CHAPTER 2—Descriptive Statistics: Tabular and Graphical Methods

2.1 Constructing either a frequency or a relative frequency distribution helps identify and quantify patterns in how often various categories occur.

LO1

2.2 Relative frequency of any category is calculated by counting the number of occurrences of the category divided by the total number of observations. Percent frequency is calculated by multiplying relative frequency by 100.

LO1

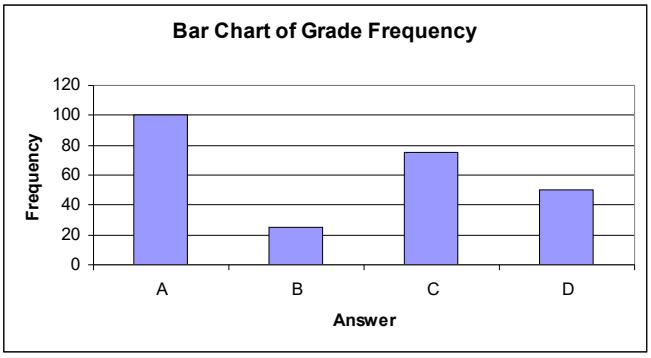
2.3 Answers and examples will vary.

LO1

2.4 **a.**

Category / Class	Frequency	Relative Frequency	Percent Frequency
A	100	0.40	40%
B	25	0.10	10%
C	75	0.30	30%
D	50	0.20	20%

b.

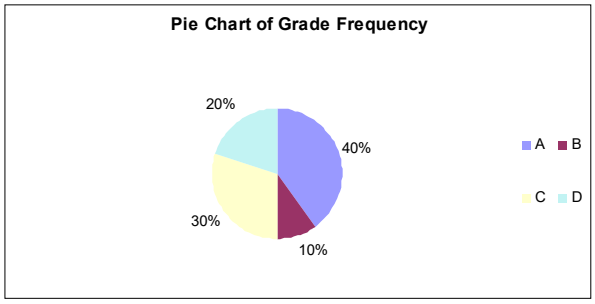


LO1

2.5 **a.** (100 / 250) * 360 degrees = 144 degrees

b. (25 / 250) * 360 degrees = 36 degrees

c.

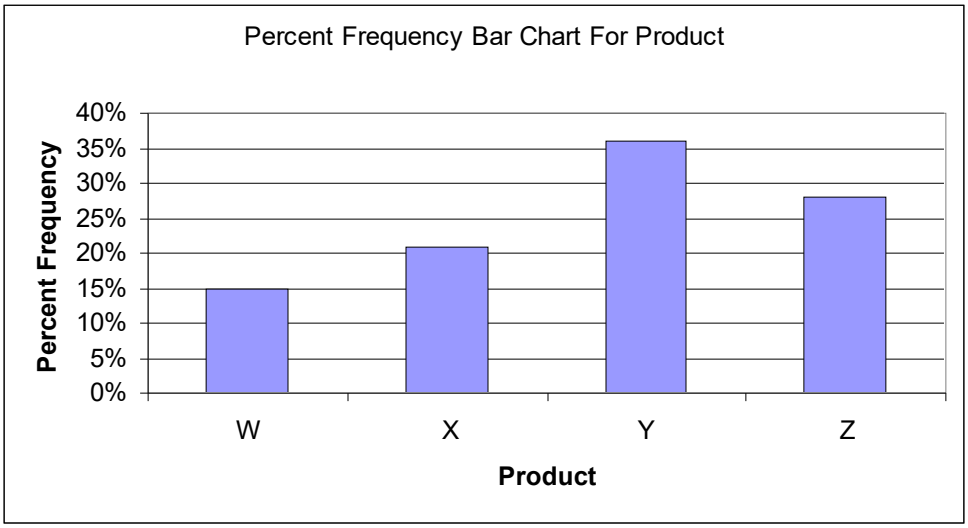


LO1

2.6 **a.** Relative frequency for product x is 1 – (0.15 + 0.36 + 0.28) = 0.21

b. Product: W X Y Z
75 105 180 140

c.



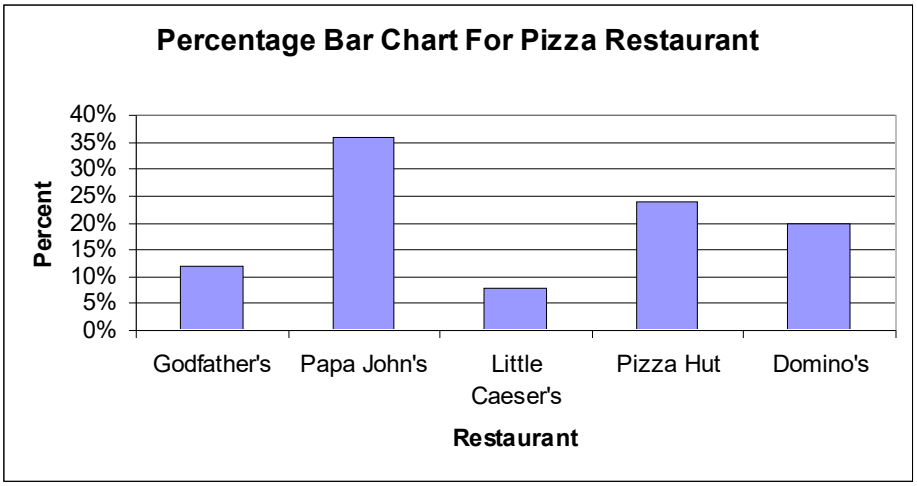
d. Degrees for W would be 54, for X degrees would be 75.6, for Y 129.6, and for Z 100.8.

LO1

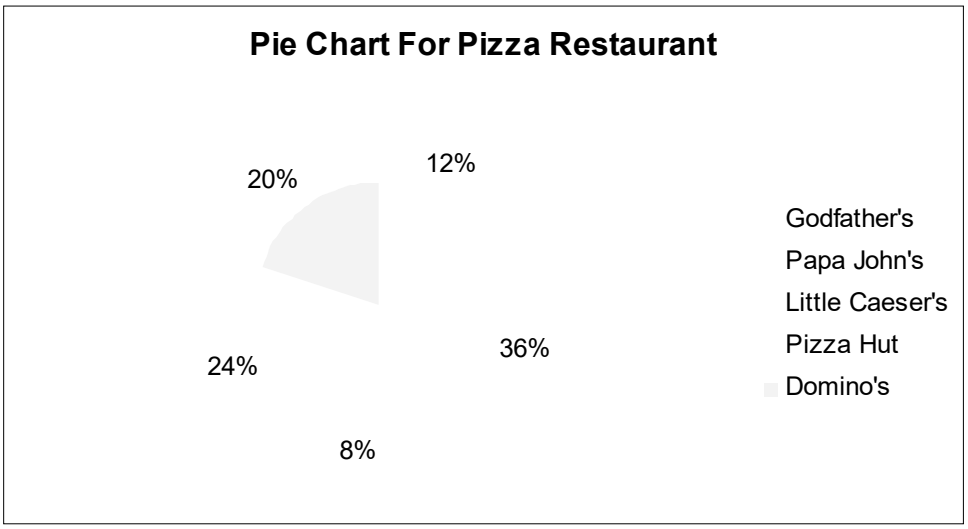
2.7 **a.**

Pizza Restaurant	Frequency	Relative Frequency
Godfather's	3	0.12
Papa John's	9	0.36
Little Caesar's	2	0.08
Pizza Hut	6	0.24
Domino's	5	0.20

b.



c.



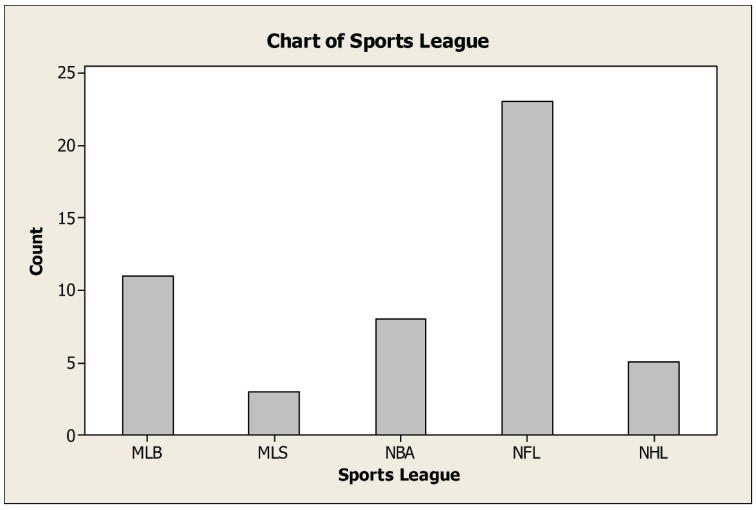
d. Most popular is Papa John's and least popular is Little Caeser's.

LO1

2.8 a. Tally for Discrete Variables: Sports League

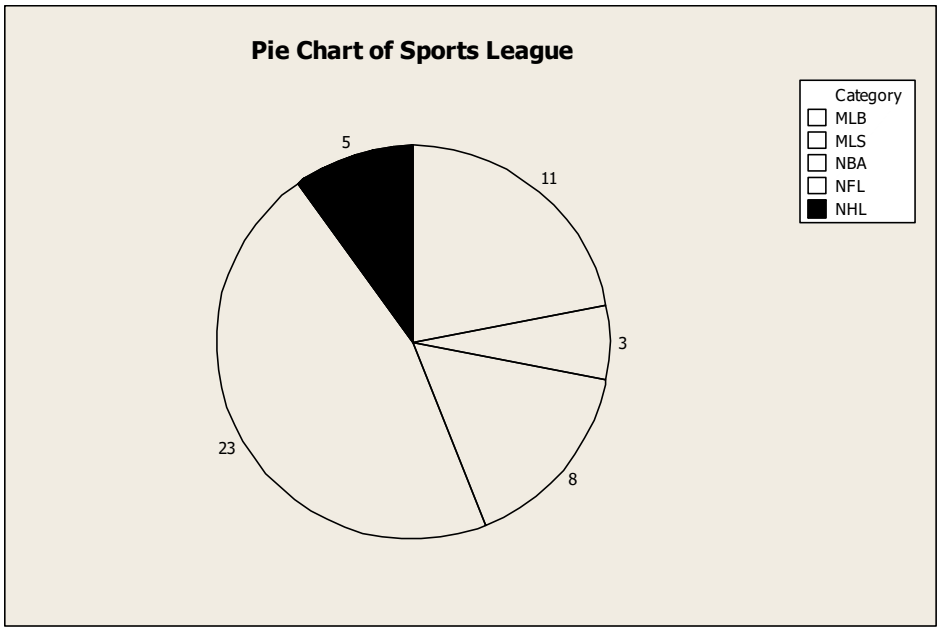
Sports League	Count	Rel. Freq.	Percent
MLB	11	0.22	22.00
MLS	3	0.06	6.00
NBA	8	0.16	16.00
NFL	23	0.46	46.00

```
NHL       5          0.10   10.00
                N=      50
```



b.

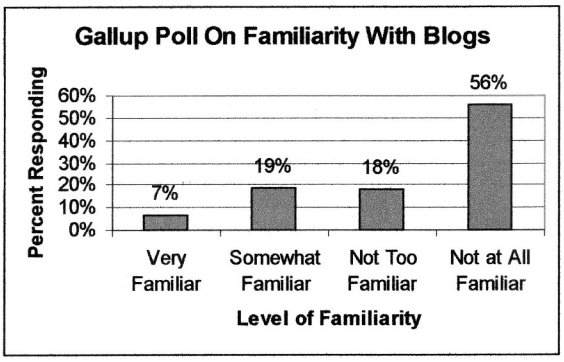
c.

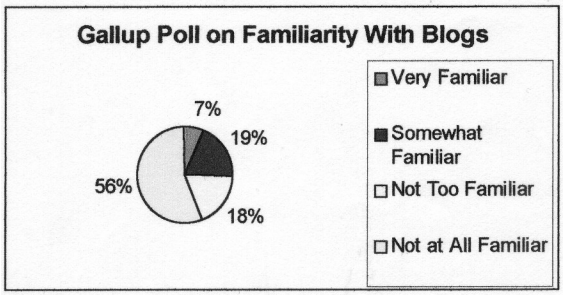


d. Most popular league is NFL and least popular is MLS.

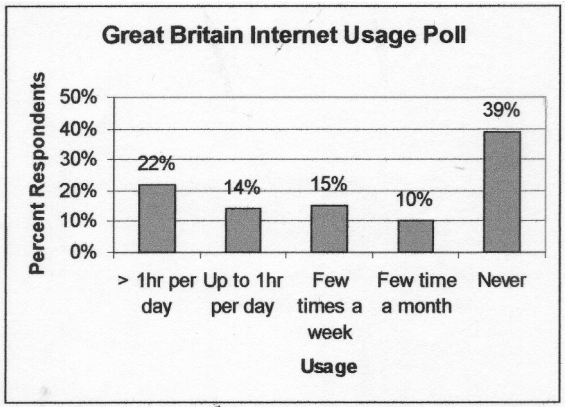
LO1

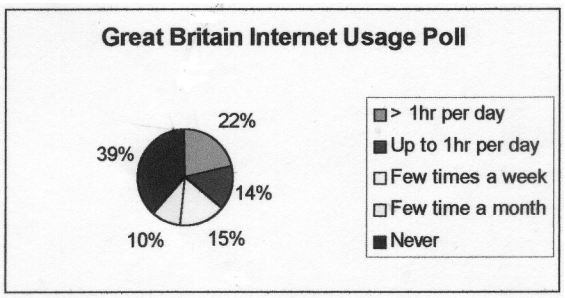
2.9 a.


Gallup Poll On Familiarity With Blogs
Percent Responding
60%
50%
40%
30%
20%
10%
0%
7%
19%
18%
56%
Very Familiar
Somewhat Familiar
Not Too Familiar
Not at All Familiar
Level of Familiarity


Gallup Poll on Familiarity With Blogs
7%
19%
56%
18%
Very Familiar
Somewhat Familiar
Not Too Familiar
Not at All Familiar

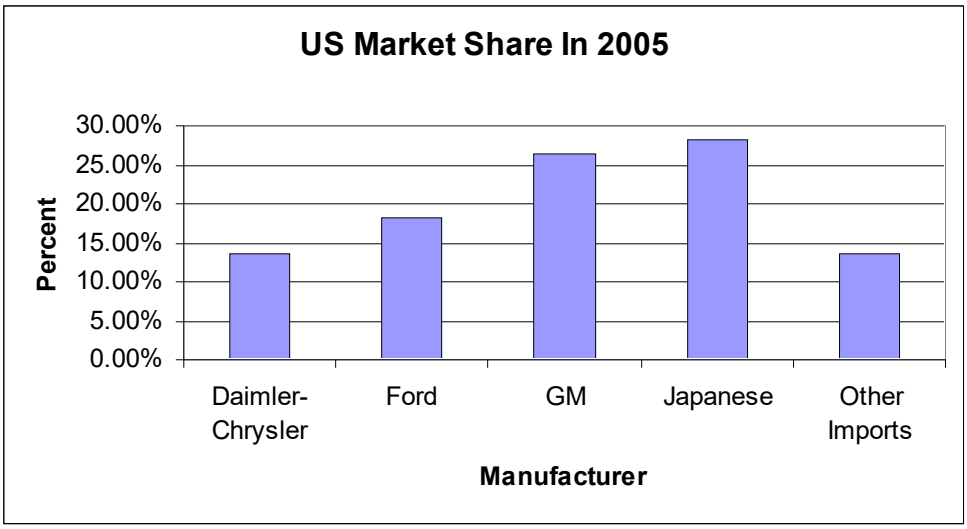
b.


Great Britain Internet Usage Poll
Percent Respondents
50%
40%
30%
20%
10%
0%
22%
14%
15%
10%
39%
> 1hr per day
Up to 1hr per day
Few times a week
Few time a month
Never
Usage

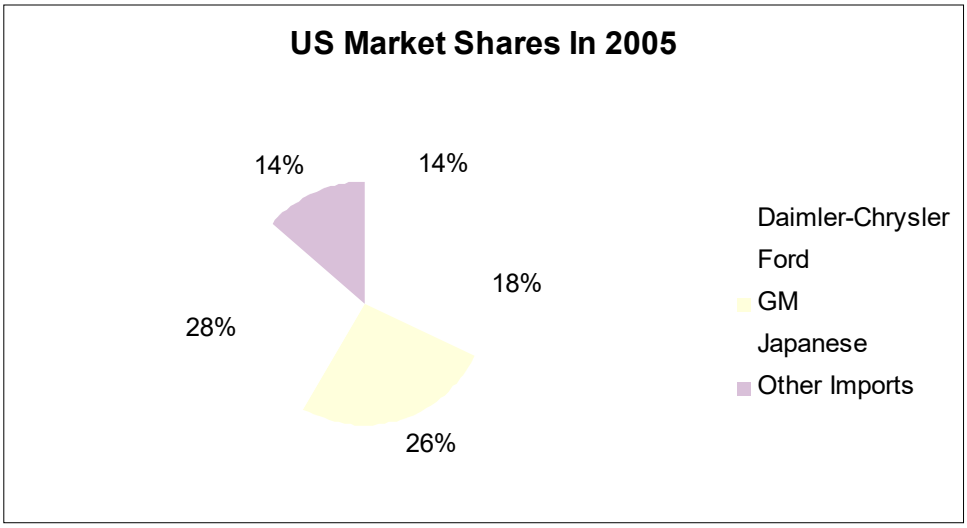

Great Britain Internet Usage Poll
22%
39%
14%
10%
15%
> 1hr per day
Up to 1hr per day
Few times a week
Few time a month
Never

LO1

2.10 a.

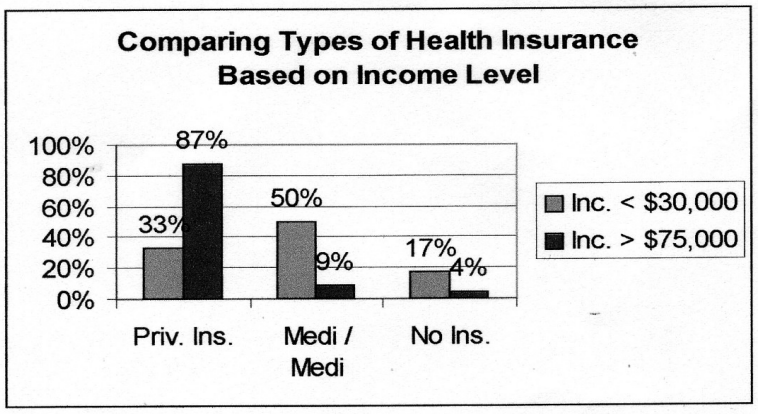

US Market Share In 2005
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Percent
Daimler-Chrysler
Ford
GM
Japanese
Other Imports
Manufacturer

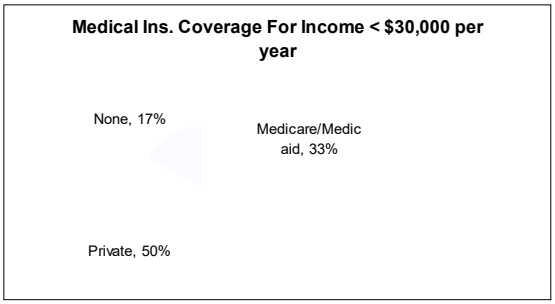
b.

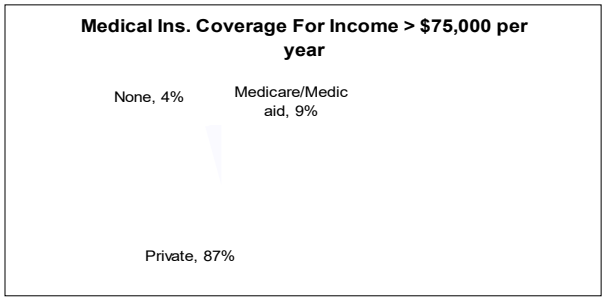

US Market Shares In 2005
14%
14%
18%
28%
26%
Daimler-Chrysler
Ford
GM
Japanese
Other Imports

LO1

2.11







LO1

2.12 **a.** 32.29%

b. 4.17%

c. Explanations will vary

LO2

2.13 **a.** We construct a frequency distribution and a histogram for a data set so we can gain some insight into the shape, center, and spread of the data along with whether or not outliers exist.

b. A frequency histogram represents the frequency in a class by bars while in a frequency polygon the frequencies in consecutive classes are connected by a line.

c. A frequency ogive represents a cumulative distribution while the frequency polygon is not a cumulative distribution. Also, in a frequency polygon the lines connect the centers of the classes while in a frequency ogive the lines connect the upper boundaries of the classes.

LO3

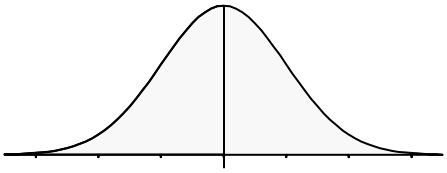
2.14 **a.** To find the frequency for a class you simply count how many of the observations are greater than or equal to the lower boundary and less than the upper boundary.

b. Once you get the frequency for a class the relative frequency is obtained by dividing the class frequency by the total number of observations (data points).

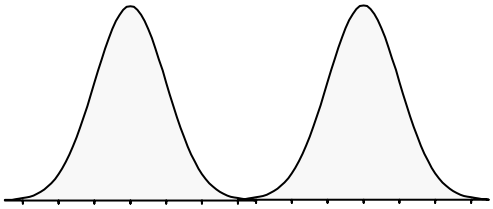
c. Percent frequency for a class is calculated by multiplying the relative frequency by 100.

LO3

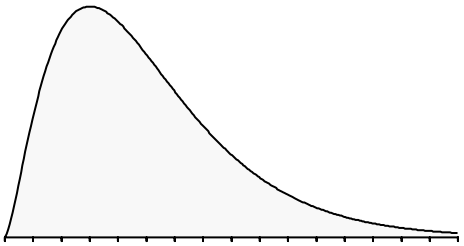
2.15 **a.** One hump in the middle; left side looks like right side.



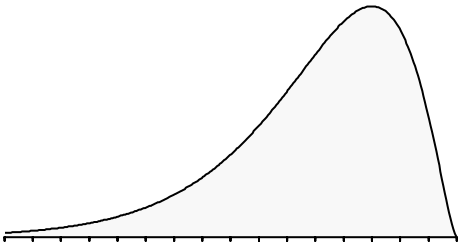
b. Two humps, left side may or may not look like right side.



c. Long tail to the right



d. Long tail to the left



LO3

2.16 **a.** Since there are 28 points you should use 5 classes (from Table 2.5).

b. Class Length (CL) = (47 – 17) / 5 = 6

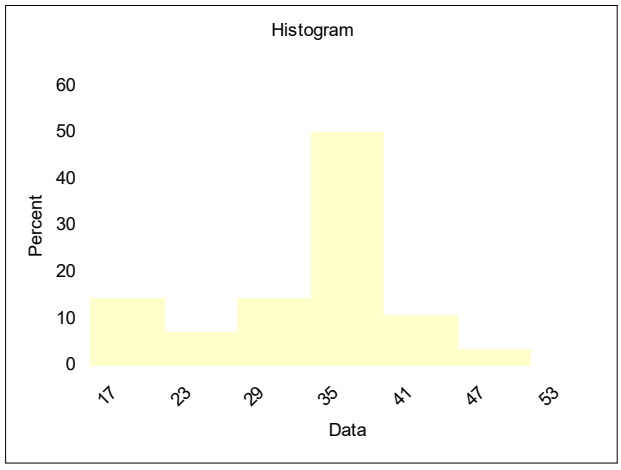
c. $17 \le x < 23$, $23 \le x < 29$, $29 \le x < 35$, $35 \le x < 41$, $41 \le x < 47$, $47 \le x < 53$

d.

Frequency Distribution - Quantitative

Data							cumulative	
lower		upper	midpoint	width	frequency	percent	frequency	percent
17	<	23	20	6	4	14.3	4	14.3
23	<	29	26	6	2	7.1	6	21.4
29	<	35	32	6	4	14.3	10	35.7
35	<	41	38	6	14	50.0	24	85.7
41	<	47	44	6	3	10.7	27	96.4
47	<	53	50	6	1	3.6	28	100.0
					28	100.0		

e.



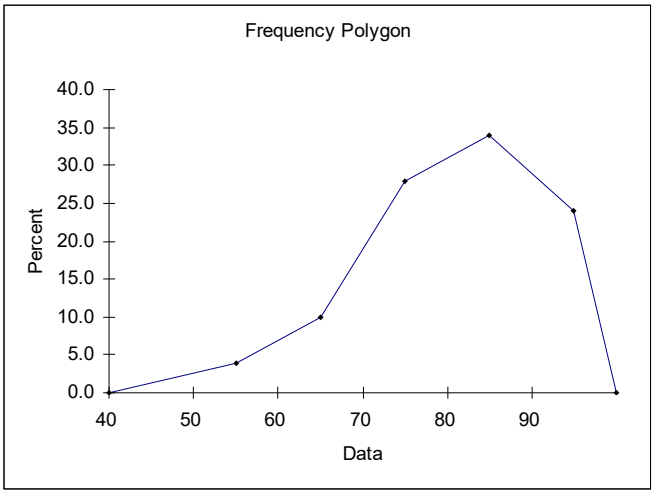
f. See output in answer to d.

LO3

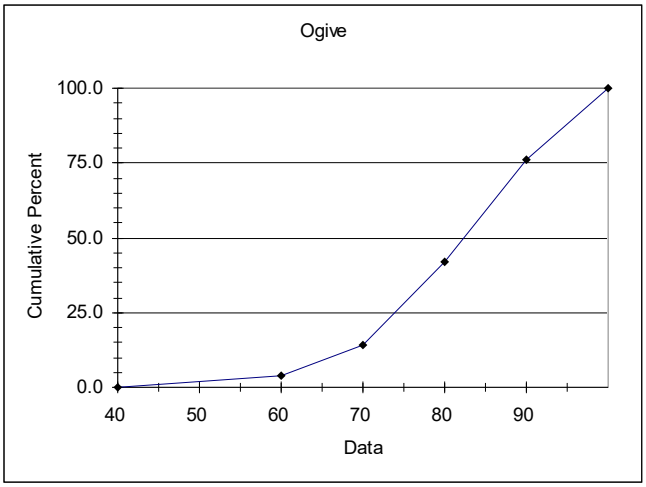
2.17a & b.

Class	Frequency	Cum Frequency	Percent Frequency	Cum % Frequency
50 < 60	2	2	4%	4%
60 < 70	5	7	10%	14%
70 < 80	14	21	28%	42%
80 < 90	17	38	34%	76%
90 < 100	12	50	24%	100%
Total	50	50	100%	

c.



d.



LO3

2.18 a. 6 classes because there are 60 data points (from Table 2.5).

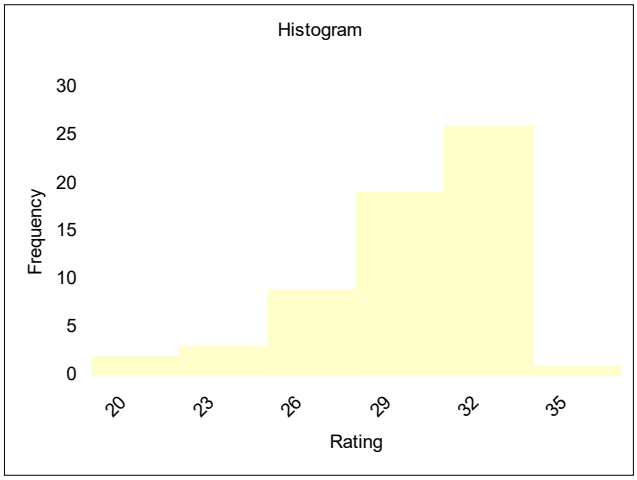
b. Class Length (CL) = (35 – 20) / 6 = 2.5 and we round up to 3.

c. $20 \le x < 23$, $23 \le x < 26$, $26 \le x < 29$, $29 \le x < 32$, $32 \le x < 35$, $35 \le x < 38$

d.

Rating							cumulative	
lower		upper	midpoint	width	frequency	Percent	frequency	percent
20	<	23	21.5	3	2	3.3	2	3.3
23	<	26	24.5	3	3	5.0	5	8.3
26	<	29	27.5	3	9	15.0	14	23.3
29	<	32	30.5	3	19	31.7	33	55.0
32	<	35	33.5	3	26	43.3	59	98.3
35	<	38	36.5	3	1	1.7	60	100.0
					60	100.0		

e. Distribution shape is skewed left.

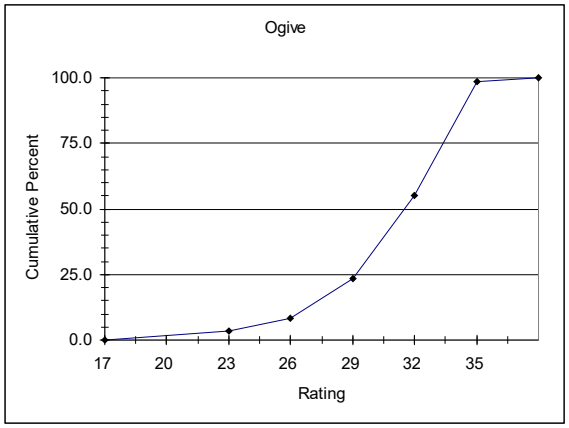


LO3

2.19a & b.

Rating							cumulative	
lower		upper	midpoint	width	frequency	Percent	frequency	percent
20	<	23	21.5	3	2	3.3	2	3.3
23	<	26	24.5	3	3	5.0	5	8.3
26	<	29	27.5	3	9	15.0	14	23.3
29	<	32	30.5	3	19	31.7	33	55.0
32	<	35	33.5	3	26	43.3	59	98.3
35	<	38	36.5	3	1	1.7	60	100.0
					60	100.0		

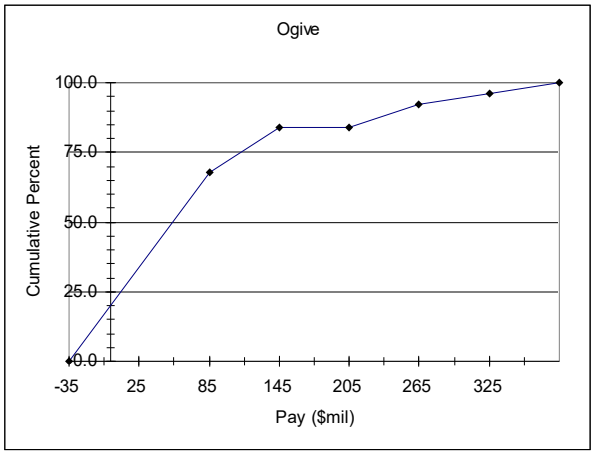
c.



LO3

2.20a & b & c.

Pay ($mil) lower		upper	midpoint	width	frequency	percent	cumulative frequency	cumulative percent
25	<	85	55	60	17	68.0	17	68.0
85	<	145	115	60	4	16.0	21	84.0
145	<	205	175	60	0	0.0	21	84.0
205	<	265	235	60	2	8.0	23	92.0
265	<	325	295	60	1	4.0	24	96.0
325	<	385	355	60	1	4.0	25	100.0
					25	100.0		



LO3

2.21 **a.** Concentrated between 42 and 46.

b. Shape of distribution is slightly skewed left. Ratings have an upper limit but stretch out to the low side.

c. Class 1 2 3 4 5 6 7 8
$34 < x \leq 36$, $36 < x \leq 38$, $38 < x \leq 40$, $40 < x \leq 42$, $42 < x \leq 44$, $44 < x \leq 46$, $46 < x \leq 48$, more

d.

Class	1	2	3	4	5	6	7	8
Cum Freq	1	4	13	25	45	61	65	65

LO3

2.22 **a.** Concentrated between 3.5 and 5.5.

b. Shape of distribution is slightly skewed right. Waiting time has a lower limit of 0 and stretch out to the high side where there are a few people who have to wait longer.

c. The class length is 1.

d.

Class	Cum Frequency
-0.5< 0 .5	1
0.5< 1.5	5
1.5< 2.5	12
2.5< 3.5	20
3.5< 4.5	37
4.5< 5.5	53
5.5< 6.5	67
6.5< 7.5	79
7.5< 8.5	87
8.5< 9.5	93
9.5<10.5	97
10.5<11.5	99
11.5<12.5	100

LO3

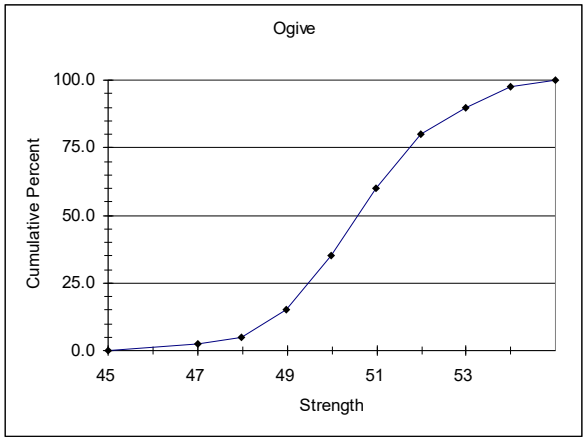
2.23 **a.** Concentrated between 49 and 52.

b. Shape of distribution is symmetric and bell shaped.

c. Class length is 1.

d.

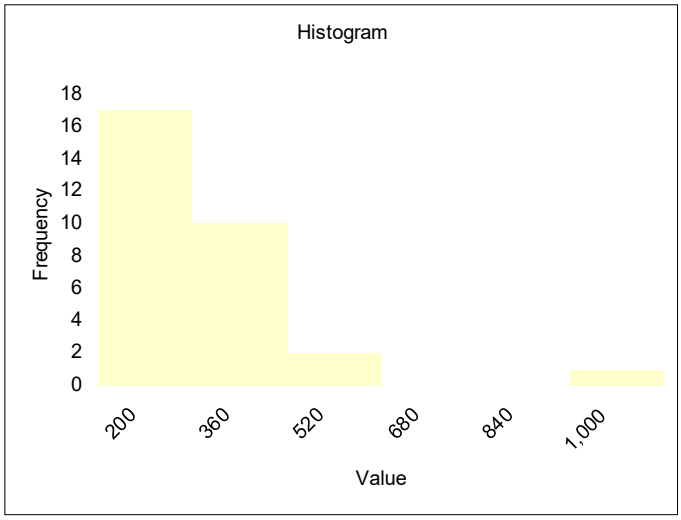
Class:	46<47	47<48	48<49	49<50	50<51	51<52	52<53	53<54	54<55
Cum Freq.	2.5%	5.0%	15.0%	35.0%	60.0%	80.0%	90.0%	97.5%	100.0%



LO3

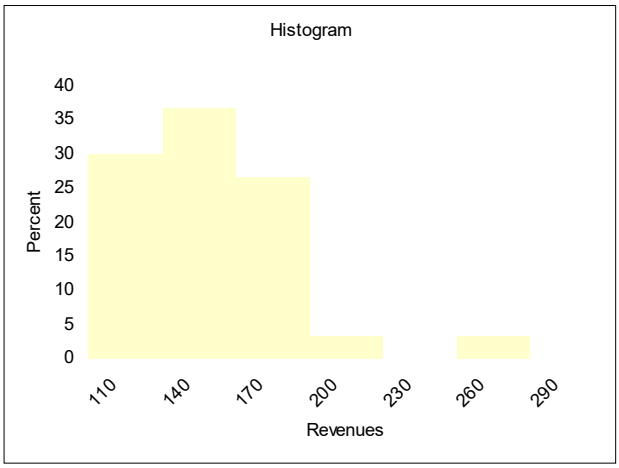
2.24 a. Distribution is skewed right and has a distinct outlier, The NY Yankees.

Value							cumulative	
lower		upper	midpoint	width	frequency	percent	frequency	percent
200	<	360	280	160	17	56.7	17	56.7
360	<	520	440	160	10	33.3	27	90.0
520	<	680	600	160	2	6.7	29	96.7
680	<	840	760	160	0	0.0	29	96.7
840	<	1,000	920	160	0	0.0	29	96.7
1,000	<	1,160	1,080	160	1	3.3	30	100.0
					30	100.0		

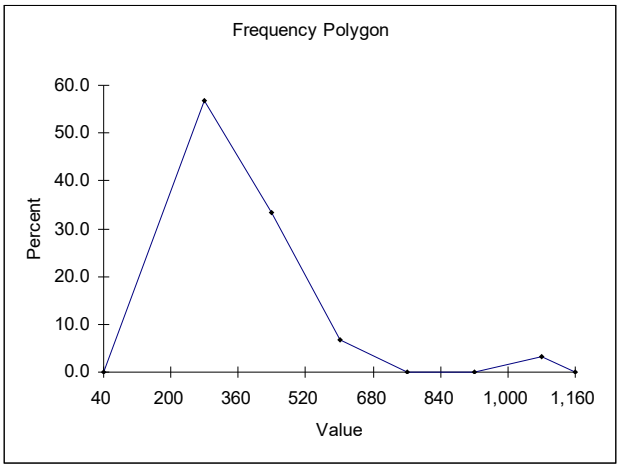


b. Distribution is skewed right.

Revenues							cumulative	
lower		upper	midpoint	width	frequency	percent	frequency	percent
110	<	140	125	30	9	30.0	9	30.0
140	<	170	155	30	11	36.7	20	66.7
170	<	200	185	30	8	26.7	28	93.3
200	<	230	215	30	1	3.3	29	96.7
230	<	260	245	30	0	0.0	29	96.7
260	<	290	275	30	1	3.3	30	100.0
					30	100.0		


Histogram
Percent
40
35
30
25
20
15
10
5
0
110
140
170
200
230
260
290
Revenues

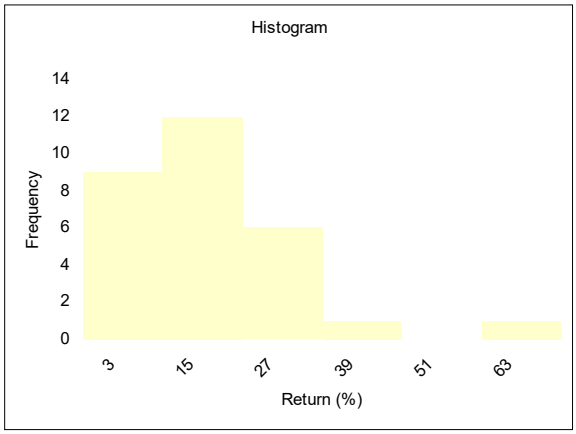
c.


Frequency Polygon
Percent
60.0
50.0
40.0
30.0
20.0
10.0
0.0
40
200
360
520
680
840
1,000
1,160
Value

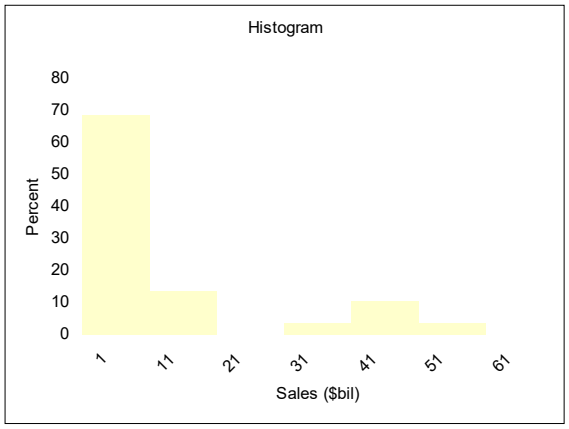
LO3

2.25 a. Distribution is skewed right.

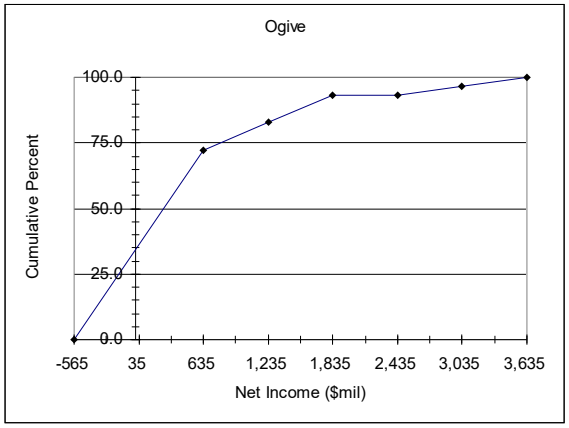
Return (%) lower		upper	midpoint	width	frequency	percent	cumulative frequency	cumulative percent
3	<	15	9	12	9	31.0	9	31.0
15	<	27	21	12	12	41.4	21	72.4
27	<	39	33	12	6	20.7	27	93.1
39	<	51	45	12	1	3.4	28	96.6
51	<	63	57	12	0	0.0	28	96.6
63	<	75	69	12	1	3.4	29	100.0
					29	100.0		



b. Distribution is skewed right or perhaps two humped.



c.



LO3

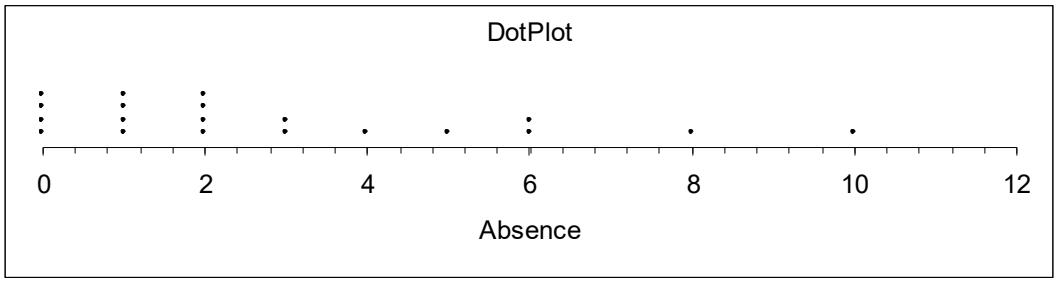
2.26 The horizontal axis spans the range of measurements and the dots represent the measurements.

LO4

2.27 With 1000 measurements it would be not be practical to use a dot plot because of the number of dots.

LO3, LO4

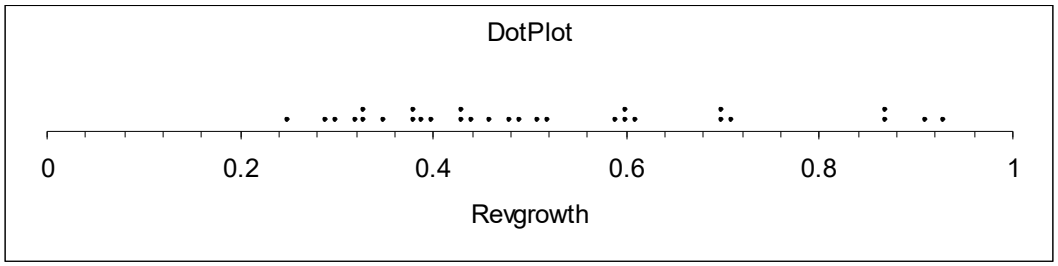
2.28



Distribution is concentrated between 0 and 2 and is skewed to the right. 10 and 8 are probably high outliers.

LO4

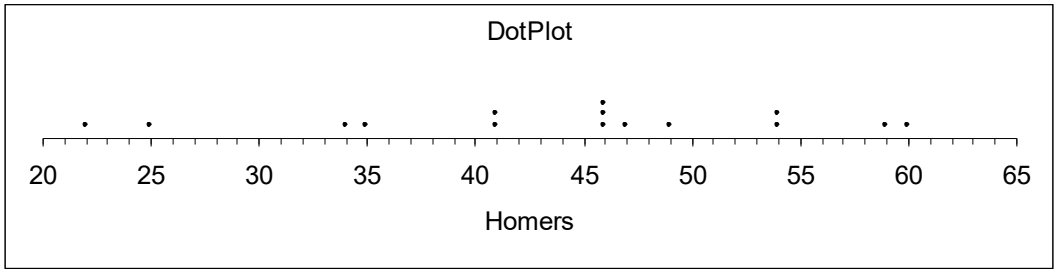
2.29



High outliers greater than 80%. Eliminating the high outliers the distribution is reasonably symmetric.

LO4

2.30



Low outliers 22 and 25. Without outliers distribution is reasonably symmetric.

LO4

2.31 A stem & leaf enables one to see the shape of the distribution and still see all the measurements where in a histogram you cannot see the values of the individual measurements.

LO3, LO5

2.32 **--**Displays all the individual measurements.
--Puts data in numerical order
--Simple to construct

LO5

2.33 With a large data set (eg 1000 measurements) it does not make sense to do a stem & leaf because it is impractical to write out 1000 leafs.

LO3, LO5

2.34

Stem Unit = 10, Leaf Unit = 1

Frequency	Stem	Leaf
1	*2*	8
4	3	0 2 3 6
5	4	2 2 3 4 9
5	5	1 3 5 6 9
2	6	3 5
1	7	0
1	8	3
1	9	1
20		

LO5

2.35

Stem Unit = 1, Leaf Unit = .1

Frequency	Stem	Leaf
2	*10*	4 4
0	11	
1	12	6
3	13	2 8 9
4	14	0 1 4 9
4	15	2 2 8 9
4	16	1 1 4 8
0	17	
0	18	
0	19	
0	20	
0	21	
1	22	2
0	23	
0	24	
1	25	2
20		

LO5

2.36 Rounding each measurement to the nearest hundred yields the following stem & leaf

Stem unit = 1000, Leaf Unit = 100

Frequency	Stem	Leaf
5	*1*	2 4 4 5 7
5	2	0 4 7 7 8
4	3	3 3 5 7
2	4	2 6
1	5	4
2	6	0 8
1	7	9
20		

LO5

2.37 a. Distribution is skewed to the right with high outliers.

b. 25, 29, 30, 32, 33, 33, 35, 38, 38, 39, 40, 43, 43, 44, 46, 48, 49, 51, 52, 59, 60, 60, 61, 70, 70, 71, 87, 87, 91, 93.

LO5

2.38 a. Distribution is symmetric

b. 46.8, 47.5, 48.2, 48.3, 48.5, 48.8, 49.0, 49.2, 49.3, 49.4

LO5

2.39

Roger Maris		Babe Ruth
8	0	
4 3	1	
6	1	
3	2	2
8 6	2	5
3	3	4
9	3	5
	4	1 1
	4	6 6 6 7 9
	5	4 4
	5	9
1	6	0

The 61 home runs hit by Maris would be considered an outlier, although an exceptional individual achievement.

LO5

2.40 a.

stem unit = 1
leaf unit = 0.1

Descriptive statistics

Frequency	Stem	Leaf
7	2	4 6 7 8 9 9 9
7	3	1 3 4 4 5 7 7
17	4	0 0 1 1 3 3 3 4 4 4 5 5 5 7 8 9 9
3	5	0 1 4
7	6	1 1 1 1 3 3 3
8	7	1 3 3 4 4 5 8 9
0	8	
1	9	1
1	10	6
51		

b. Mississippi & Louisiana are high outliers. Explanations will vary.

LO5

2.41 a.

Stem and Leaf plot for Ratings
stem unit = 1
leaf unit = 0.1

Descriptive statistics

Frequency	Stem	Leaf
1	*36*	0
0	37	
3	38	0 0 0
4	39	0 0 0 0
5	40	0 0 0 0 0
6	41	0 0 0 0 0 0
6	42	0 0 0 0 0 0
8	43	0 0 0 0 0 0 0 0
12	44	0 0 0 0 0 0 0 0 0 0 0 0
9	45	0 0 0 0 0 0 0 0 0
7	46	0 0 0 0 0 0 0
3	47	0 0 0
1	48	0
65		

b. Distribution is slightly skewed to the left.

c. Since 19 of the ratings are below 42 it would not be accurate to say that almost all purchasers are very satisfied.

LO5

2.42 Cross tabulation tables are used to study association between categorical variables.

LO6

2.43 Each cell is filled with the number of observations that have the specific values of the categorical variables associated with that cell.

LO6

2.44 Row percentages are calculated by dividing the cell frequency by the total frequency for that particular row. Column percentages are calculated by dividing the cell frequency by the total frequency for that particular column. Row percentages show the distribution of the column categorical variable for a given value of the row categorical variable. Column percentages show the distribution of the row categorical variable for a given value of the column categorical variable.

LO6

2.45

Crosstabulation

			Purchased?		
			No	Yes	Total
Preference	Koka	Observed	**14**	**2**	16
		% of row	87.5%	12.5%	100.0%
		% of column	66.7%	10.5%	40.0%
		% of total	35.0%	5.0%	40.0%
	Rola	Observed	**7**	**17**	24
		% of row	29.2%	70.8%	100.0%
		% of column	33.3%	89.5%	60.0%
		% of total	17.5%	42.5%	60.0%
	Total	Observed	21	19	40
		% of row	52.5%	47.5%	100.0%
		% of column	100.0%	100.0%	100.0%
		% of total	52.5%	47.5%	100.0%

a. 17 **b.** 14

c. If you have purchased Rola previously you are more likely to prefer Rola. If you have not purchased Rola previously you are more likely to prefer Koka.

LO6

2.46

Crosstabulation

			Preference			
			Very Sweet	Sweet	Not So Sweet	Total
Preference	Koka	Observed	**6**	**4**	**6**	16
		% of row	37.5%	25.0%	37.5%	100.0%
		% of column	42.9%	30.8%	46.2%	40.0%
		% of total	15.0%	10.0%	15.0%	40.0%
	Rola	Observed	**8**	**9**	**7**	24
		% of row	33.3%	37.5%	29.2%	100.0%
		% of column	57.1%	69.2%	53.8%	60.0%
		% of total	20.0%	22.5%	17.5%	60.0%
	Total	Observed	14	13	13	40
		% of row	35.0%	32.5%	32.5%	100.0%
		% of column	100.0%	100.0%	100.0%	100.0%
		% of total	35.0%	32.5%	32.5%	100.0%

a. 17 **b.** 6
c. No relationship.

LO6

2.47

			Consumption			
			0 to 5	6 to 10	More Than 10	Total
Preference	Koka	Observed	**12**	**3**	**1**	16
		% of row	75.0%	18.8%	6.3%	100.0%
		% of column	60.0%	17.6%	33.3%	40.0%
		% of total	30.0%	7.5%	2.5%	40.0%
	Rola	Observed	**8**	**14**	**2**	24
		% of row	33.3%	58.3%	8.3%	100.0%
		% of column	40.0%	82.4%	66.7%	60.0%
		% of total	20.0%	35.0%	5.0%	60.0%
	Total	Observed	20	17	3	40
		% of row	50.0%	42.5%	7.5%	100.0%
		% of column	100.0%	100.0%	100.0%	100.0%
		% of total	50.0%	42.5%	7.5%	100.0%

a. 22 **b.** 4
c. People who drink more cola are more likely to prefer Rola.

LO6

2.48 **a.** 16%, 56%
b. Row Percentage Table

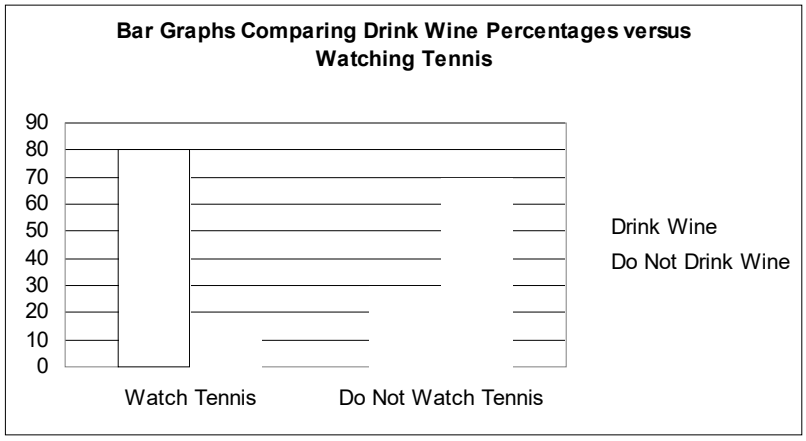
	Watch Tennis	Do Not Watch Tennis	Total
Drink Wine	40%	60%	100%
Do Not Drink Wine	6.7%	93.3%	100%

c. Column Percentage Table

	Watch Tennis	Do Not Watch Tennis
Drink Wine	80%	30%
Do Not Drink Wine	20%	70%
Total	100%	100%

d. People who watch tennis are more likely to drink wine.

e.



LO1, LO6

2.49

a.

	TV Violence Inc.	TV Violence No Inc.	Total
TV Quality Worse	**362**	**92**	**454**
TV Quality Not Worse	**359**	**187**	**546**
Total	**721**	**279**	**1000**

b.

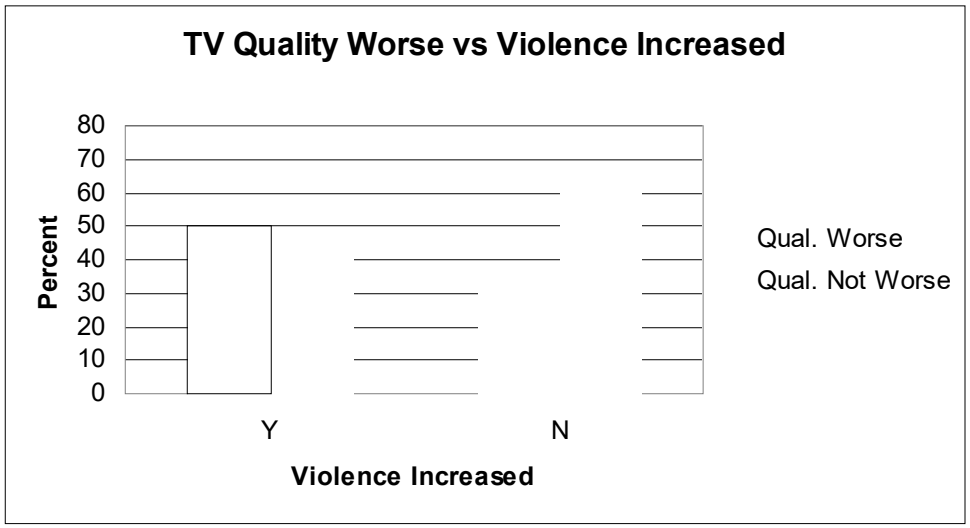
	TV Violence Inc.	TV Violence No Inc.	Total
TV Quality Worse	**79.7%**	**20.3%**	**100%**
TV Quality Not Worse	**65.8%**	**34.2%**	**100%**

c.

	TV Violence Inc.	TV Violence No Inc.
TV Quality Worse	**50.2%**	**33.0%**
TV Quality Not Worse	**49.8%**	**67.0%**
Total	**100%**	**100%**

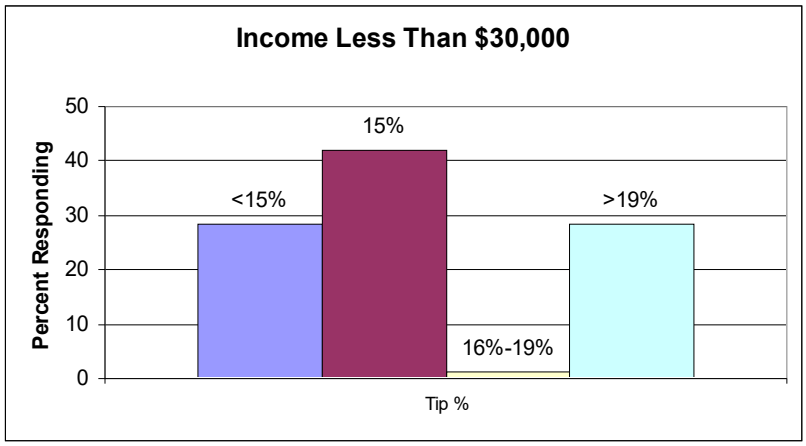
d. Those people who think TV violence has increased are more likely to think TV quality has gotten worse.

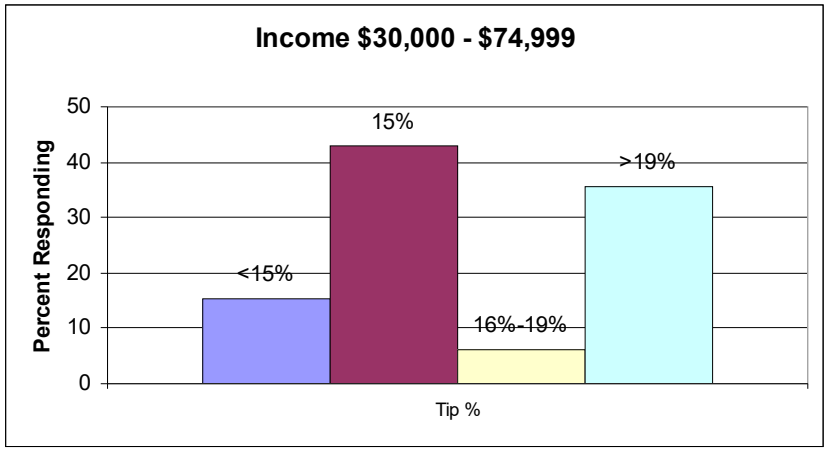
e.

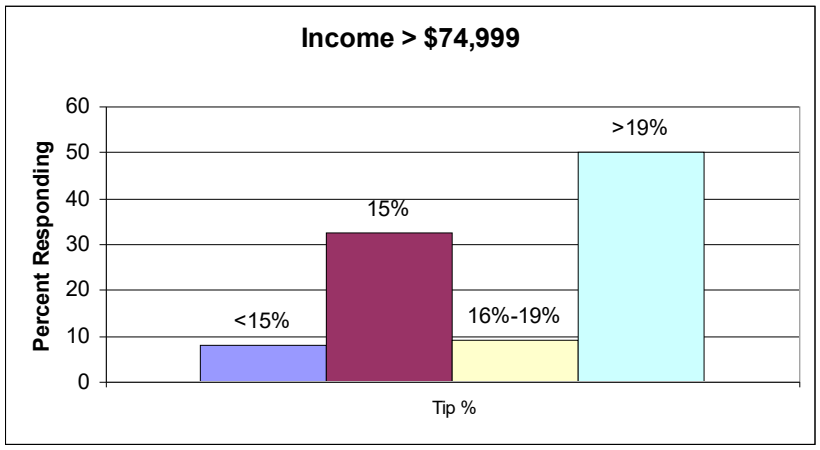

TV Quality Worse vs Violence Increased
Percent
80
70
60
50
40
30
20
10
0
Y
N
Violence Increased
Qual. Worse
Qual. Not Worse

LO1, LO6

2.50 a.


Income Less Than $30,000
Percent Responding
50
40
30
20
10
0
<15%
15%
16%-19%
>19%
Tip %

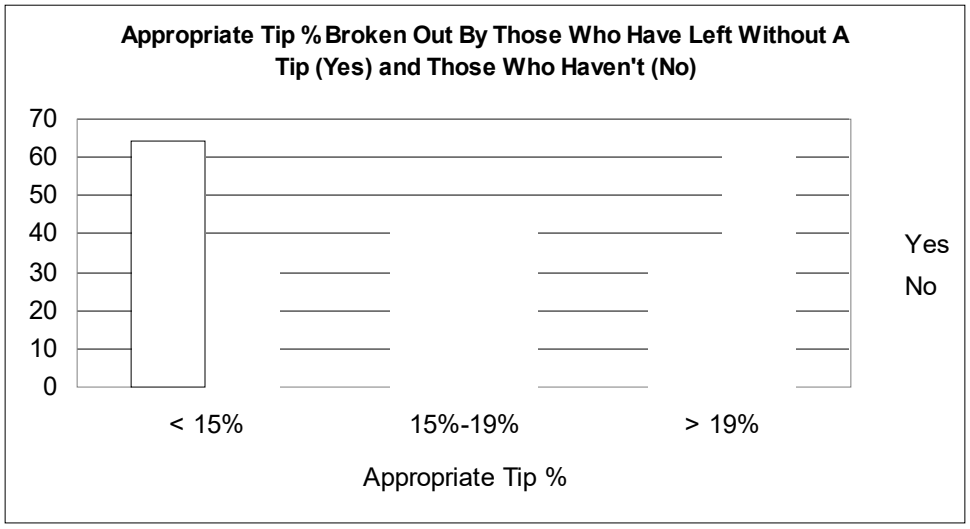

Income $30,000 - $74,999
Percent Responding
50
40
30
20
10
0
<15%
15%
16%-19%
>19%
Tip %



b. As income rises the percent of people seeing larger tips as appropriate also rises.

LO1, LO6

2.51 a.



b. People who have left at least once without leaving a tip are more likely to think a smaller tip is appropriate.

LO1, LO6

2.52 A scatterplot is used to look at the relationship between two quantitative variables.

LO7

2.53 Data are scattered around a straight line with positive slope.

LO7

2.54 Data are scattered around a straight line with negative slope.

LO7

2.55 Data are scattered on the plot with the best line to draw through the data being horizontal.

LO7

2.56 Scatter plot: each value of y is plotted against its corresponding value of x.
Runs plot: a graph of individual process measurements versus time

LO7

2.57 As home size increases, sales price increases in a linear fashion. A fairly strong relationship

LO7

2.58 As temperature increases, fuel consumption decreases in a linear fashion. A strong relationship.

LO7

2.59 Cable rates decreased in the early 1990's in an attempt to compete with the newly emerging satellite business. As the satellite business was increasing its rates from 1995 to 2005, cable was able to do the same.

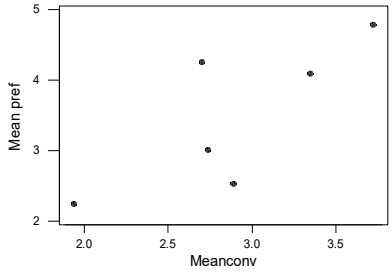
LO7

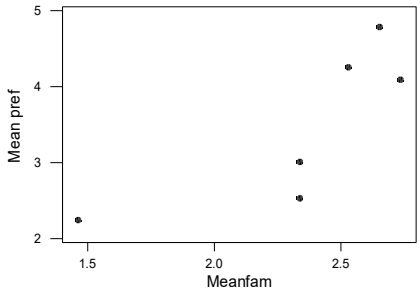
2.60 Clearly there is a positive linear relationship here. As a brand gets more sales, retailers want to give more shelf space. Also as shelf space increases sales will tend to increase. Its difficult to determine cause and effect here.

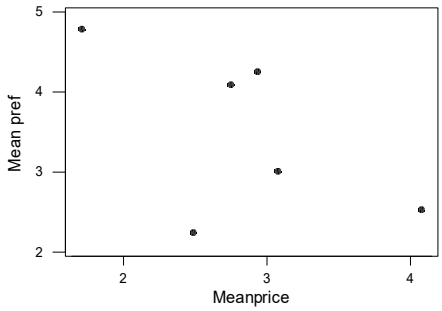
LO7

2.61 The scatterplot shows that the average rating for taste is related to the average rating for preference in a positive linear fashion. This relationship is fairly strong.

The scatterplots below show that average convenience, familiarity, and price are all related in a linear fashion to average preference in a positive, positive, and negative fashion (respectively). These relationships are not as strong as the one between taste and preference.







LO7

2.62 The differences in the heights of the bars are more pronounced.

LO8

2.63 Examples and reports will vary.

LO8

2.64 The administration's plot indicates a steep increase over the four years while the union organizer's plot shows a gradual increase.

LO8

2.65 **a.** No, very slight (if any).

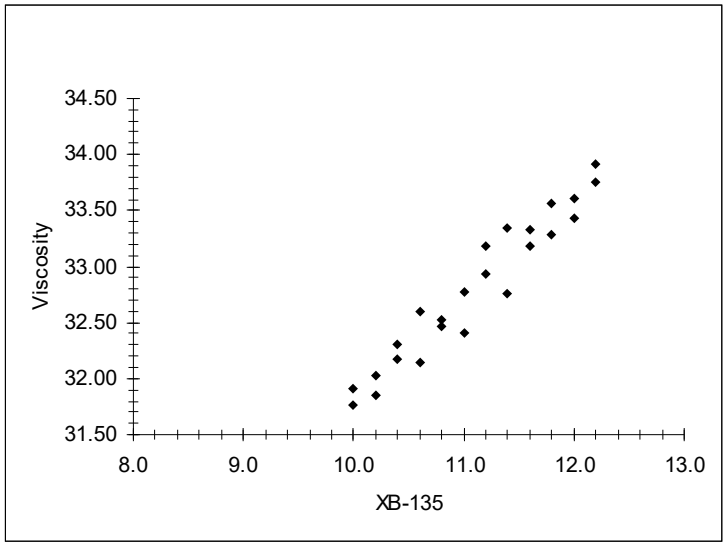
b. Yes, strong trend.

c. The line graph is more appropriate.

d. Probably not

LO8

2.66 a.



b. Strong positive linear relationship

c. If you have the underlying chemistry knowledge as to why this is a cause & effect situation.

LO7

2.67 Large portion of manufacturers are rated 3.

Mfg Rating	*frequency*
1	0
2	9
3	20
4	7
5	1
	37

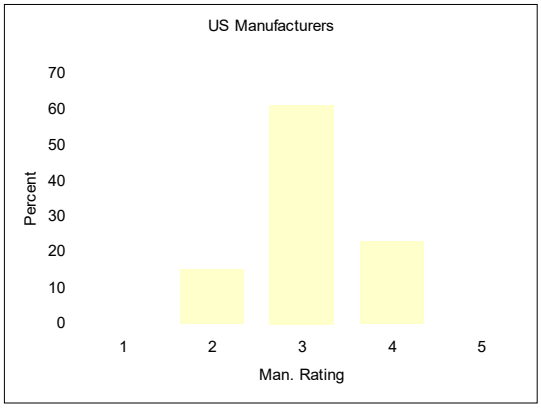
LO1

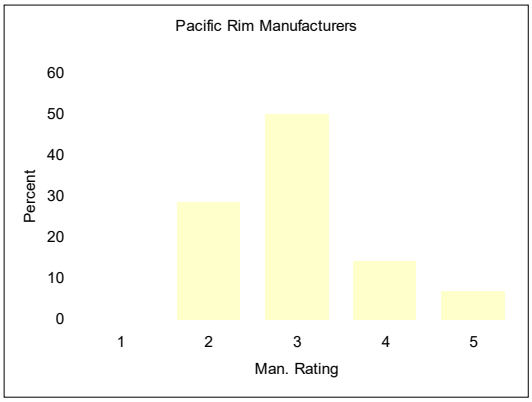
2.68 More spread out than manufacturing distribution. Categories 2 & 3 cover large portion of companies.

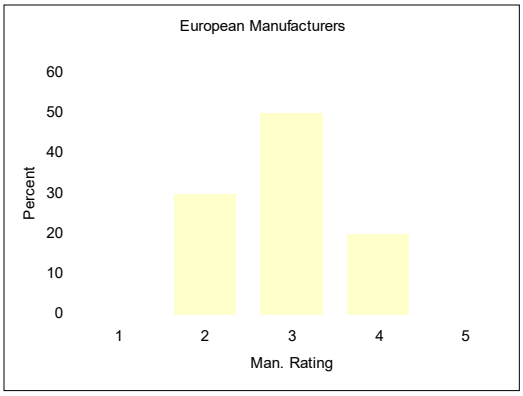
Design Quality	*frequency*	*percent*
1	0	0.0
2	11	29.7
3	19	51.4
4	6	16.2
5	1	2.7
	37	100.0

LO1

2.69 Written analysis will vary.

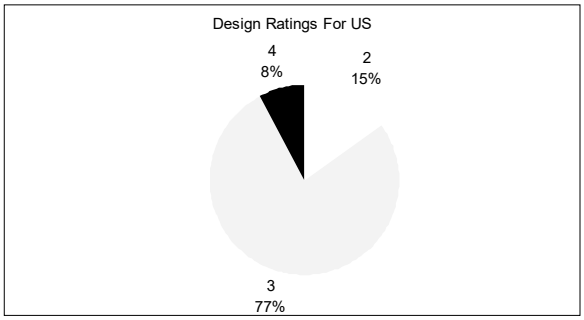


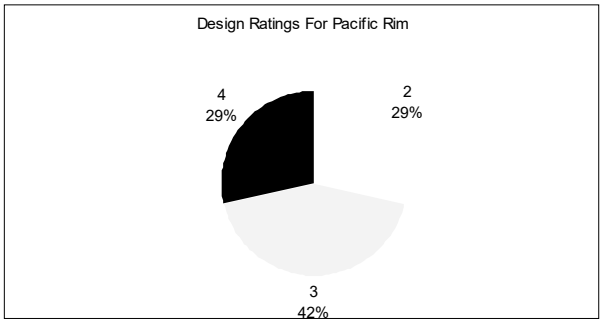


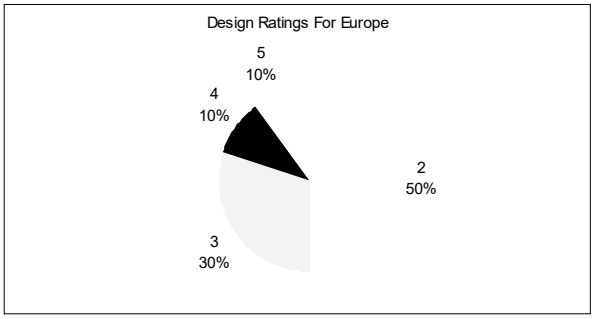


LO1

2.70 Written analysis will vary







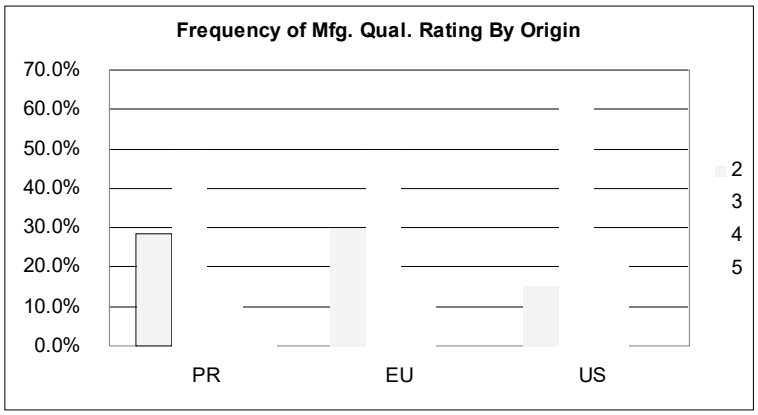
LO1

2.71 No apparent relationship

			Man. Qual				
			2	3	4	5	Total
Origin	PR	Observed	**4**	**7**	**2**	**1**	14
		% of row	28.6%	50.0%	14.3%	7.1%	100.0%
	EU	Observed	**3**	**5**	**2**		10
		% of row	30.0%	50.0%	20.0%	0.0%	100.0%
	US	Observed	**2**	**8**	**3**		13
		% of row	15.4%	61.5%	23.1%	0.0%	100.0%
	Total	Observed	9	20	7	1	37
		% of row	24.3%	54.1%	18.9%	2.7%	100.0%

LO6

2.72 Written reports will vary. See 2.71 for row percentages.



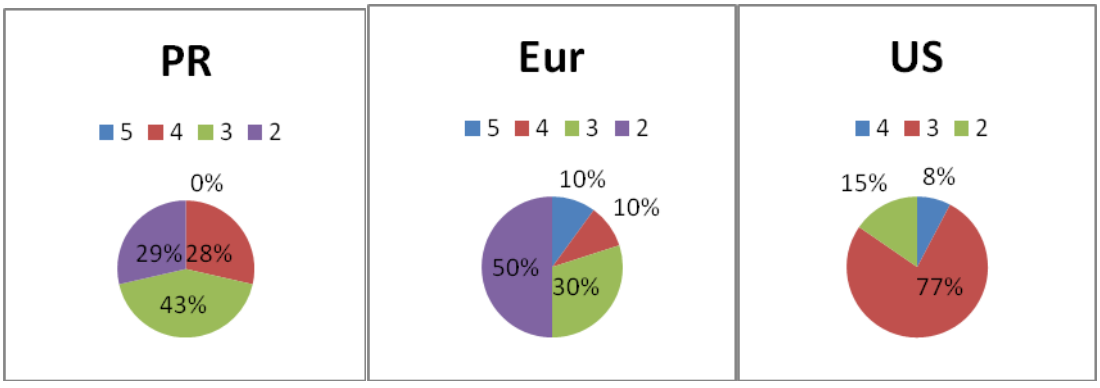
LO6

2.73 No apparent relationship

			Des. Qual				
			2	3	4	5	Total
Origin	PR	Observed	**4**	**6**	**4**		14
		% of row	28.6%	42.9%	28.6%	0.0%	100.0%
	EU	Observed	**5**	**3**	**1**	**1**	10
		% of row	50.0%	30.0%	10.0%	10.0%	100.0%
	US	Observed	**2**	**10**	**1**		13
		% of row	15.4%	76.9%	7.7%	0.0%	100.0%
	Total	Observed	11	19	6	1	37
		% of row	29.7%	51.4%	16.2%	2.7%	100.0%

LO6

2.74 Written reports will vary. See 2.72 for row percentages



LO6

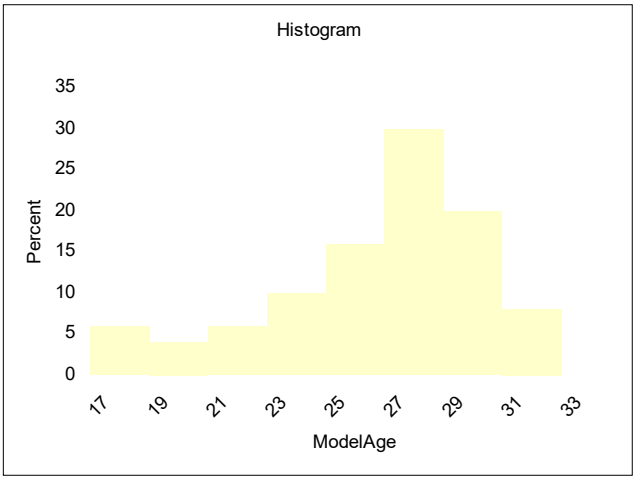
2.75 a. Since there are 50 data points you should use 6 classes.

b.

Frequency Distribution - Quantitative

ModelAge							*cumulative*	
lower		*upper*	*midpoint*	*width*	*frequency*	*percent*	*frequency*	*percent*
17	<	19	18	2	3	6.0	3	6.0
19	<	21	20	2	2	4.0	5	10.0
21	<	23	22	2	3	6.0	8	16.0
23	<	25	24	2	5	10.0	13	26.0
25	<	27	26	2	8	16.0	21	42.0
27	<	29	28	2	15	30.0	36	72.0
29	<	31	30	2	10	20.0	46	92.0
31	<	33	32	2	4	8.0	50	100.0
					50	100.0		

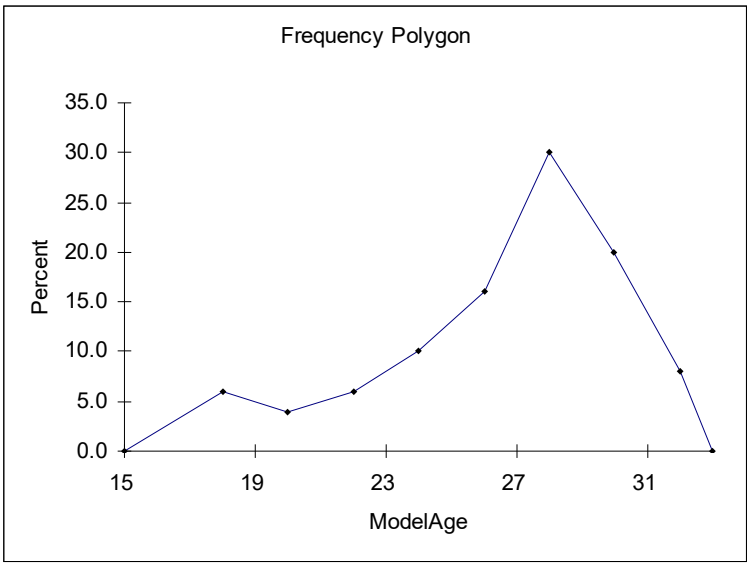
c.



d. This distribution is skewed to the left.

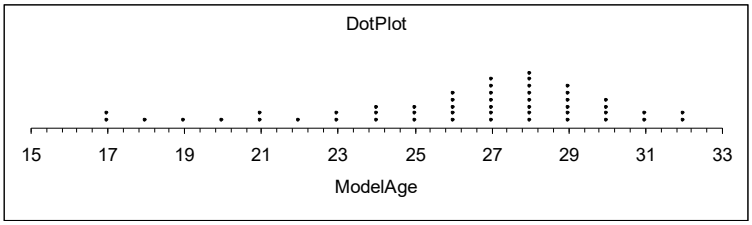
LO3

2.76



LO3

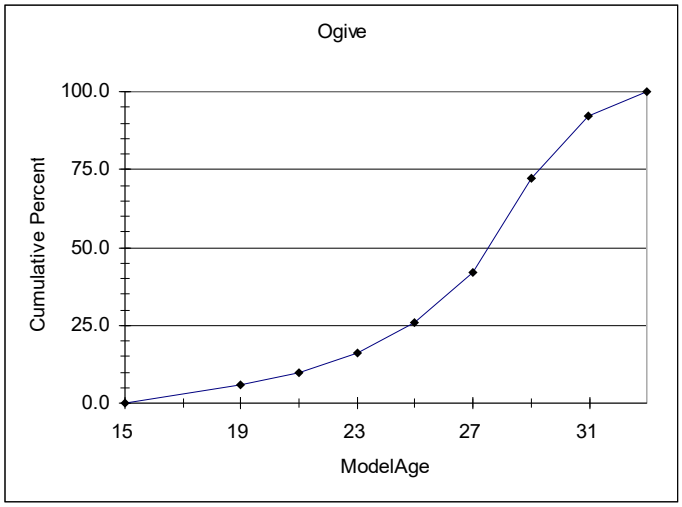
2.77 26% of the perceived ages are below 25. Much too high.



LO4

2.78a & b & c. See table in 2.75

d.



e. 36 out of 50 = 72%

f. 8 out of 50 = 16%

LO3

2.79

Stem and Leaf plot for Growth
stem unit = 1
leaf unit = 0.1

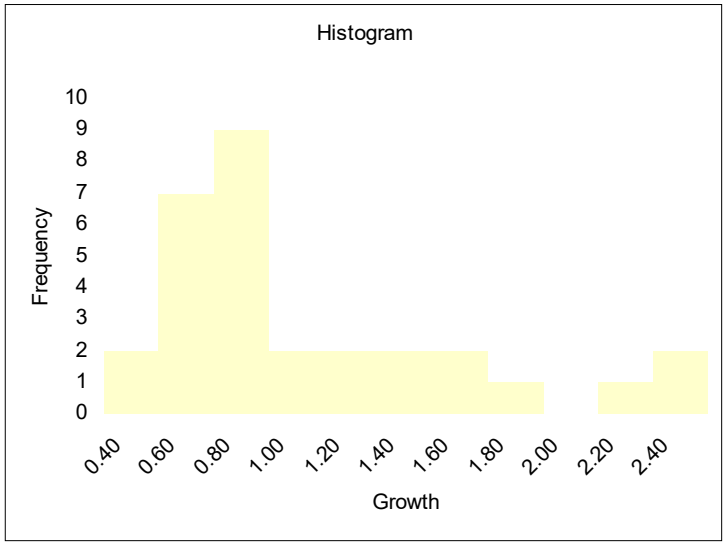
Frequency	Stem	Leaf
2	2	5 9
8	3	0 2 3 3 5 8 8 9
7	4	0 3 3 4 6 8 9
3	5	1 2 9
3	6	0 0 1
3	7	0 0 1
2	8	7 7
2	9	1 3
30		

LO5

2.80

Frequency Distribution - Quantitative

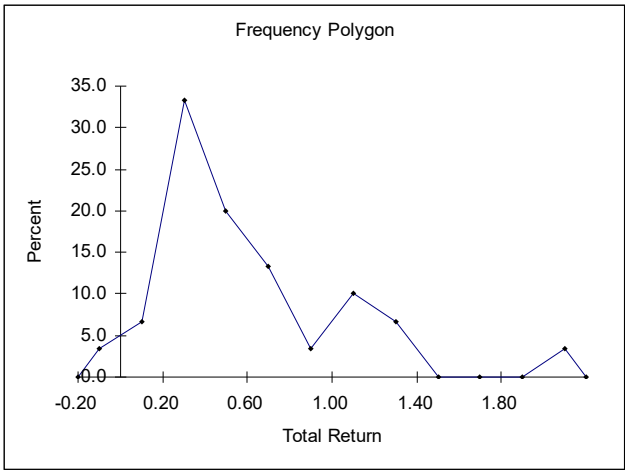
Growth							cumulative	
lower		upper	midpoint	width	frequency	percent	frequency	percent
0.40	<	0.60	0.50	0.20	2	6.7	2	6.7
0.60	<	0.80	0.70	0.20	7	23.3	9	30.0
0.80	<	1.00	0.90	0.20	9	30.0	18	60.0
1.00	<	1.20	1.10	0.20	2	6.7	20	66.7
1.20	<	1.40	1.30	0.20	2	6.7	22	73.3
1.40	<	1.60	1.50	0.20	2	6.7	24	80.0
1.60	<	1.80	1.70	0.20	2	6.7	26	86.7
1.80	<	2.00	1.90	0.20	1	3.3	27	90.0
2.00	<	2.20	2.10	0.20	0	0.0	27	90.0
2.20	<	2.40	2.30	0.20	1	3.3	28	93.3
2.40	<	2.60	2.50	0.20	2	6.7	30	100.0
					30	100.0		



Distribution is skewed right.

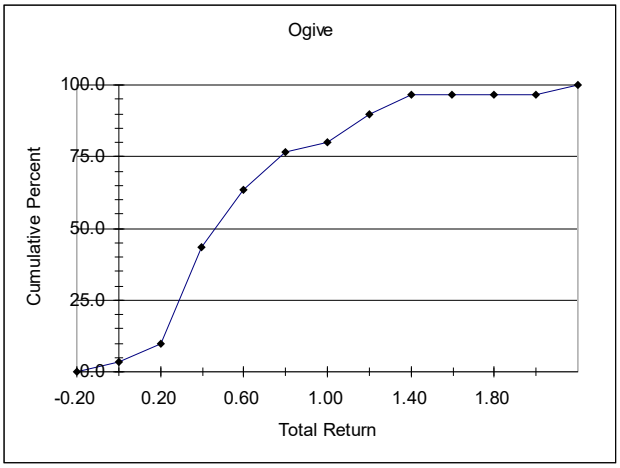
LO3

2.81 Distribution is skewed to the right



LO3

2.82 For the distributions see table in 2.80

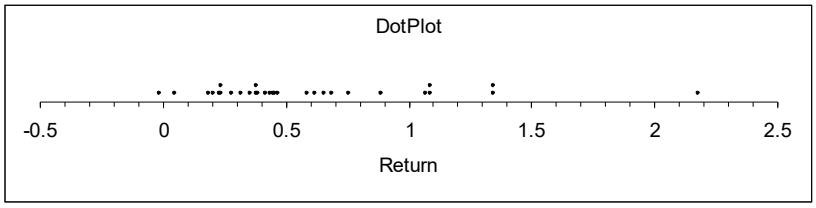


LO3

2.83 Distribution has one high outlier and with or without the outlier is skewed right.

LO4

2.84 Distribution has one high outlier and with or without the outlier is skewed right.



LO4

2.85 **a.**

Class	Factor	Height
\$50K to 100K	$\frac{100-50}{10-0}=\frac{50}{10}=5$	$\left(\frac{1}{5}\right)(60)=12$
\$100K to 150K	$\frac{150-100}{10-0}=\frac{50}{10}=5$	$\left(\frac{1}{5}\right)(24)=4\frac{4}{5}$
\$150K to 200K	$\frac{200-150}{10-0}=\frac{50}{10}=5$	$\left(\frac{1}{5}\right)(19)=3\frac{4}{5}$
\$200K to 250K	$\frac{250-200}{10-0}=\frac{50}{10}=5$	$\left(\frac{1}{5}\right)(22)=4\frac{2}{5}$
\$250K to 500K	$\frac{500-250}{10-0}=\frac{250}{10}=25$	$\left(\frac{1}{25}\right)(21)=\frac{21}{25}$

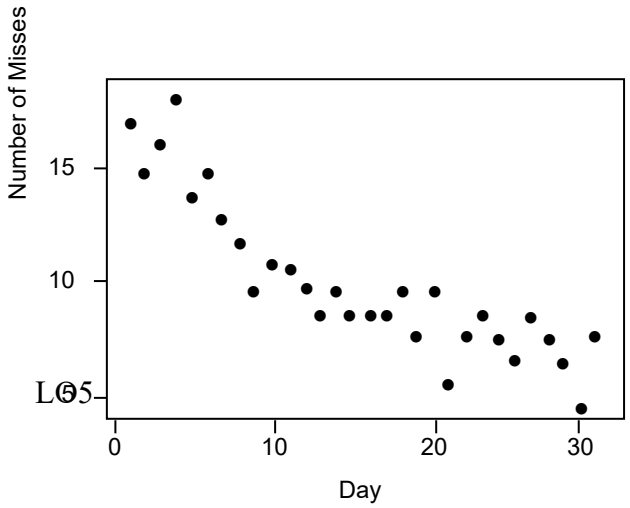
b, c. Student should sketch the histogram.

LO3

2.86 Since the runs plot is not in control, the stem & leaf is not representative of the number of missed shots.

```
Stem-and-leaf of Shots Missed    N = 30
Leaf Unit = 0.10

    1     5 0
    2     6 0
    4     7 00
    9     8 00000
   15     9 000000
   15    10 00000
   10    11 00
    8    12 0
    7    13 0
    6    14 0
    5    15 00
    3    16 0
    2    17 0
    1    18 0
```



2.87 The graph indicates that Chevy trucks far exceed Ford and Dodge in terms of resale value, but the y-axis scale is misleading.

LO8

2.88 **a.** Stock funds: $60,000; bond funds: $30,000; govt. securities: $10,000

b. Stock funds: $78,000 (63.36%); bond funds: $34,500 (28.03%); govt. securities: $10,600 (8.61%)

c. Stock funds: $73,860; bond funds: $36,930; govt. securities: $12,310

LO1

Internet Exercises

2.89 Answers will vary depending on which poll(s) the student refers to.

LO1 – LO8