

For Questions 1-3. Test the outliers, influence

The REG Procedure
Model: MODEL1
Dependent Variable: y2

Number of Observations Read	17
Number of Observations Used	17

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	249.60911	83.20304	18.50	<.0001
Error	13	58.47074	4.49775		
Corrected Total	16	308.07985			

Root MSE	2.12079	R-Square	0.8102
Dependent Mean	3.62824	Adj R-Sq	0.7664
Coeff Var	58.45238		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-5.71033	1.85178	-3.08	0.0087
x1	1	0.77737	0.20563	3.78	0.0023
x2	1	-1.44756	0.57799	-2.50	0.0264
x3	1	0.06640	0.01405	4.73	0.0004

For Questions 1-3. Test the outliers, influence

The REG Procedure
Model: MODEL1
Dependent Variable: y2

Output Statistics									
Obs	Residual	RStudent	Hat Diag H	Cov Ratio	DFFITS	DFBETAS			
						Intercept	x1	x2	x3
1	-0.2934	-0.1516	0.2300	1.7751	-0.0829	-0.0589	0.0611	0.0357	-0.0390
2	0.2245	0.1127	0.1844	1.6816	0.0536	0.0493	-0.0350	-0.0231	-0.0090
3	1.7792	0.9733	0.2600	1.3735	0.5769	0.4909	-0.2595	-0.1923	-0.3219
4	0.2686	0.1419	0.2632	1.8570	0.0848	0.0227	-0.0367	0.0563	0.0281
5	-1.4963	-0.7313	0.1024	1.2889	-0.2470	-0.0934	0.0811	0.0997	-0.1259
6	-1.4089	-0.7767	0.2908	1.5961	-0.4974	0.0560	0.0658	-0.3235	-0.2784
7	0.4517	0.2338	0.2304	1.7574	0.1279	0.0070	0.0119	0.1026	-0.0467
8	2.3865	1.4537	0.3495	1.1067	1.0656	0.1171	0.1731	0.7219	-0.6977
9	-1.5251	-0.7942	0.2035	1.4088	-0.4014	-0.0758	0.1201	0.1681	-0.3033
10	1.1550	0.5721	0.1407	1.4393	0.2315	0.1237	-0.1163	-0.1157	0.1145
11	-1.5371	-0.7595	0.1189	1.2956	-0.2790	-0.2061	0.0939	0.1342	0.0911
12	0.3377	0.1725	0.2116	1.7297	0.0894	0.0570	-0.0125	-0.0292	-0.0630
13	-1.5609	-0.8353	0.2416	1.4487	-0.4715	0.1854	-0.1593	-0.3707	-0.0728
14	-1.3663	-0.7034	0.1937	1.4534	-0.3448	0.1660	-0.2319	0.1042	-0.0533
15	-3.4492	-2.4328	0.3840	0.4497	-1.9208	0.3708	-1.3026	0.2894	1.3709
16	4.5054	3.2127	0.2492	0.1532	1.8511	-0.9094	0.9377	-0.5309	0.9145
17	1.5289	0.8840	0.3461	1.6367	0.6432	-0.4123	0.5356	-0.1204	0.0228

Sum of Residuals	0
Sum of Squared Residuals	58.47074
Predicted Residual SS (PRESS)	115.30536

For Question 4. Test the homoscedasticity - White test

The REG Procedure
 Model: MODEL1
 Dependent Variable: y2

Number of Observations Read	17
Number of Observations Used	17

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	249.60911	83.20304	18.50	<.0001
Error	13	58.47074	4.49775		
Corrected Total	16	308.07985			

Root MSE	2.12079	R-Square	0.8102
Dependent Mean	3.62824	Adj R-Sq	0.7664
Coeff Var	58.45238		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-5.71033	1.85178	-3.08	0.0087
x1	1	0.77737	0.20563	3.78	0.0023
x2	1	-1.44756	0.57799	-2.50	0.0264
x3	1	0.06640	0.01405	4.73	0.0004

For Question 4. Test the homoscedasticity - White test

The REG Procedure
Model: MODEL1
Dependent Variable: y2

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
9	5.87	0.7529

For Question 4. Test the homoscedasticity - White test

The CORR Procedure

3 Variables: x1 x2 x3

Simple Statistics						
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
x1	17	8.39412	2.67242	142.70000	5.30000	14.00000
x2	17	0.61176	0.92471	10.40000	0.01000	2.00000
x3	17	55.70588	38.94670	947.00000	0	104.00000

Pearson Correlation Coefficients, N = 17

Prob > |r| under H0: Rho=0

	x1	x2	x3
x1	1.00000	-0.10371 0.6920	0.23663 0.3605
x2	-0.10371 0.6920	1.00000	0.04533 0.8629
x3	0.23663 0.3605	0.04533 0.8629	1.00000

For Question 4. Test the homoscedasticity - White test

The REG Procedure
Model: MODEL1
Dependent Variable: y2

Number of Observations Read	17
Number of Observations Used	17

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	249.60911	83.20304	18.50	<.0001
Error	13	58.47074	4.49775		
Corrected Total	16	308.07985			

Root MSE	2.12079	R-Square	0.8102
Dependent Mean	3.62824	Adj R-Sq	0.7664
Coeff Var	58.45238		

Parameter Estimates							
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t	Tolerance	Variance Inflation
Intercept	1	-5.71033	1.85178	-3.08	0.0087	.	0
x1	1	0.77737	0.20563	3.78	0.0023	0.93088	1.07425
x2	1	-1.44756	0.57799	-2.50	0.0264	0.98407	1.01619
x3	1	0.06640	0.01405	4.73	0.0004	0.93907	1.06488

Collinearity Diagnostics						
Number	Eigenvalue	Condition Index	Proportion of Variation			
			Intercept	x1	x2	x3
1	3.12726	1.00000	0.00731	0.00751	0.03284	0.02473
2	0.61899	2.24772	0.00361	0.00830	0.91397	0.03129
3	0.21118	3.84816	0.05915	0.06264	0.00597	0.94303
4	0.04256	8.57154	0.92993	0.92156	0.04723	0.00095026

For Question 5

The REG Procedure
Model: MODEL1
Dependent Variable: y2

Number of Observations Read	17
Number of Observations Used	17

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	249.60911	83.20304	18.50	<.0001
Error	13	58.47074	4.49775		
Corrected Total	16	308.07985			

Root MSE	2.12079	R-Square	0.8102
Dependent Mean	3.62824	Adj R-Sq	0.7664
Coeff Var	58.45238		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-5.71033	1.85178	-3.08	0.0087
x1	1	0.77737	0.20563	3.78	0.0023
x2	1	-1.44756	0.57799	-2.50	0.0264
x3	1	0.06640	0.01405	4.73	0.0004

For Question 5

Obs	cookd
1	0.00186
2	0.00078
3	0.08355
4	0.00194
5	0.01582
6	0.06379
7	0.00441
8	0.26148
9	0.04146
10	0.01413
11	0.02012
12	0.00216
13	0.05689
14	0.03092
15	0.66918
16	0.49890
17	0.10519

For Question 6

The UNIVARIATE Procedure Variable: y2

Moments			
N	17	Sum Weights	17
Mean	3.62823529	Sum Observations	61.68
Std Deviation	4.38805087	Variance	19.2549904
Skewness	1.50902498	Kurtosis	1.84979634
Uncorrected SS	531.8694	Corrected SS	308.079847
Coeff Variation	120.941739	Std Error Mean	1.06425866

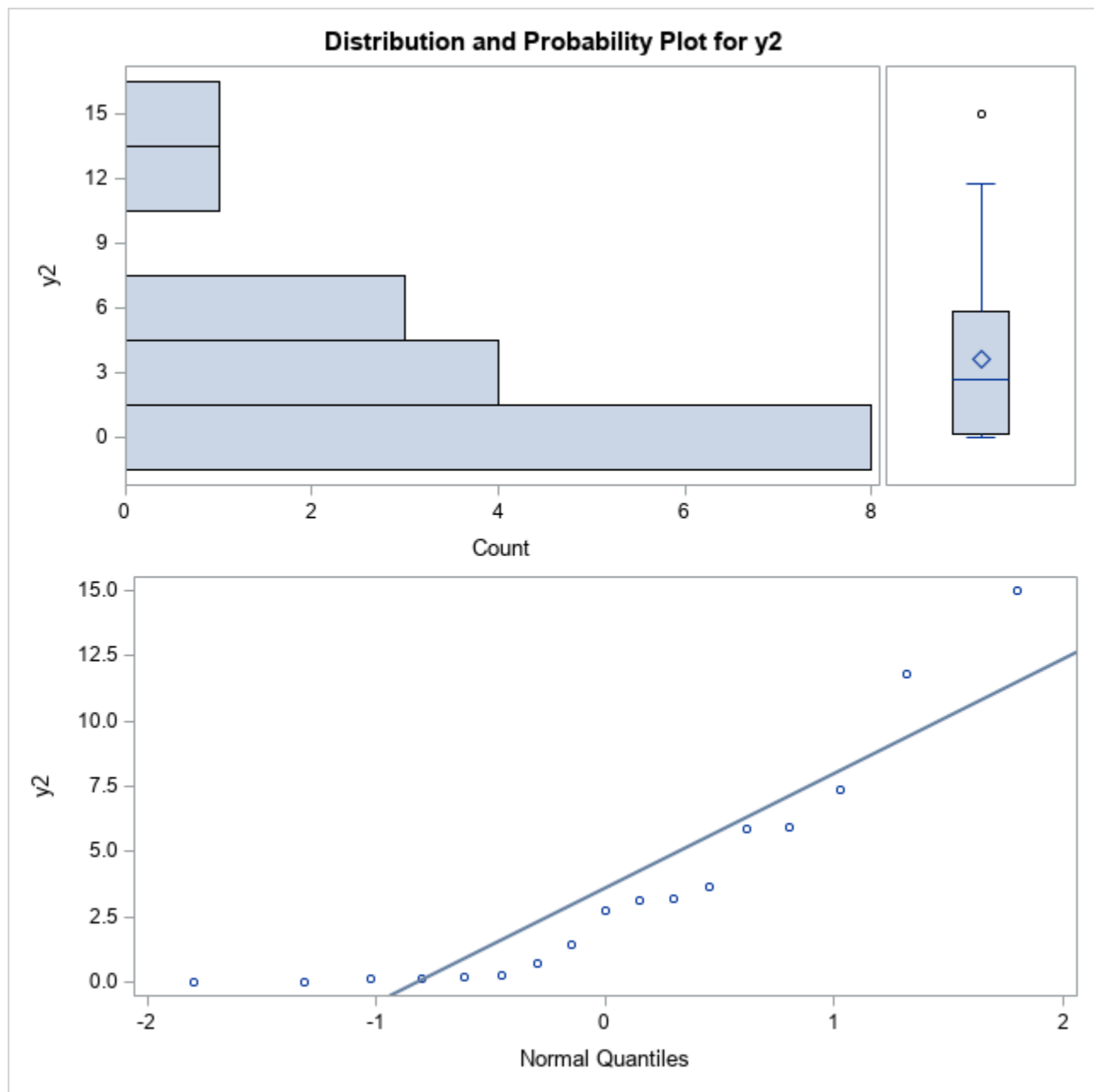
Basic Statistical Measures			
Location		Variability	
Mean	3.628235	Std Deviation	4.38805
Median	2.720000	Variance	19.25499
Mode	.	Range	15.00000
		Interquartile Range	5.67000

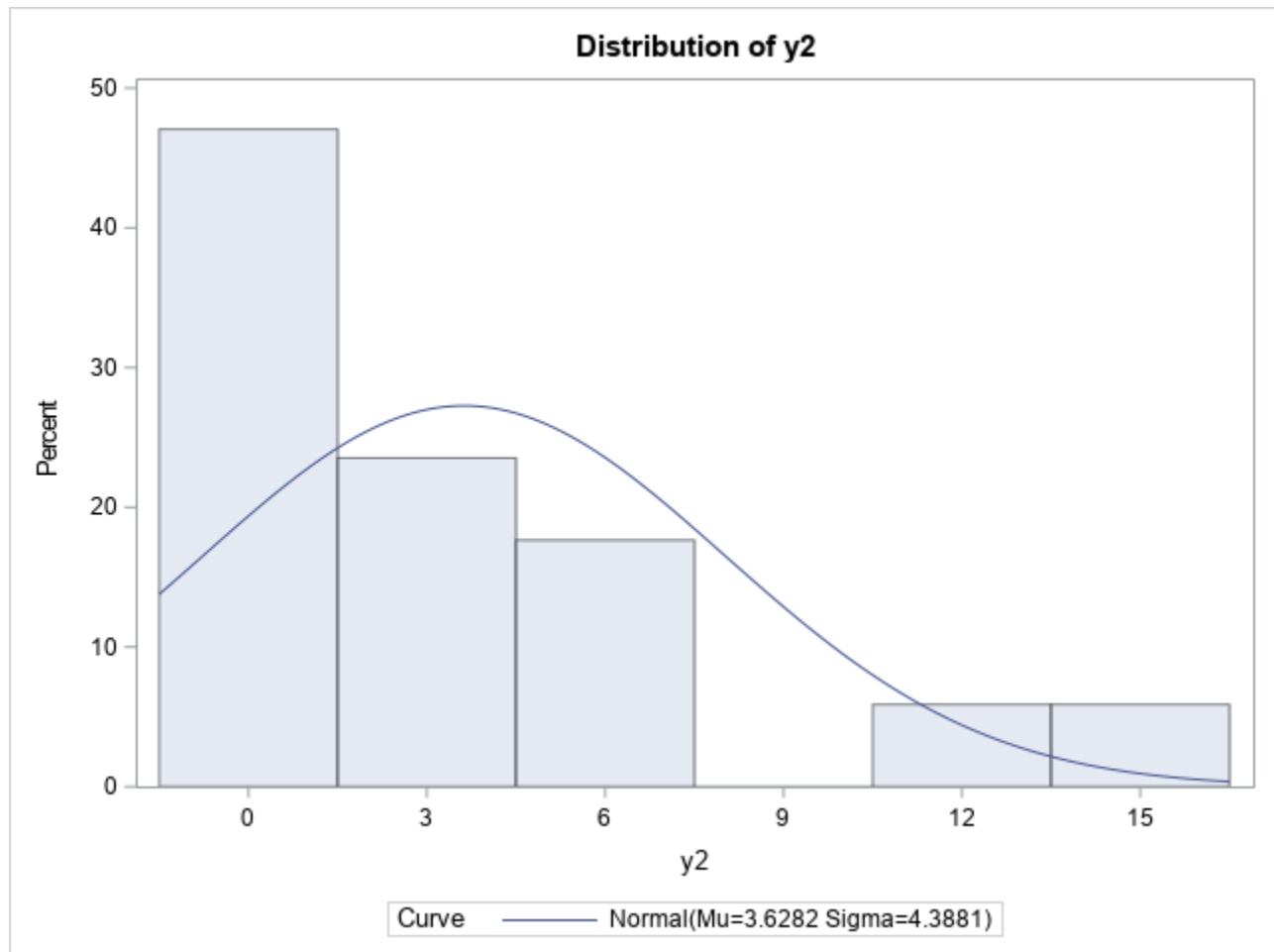
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	3.409167	Pr > t 	0.0036
Sign	M	8	Pr >= M 	<.0001
Signed Rank	S	68	Pr >= S 	<.0001

Quantiles (Definition 5)	
Level	Quantile
100% Max	15.00
99%	15.00
95%	15.00
90%	11.80
75% Q3	5.86
50% Median	2.72
25% Q1	0.19
10%	0.04
5%	0.00

1%	0.00
0% Min	0.00

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.00	8	5.86	9
0.04	12	5.97	10
0.14	15	7.35	14
0.16	3	11.80	17
0.19	7	15.00	16



For Question 6**The UNIVARIATE Procedure**

For Question 6

The UNIVARIATE Procedure Fitted Normal Distribution for y2

Parameters for Normal Distribution		
Parameter	Symbol	Estimate
Mean	Mu	3.628235
Std Dev	Sigma	4.388051

Goodness-of-Fit Tests for Normal Distribution				
Test	Statistic		p Value	
Kolmogorov-Smirnov	D	0.20416263	Pr > D	0.059
Cramer-von Mises	W-Sq	0.18842841	Pr > W-Sq	0.007
Anderson-Darling	A-Sq	1.16647472	Pr > A-Sq	<0.005

Quantiles for Normal Distribution		
Percent	Quantile	
	Observed	Estimated
1.0	0.0000	-6.57990
5.0	0.0000	-3.58947
10.0	0.0400	-1.99528
25.0	0.1900	0.66854
50.0	2.7200	3.62824
75.0	5.8600	6.58793
90.0	11.8000	9.25175
95.0	15.0000	10.84594
99.0	15.0000	13.83637

For Question 6

The UNIVARIATE Procedure Variable: x1

Moments			
N	17	Sum Weights	17
Mean	8.39411765	Sum Observations	142.7
Std Deviation	2.67242179	Variance	7.14183824
Skewness	0.77860803	Kurtosis	-0.4061029
Uncorrected SS	1312.11	Corrected SS	114.269412
Coeff Variation	31.8368399	Std Error Mean	0.64815749

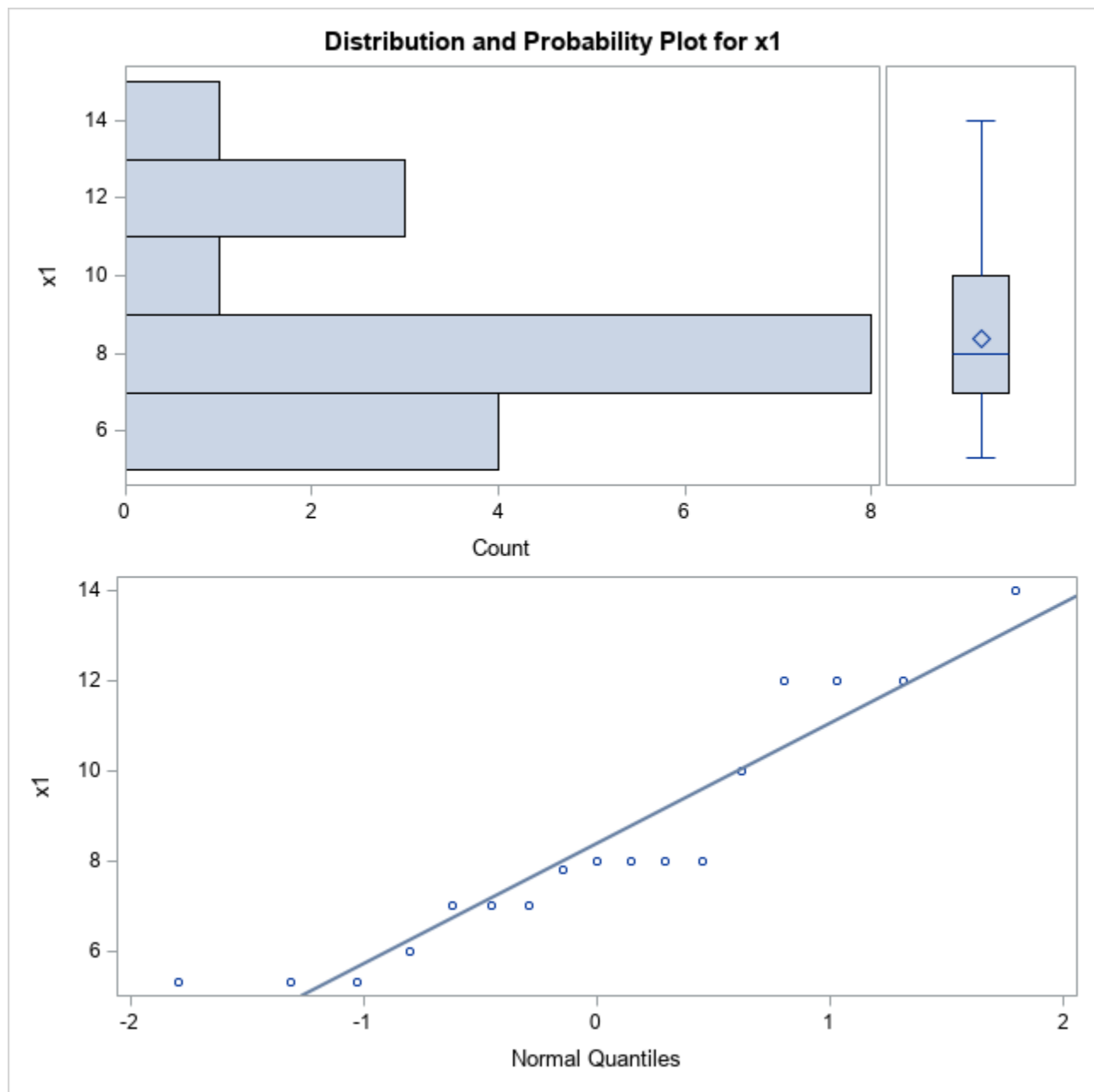
Basic Statistical Measures			
Location		Variability	
Mean	8.394118	Std Deviation	2.67242
Median	8.000000	Variance	7.14184
Mode	8.000000	Range	8.70000
		Interquartile Range	3.00000

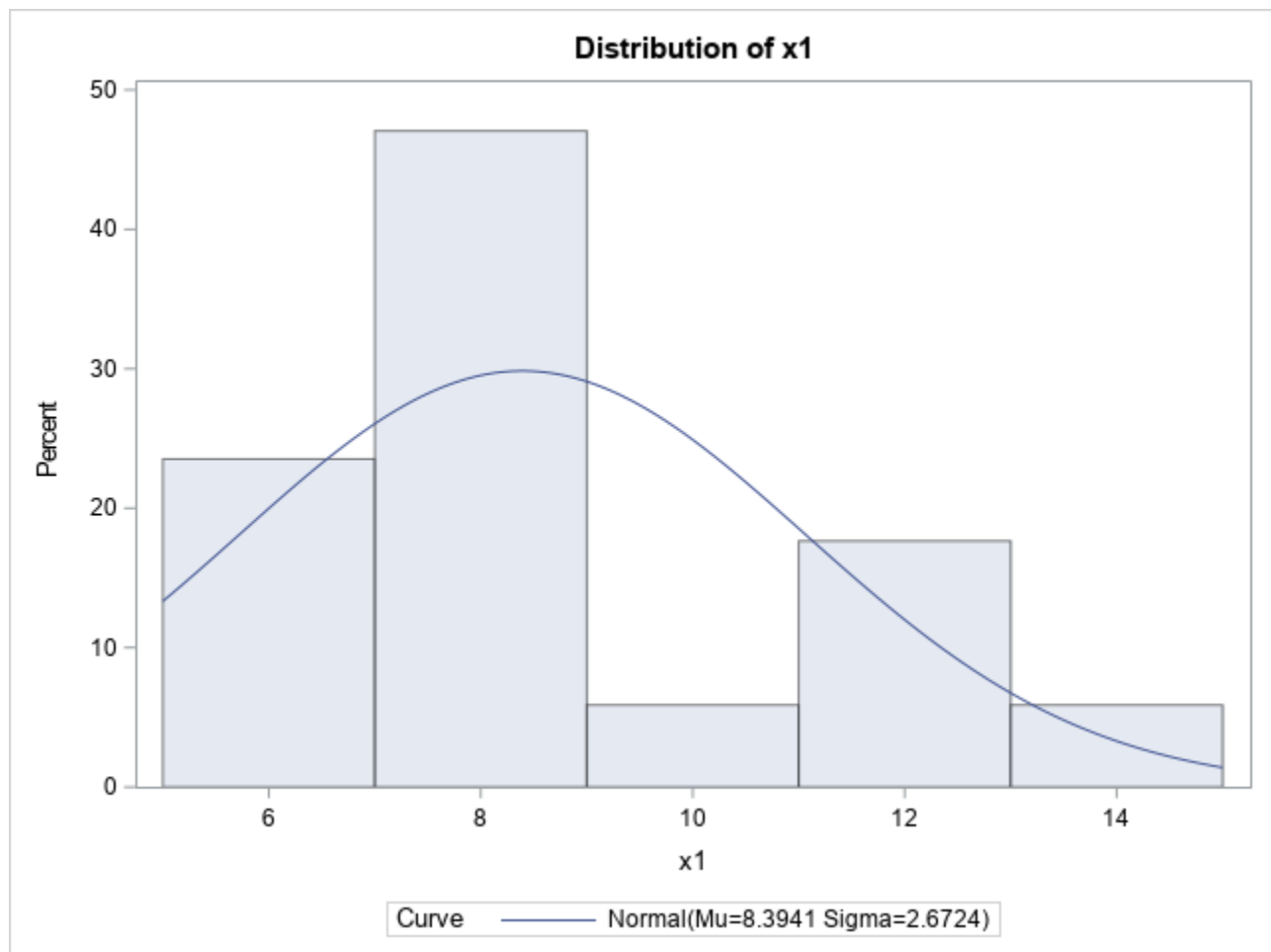
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.95074	Pr > t 	<.0001
Sign	M	8.5	Pr >= M 	<.0001
Signed Rank	S	76.5	Pr >= S 	<.0001

Quantiles (Definition 5)	
Level	Quantile
100% Max	14.0
99%	14.0
95%	14.0
90%	12.0
75% Q3	10.0
50% Median	8.0
25% Q1	7.0
10%	5.3
5%	5.3

1%	5.3
0% Min	5.3

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
5.3	3	10	13
5.3	2	12	14
5.3	1	12	15
6.0	4	12	16
7.0	12	14	17



For Question 6**The UNIVARIATE Procedure**

For Question 6

The UNIVARIATE Procedure Fitted Normal Distribution for x1

Parameters for Normal Distribution		
Parameter	Symbol	Estimate
Mean	Mu	8.394118
Std Dev	Sigma	2.672422

Goodness-of-Fit Tests for Normal Distribution				
Test	Statistic		p Value	
Kolmogorov-Smirnov	D	0.26450413	Pr > D	<0.010
Cramer-von Mises	W-Sq	0.14622669	Pr > W-Sq	0.024
Anderson-Darling	A-Sq	0.81600031	Pr > A-Sq	0.028

Quantiles for Normal Distribution		
Percent	Quantile	
	Observed	Estimated
1.0	5.30000	2.17713
5.0	5.30000	3.99837
10.0	5.30000	4.96927
25.0	7.00000	6.59160
50.0	8.00000	8.39412
75.0	10.00000	10.19664
90.0	12.00000	11.81896
95.0	14.00000	12.78986
99.0	14.00000	14.61110

For Question 6

The UNIVARIATE Procedure Variable: x2

Moments			
N	17	Sum Weights	17
Mean	0.61176471	Sum Observations	10.4
Std Deviation	0.924711	Variance	0.85509044
Skewness	0.98596659	Kurtosis	-1.1704046
Uncorrected SS	20.0438	Corrected SS	13.6814471
Coeff Variation	151.154683	Std Error Mean	0.22427536

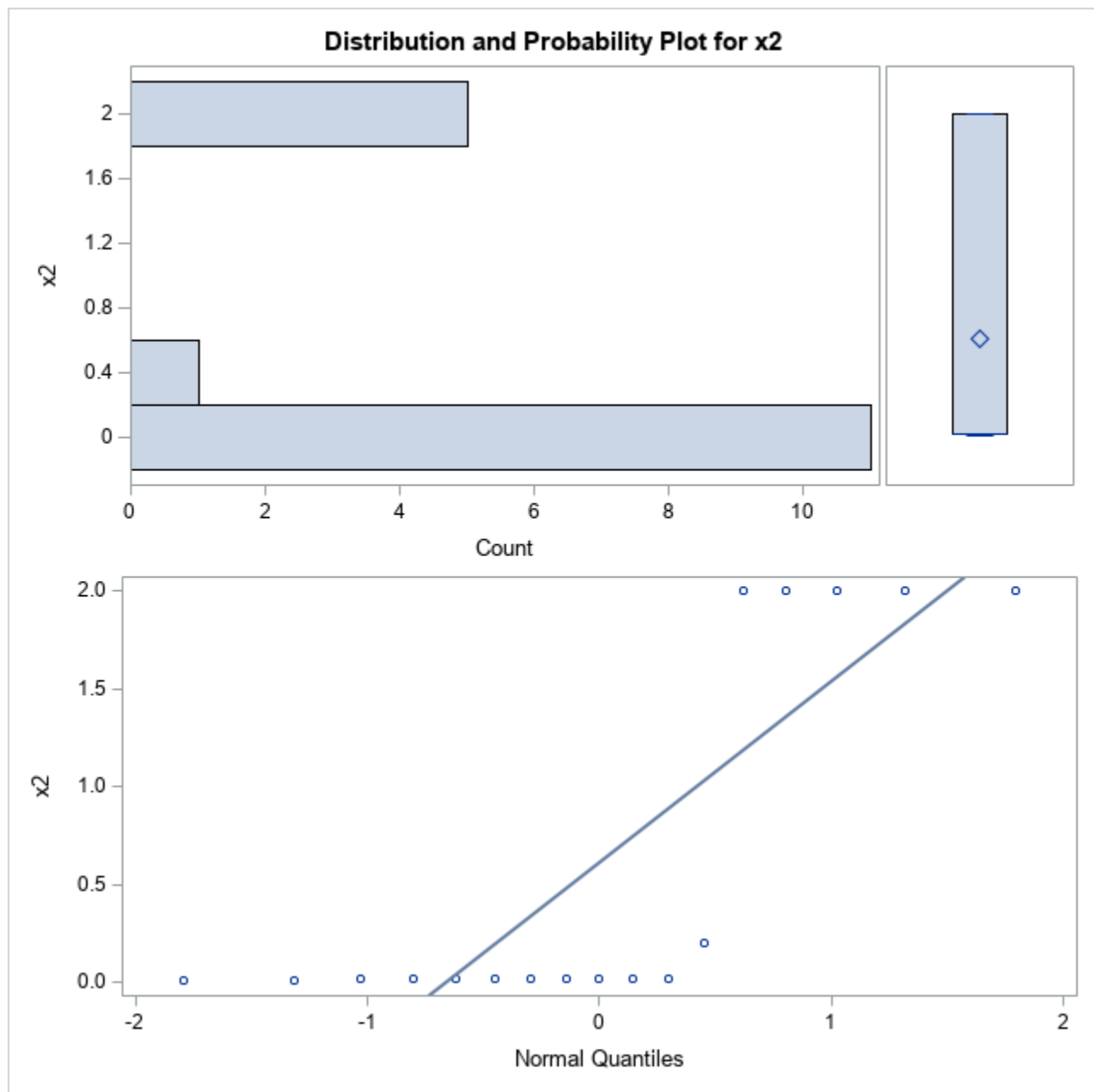
Basic Statistical Measures			
Location		Variability	
Mean	0.611765	Std Deviation	0.92471
Median	0.020000	Variance	0.85509
Mode	0.020000	Range	1.99000
		Interquartile Range	1.98000

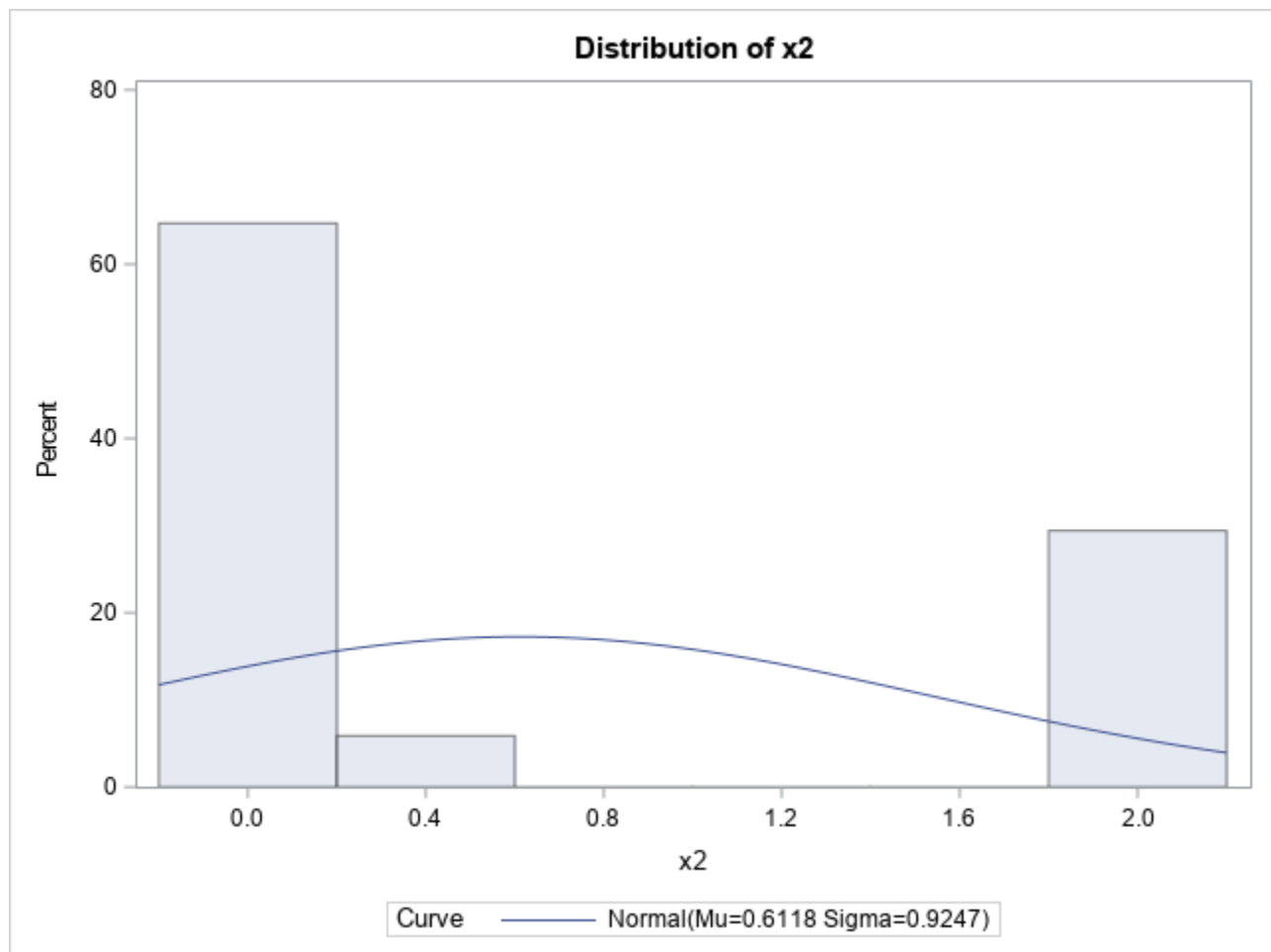
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	2.727739	Pr > t 	0.0149
Sign	M	8.5	Pr >= M 	<.0001
Signed Rank	S	76.5	Pr >= S 	<.0001

Quantiles (Definition 5)	
Level	Quantile
100% Max	2.00
99%	2.00
95%	2.00
90%	2.00
75% Q3	2.00
50% Median	0.02
25% Q1	0.02
10%	0.01
5%	0.01

1%	0.01
0% Min	0.01

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.01	17	2	4
0.01	14	2	6
0.02	16	2	7
0.02	15	2	8
0.02	12	2	13



For Question 6**The UNIVARIATE Procedure**

For Question 6

The UNIVARIATE Procedure Fitted Normal Distribution for x2

Parameters for Normal Distribution		
Parameter	Symbol	Estimate
Mean	Mu	0.611765
Std Dev	Sigma	0.924711

Goodness-of-Fit Tests for Normal Distribution				
Test	Statistic		p Value	
Kolmogorov-Smirnov	D	0.38595483	Pr > D	<0.010
Cramer-von Mises	W-Sq	0.61390955	Pr > W-Sq	<0.005
Anderson-Darling	A-Sq	3.38298199	Pr > A-Sq	<0.005

Quantiles for Normal Distribution		
Percent	Quantile	
	Observed	Estimated
1.0	0.01000	-1.53943
5.0	0.01000	-0.90925
10.0	0.01000	-0.57330
25.0	0.02000	-0.01194
50.0	0.02000	0.61176
75.0	2.00000	1.23547
90.0	2.00000	1.79683
95.0	2.00000	2.13278
99.0	2.00000	2.76296

For Question 6

The UNIVARIATE Procedure Variable: x3

Moments			
N	17	Sum Weights	17
Mean	55.7058824	Sum Observations	947
Std Deviation	38.9467019	Variance	1516.84559
Skewness	-0.3907818	Kurtosis	-1.3920979
Uncorrected SS	77023	Corrected SS	24269.5294
Coeff Variation	69.914882	Std Error Mean	9.44596269

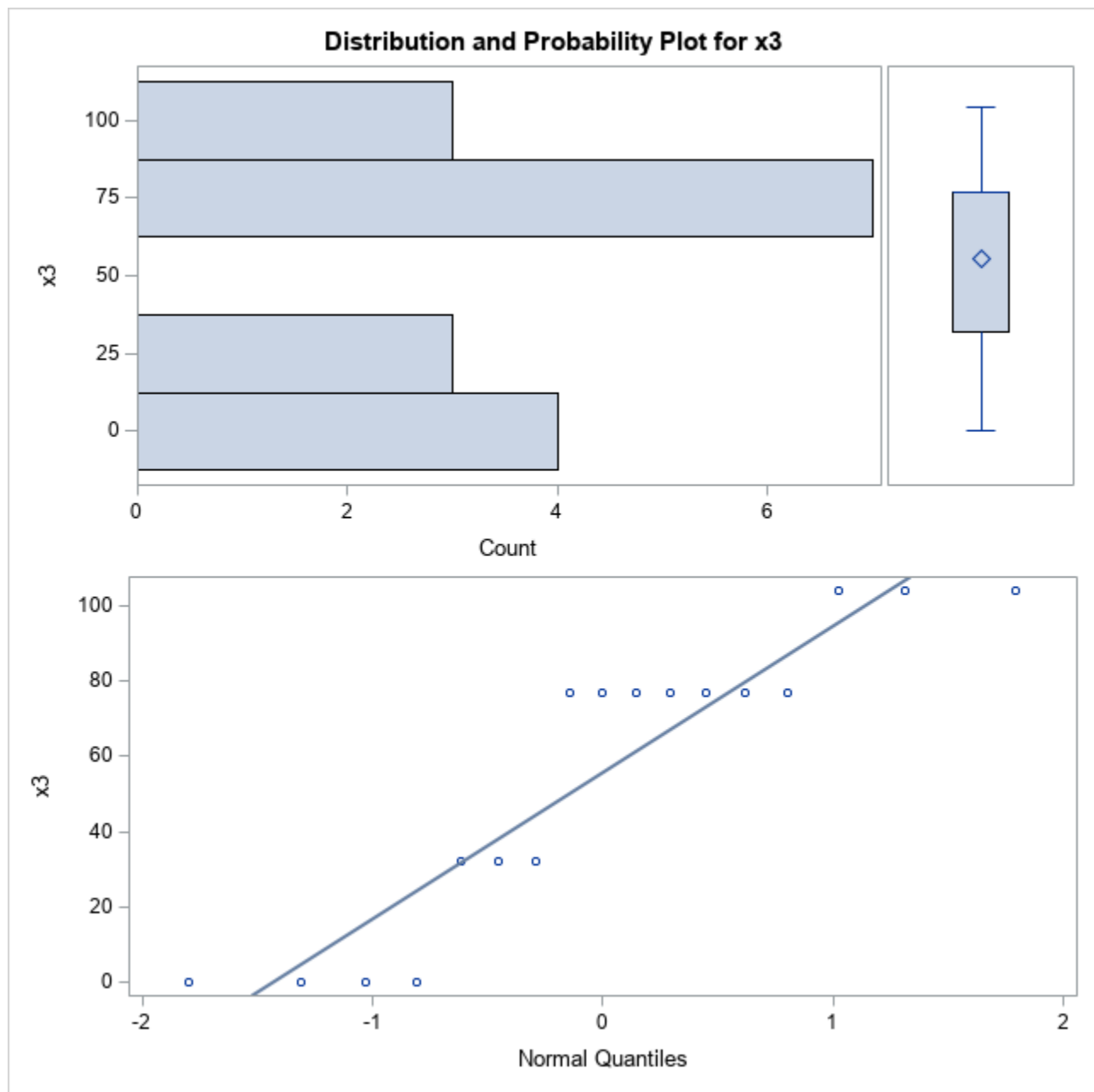
Basic Statistical Measures			
Location		Variability	
Mean	55.70588	Std Deviation	38.94670
Median	77.00000	Variance	1517
Mode	77.00000	Range	104.00000
		Interquartile Range	45.00000

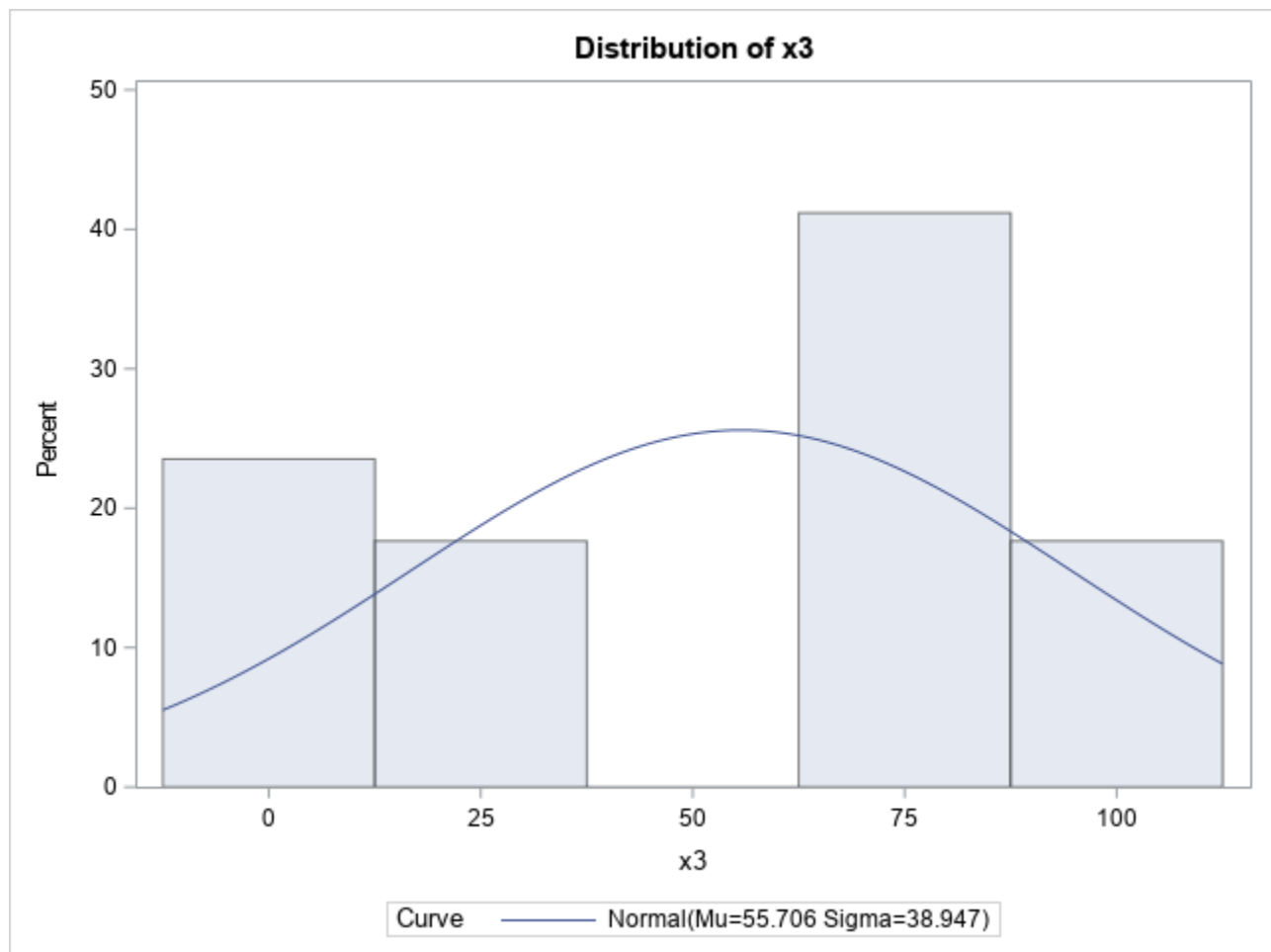
Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	5.897322	Pr > t 	<.0001
Sign	M	6.5	Pr >= M 	0.0002
Signed Rank	S	45.5	Pr >= S 	0.0002

Quantiles (Definition 5)	
Level	Quantile
100% Max	104
99%	104
95%	104
90%	104
75% Q3	77
50% Median	77
25% Q1	32
10%	0
5%	0

1%	0
0% Min	0

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	15	77	14
0	12	77	17
0	8	104	6
0	3	104	9
32	11	104	16



For Question 6**The UNIVARIATE Procedure**

For Question 6

The UNIVARIATE Procedure Fitted Normal Distribution for x3

Parameters for Normal Distribution		
Parameter	Symbol	Estimate
Mean	Mu	55.70588
Std Dev	Sigma	38.9467

Goodness-of-Fit Tests for Normal Distribution				
Test	Statistic		p Value	
Kolmogorov-Smirnov	D	0.29596012	Pr > D	<0.010
Cramer-von Mises	W-Sq	0.20583506	Pr > W-Sq	<0.005
Anderson-Darling	A-Sq	1.17530494	Pr > A-Sq	<0.005

Quantiles for Normal Distribution		
Percent	Quantile	
	Observed	Estimated
1.0	0.000	-34.89769
5.0	0.000	-8.35574
10.0	0.000	5.79368
25.0	32.000	29.43673
50.0	77.000	55.70588
75.0	77.000	81.97503
90.0	104.000	105.61809
95.0	104.000	119.76751
99.0	104.000	146.30946

For Question 7

The REG Procedure
 Model: MODEL1
 Dependent Variable: y1

Number of Observations Read	17
Number of Observations Used	17

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.8529 and C(p) = 4.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1435582	478527	25.12	<.0001
Error	13	247662	19051		
Corrected Total	16	1683244			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	730.01597	120.51736	699008	36.69	<.0001
x1	-7.78610	13.38278	6448.57446	0.34	0.5707
x2	173.74999	37.61655	406451	21.33	0.0005
x3	-6.49440	0.91428	961251	50.46	<.0001

Bounds on condition number: 1.0743, 9.466

Backward Elimination: Step 1

Variable x1 Removed: R-Square = 0.8490 and C(p) = 2.3385

Analysis of Variance					

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1429133	714567	39.37	<.0001
Error	14	254111	18151		
Corrected Total	16	1683244			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	670.27724	61.58967	2149754	118.44	<.0001
x2	176.33042	36.46098	424515	23.39	0.0003
x3	-6.62360	0.86569	1062567	58.54	<.0001

Bounds on condition number: 1.0021, 4.0082

All variables left in the model are significant at the 0.5000 level.

Summary of Backward Elimination							
Step	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x1	2	0.0038	0.8490	2.3385	0.34	0.5707

For Questions 8 and 9

The REG Procedure
Model: MODEL1
Dependent Variable: y1

Adjusted R-Square Selection Method

Number of Observations Read	17
Number of Observations Used	17

Number in Model	Adjusted R-Square	R-Square	C(p)	AIC	SBC	Variables in Model
2	0.8275	0.8490	2.3385	169.4093	171.90896	x2 x3
3	0.8189	0.8529	4.0000	170.9723	174.30520	x1 x2 x3
1	0.5700	0.5968	22.6216	184.1084	185.77484	x3
2	0.5559	0.6114	23.3350	185.4830	187.98263	x1 x3
2	0.1792	0.2818	52.4568	195.9243	198.42397	x1 x2
1	0.1656	0.2178	56.1135	195.3760	197.04238	x2
1	0.0294	0.0900	67.3997	197.9474	199.61381	x1