************************************************************
*******************************************************************************************
```

```
Question 5
Obs    rows    dogs      breed       weight
  1      1       1     Cattle Dog      45
  2      1       2     Shepherd        52
  .      .       .     ........         .
 19     10       1     Cattle Dog      48
 20     10       2     Shepherd        59
```

```
Question 5
breed=Cattle Dog
The MEANS Procedure
 Analysis Variable : weight
        Mean        Variance
---------------------------
  46.8000000       9.2888889
```

```
----------------------------
breed=Shepherd
 Analysis Variable : weight
        Mean        Variance
----------------------------
  56.4000000      16.7111111
----------------------------


Question 5
Australian Shepherd Dogs
Obs    rows    dogs     breed      weight
  1      1       2     Shepherd      52
  2      2       2     Shepherd      55
  3      3       2     Shepherd      60
  4      4       2     Shepherd      58
  5      5       2     Shepherd      62
  6      6       2     Shepherd      49
  7      7       2     Shepherd      55
  8      8       2     Shepherd      54
  9      9       2     Shepherd      60
 10     10       2     Shepherd      59


Question 6
Part (i) All Groups
Obs    rows    group     GrName     heartrate
  1      1       1      10 to 19        29
  2      1       2      20 to 39        20
  3      1       3      40 to 59        37
  4      1       4      60 to 69        28
 . . . . . . . . . .
 40     10       4      60 to 69        32
*******************************************************************************
Question 6
Group 2 Data
Obs    rows    group     GrName     heartrate
  1      1       2      20 to 39        20
  2      2       2      20 to 39        21
  3      3       2      20 to 39        30
  4      4       2      20 to 39        28
  5      5       2      20 to 39        20
  6      6       2      20 to 39        23
  7      7       2      20 to 39        23
  8      8       2      20 to 39        23
  9      9       2      20 to 39        21
 10     10       2      20 to 39        25
*******************************************************************************
Question 6
Group 2 and Group 3 Data
Obs    rows    group     GrName     heartrate
  1      1       2      20 to 39        20
  2      1       3      40 to 59        37
  3      2       2      20 to 39        21
  4      2       3      40 to 59        25
 . . .
```

```
 19     10       2      20 to 39        25
 20     10       3      40 to 59        33
********************************************************************************

Question 7
Part (i)  P(X = 4)
   p1
0.18212
********************************************************************************
Question 7
Part (ii) P(2 <= X <= 5) = P(X <= 5) - P(X <= 1)
   p2
0.75713
********************************************************************************
Question 7
Part (iii)  P(X > 4)
  p3a
0.17015
********************************************************************************
Question 7
Part (iv)  mean = np
  mean_
binomial
    3
********************************************************************************


********************************************************************************
********************************************************************************
**  QUESTION 7                                                                **
** Subpart  (i)   P(X = 4) = p1 = 0.18212                                     **
** Subpart  (ii)  P(2 <= X <= 5) = p2 = 0.75713                               **
** Subpart (iii)  P(X > 4) = p3 = 0.17015                                     **
** Subpart  (iv)  mean = np = 3                                               **
********************************************************************************
********************************************************************************


********************************************************************************
Question 8
Part (i)  P(X<=x) = P(X <= 43)
   p1
0.34458
********************************************************************************
Question 8
Part (ii)  P(X >= 43)
   p2
0.65542
********************************************************************************
Question 8
Part (iii)  P(42 < X < 47) = P(X < 47) - P(X <= 42)
   p3
```

```
0.38117
********************************************************************************
Question 8
Part (iv) 97.5th percentile
   x3
54.7998
********************************************************************************

********************************************************************************************
********************************************************************************************
**  QUESTION 6                                                                            **
** Subpart(i)    P(X <= 43) = p1  = 0.344580                                             **
** Subpart (ii)  P(X > 43) = p2 = 0.65542                                                **
** Subpart (iii) P(42 < X < 47) = p3  = 0.38117                                          **
** Subpart (iv)  x3 = 54.7998                                                            **
********************************************************************************************
********************************************************************************************


      ************************************
      ** END Practice Exam I SAS Portion  **
      ************************************
```