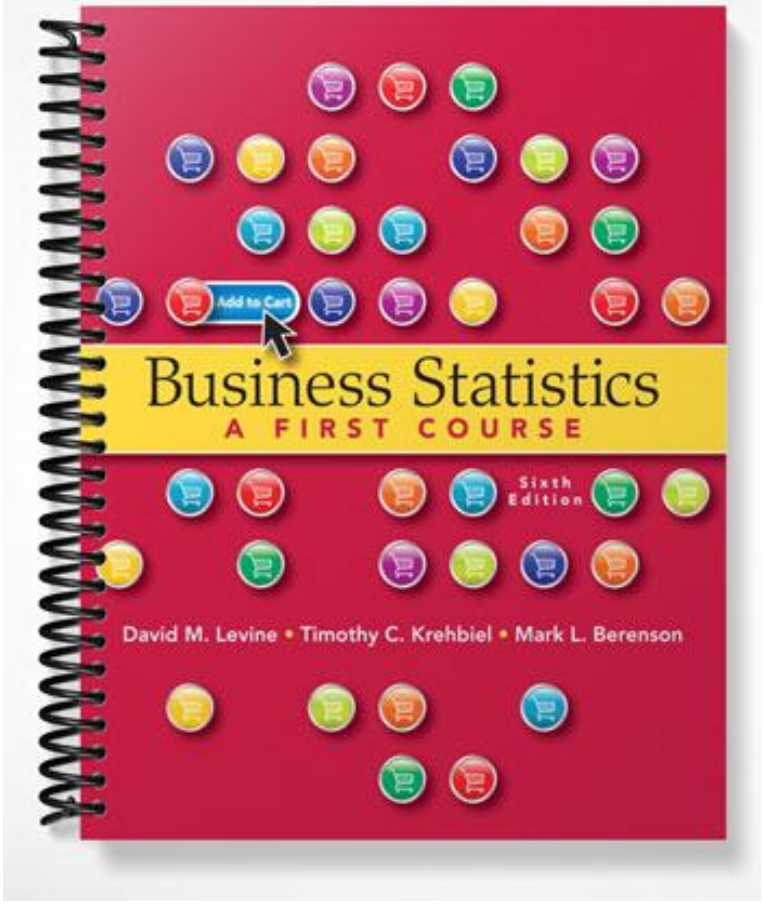
SOLUTIONS MANUAL



CHAPTER 2

2.1 The answer depends on the chosen data set.

2.2 The answer depends on the specific story.

2.3 The supermarket chain should use primary data collected through an observation study of the shopping behavior of their customers.

2.4 The information presented there is based on surveys.

2.5 (a)

Category	Frequency	Percentage
A	13	26%
B	28	56
C	9	18

(b) Category "B" is the majority.

2.6 (a) Table frequencies for all student responses

	Student Major Categories			
Gender	A	C	M	Totals
Male	14	9	2	25
Female	6	6	3	15
Totals	20	15	5	40

(b) Table percentages based on overall student responses

	Student Major Categories			
Gender	A	C	M	Totals
Male	35.0%	22.5%	5.0%	62.5%
Female	15.0%	15.0%	7.5%	37.5%
Totals	50.0%	37.5%	12.5%	100.0%

Table based on row percentages

	Student Major Categories			
Gender	A	C	M	Totals
Male	56.0%	36.0%	8.0%	100.0%
Female	40.0%	40.0%	20.0%	100.0%
Totals	50.0%	37.5%	12.5%	100.0%

Table based on column percentages

	Student Major Categories			
Gender	A	C	M	Totals
Male	70.0%	60.0%	40.0%	62.5%
Female	30.0%	40.0%	60.0%	37.5%
Totals	100.0%	100.0%	100.0%	100.0%

2.7 (a)

Category	**Frequency**	**Percentage**
Flammables/Irritants	8,350	59.26%
Knives and blades	4,134	29.34%
Prohibited tools	753	5.34%
Sharp objects	497	3.53%
Other	357	2.53%
Total	14,091	100.00%

(b) Flammables, irritants, knives and blades made up almost 90% of the banned items.

2.8 (a)

Region	Oil Consumption (millions of barrels a day)	Percentage
Developed Europe	14.5	17.18%
Japan	4.4	5.21%
United States	18.8	22.27%
Rest of the world	46.7	55.33%
Total	84.4	100.00%

(b) More than half the oil consumed is from countries other than the U.S., Japan, and developed Europe. More than 20% is consumed by the U.S. and slightly less than 20% is consumed by developed Europe.

2.9 (a)

Category	**Cost per Household**	**Percentage**
Civil servant retirement	15,851	2.90%
Federal debt	54,537	9.97%
Medicare	284,288	52.00%
Military retirement	29,694	5.43%
Social Security	160,216	29.30%
Other	2,172	0.40%
Total	546,758	100.00%

(b) Medicare at 52% and Social Security at 29.3% together made up more than 80% of the debt.

2.10 (a) Table of total percentages

ENJOY SHOPPING FOR CLOTHING FOR YOURSELF	GENDER		
	Male	Female	Total
Yes	22%	25%	47%
No	28%	25%	53%
Total	50%	50%	100%

Table of row percentages

ENJOY SHOPPING FOR CLOTHING FOR YOURSELF	GENDER		
	Male	Female	Total
Yes	46%	54%	100%
No	53%	47%	100%
Total	50%	50%	100%

Table of column percentages

ENJOY SHOPPING FOR CLOTHING FOR YOURSELF	GENDER		
	Male	Female	Total
Yes	44%	51%	47%
No	56%	49%	53%
Total	100%	100%	100%

(b) A higher percentage of females enjoy shopping for clothing for themselves.

2.11 (a)

Table of total percentages

	Shift		
	Day	Evening	
Nonconforming	1.6%	2.4%	4%
Conforming	65.4%	30.6%	96%
Total	67%	33%	100%

Table of row percentages

	Shift		
	Day	Evening	
Nonconforming	40%	60%	100%
Conforming	68%	32%	100%
Total	67%	33%	100%

Table of column percentages

	Shift		
	Day	Evening	
Nonconforming	2%	7%	4%
Conforming	98%	93%	96%
Total	100%	100%	100%

2.11 cont. (b) The row percentages allow us to block the effect of disproportionate group size and show us that the pattern for day and evening tests among the nonconforming group is very different from the pattern for day and evening tests among the conforming group. Where 40% of the nonconforming group was tested during the day, 68% of the conforming group was tested during the day.

(c) The director of the lab may be able to cut the number of nonconforming tests by reducing the number of tests run in the evening, when there is a higher percent of tests run improperly.

2.12 Table of row percentages

	Need => 3 Clicks		
Year	Yes	No	
2009	39%	61%	100%
2008	7%	93%	100%

According to the row percentages table, 32% more online retailers were requiring three or more clicks in 2009 than in 2008.

2.13 Ordered array: 63 64 68 71 75 88 94

2.14 Ordered array: 73 78 78 78 85 88 91

2.15 (a) 4% (b) 32% (c) 36% (d) 100%

2.16 (a) The class boundaries of the 9 classes can be "10 to less than 20", "20 to less than 30", "30 to less than 40", "40 to less than 50", "50 to less than 60", "60 to less than 70", "70 to less than 80", "80 to less than 90", and "90 to less than 100".

(b) The class-interval width is $= \dfrac{97.8 - 11.6}{9} = 9.58 \cong 10$.

(c) The nine class midpoints are: 15, 25, 35, 45, 55, 65, 75, 85, and 95.

2.17 (a) Ordered array: Cost($)115, 121, 127, 132, 141, 151, 158, 160, 161, 162, 168, 170, 172, 173, 178, 180, 184, 207, 208, 212, 216, 217, 221, 222, 227, 227, 250, 316, 330, 335

(b) PHStat output:

Bin Cell	*Frequency*	*Percentage*
105 but less than 135	4	13.33%
135 but less than 165	6	20.00%
165 but less than 195	7	23.33%
195 but less than 225	7	23.33%
225 but less than 255	3	10.00%
255 but less than 285	0	0.00%
285 but less than 315	0	0.00%
315 but less than 345	3	10.00%

(c) The costs of attending a baseball game is concentrating around $195 for fourteen of the teams have costs in between $165 and $225.

2.18 (a)

Electricity Costs	Frequency	Percentage
$80 to $99	4	8%
$100 to $119	7	14
$120 to $139	9	18
$140 to $159	13	26
$160 to $179	9	18
$180 to $199	5	10
$200 to $219	3	6

(b)

Electricity Costs	*Frequency*	*Percentage*	*Cumulative %*
$99	4	8%	8%
$119	7	14%	22%
$139	9	18%	40%
$159	13	26%	66%
$179	9	18%	84%
$199	5	10%	94%
$219	3	6%	100%

(c) The majority of utility charges are clustered between $120 and $180.

2.19 (a), (b)

Bin	*Frequency*	*Percentage*	*Cumulative %*
-0.00350 but less than -0.00201	13	13.00%	13.00%
-0.00200 but less than -0.00051	26	26.00%	39.00%
-0.00050 but less than 0.00099	32	32.00%	71.00%
0.00100 but less than 0.00249	20	20.00%	91.00%
0.00250 but less than 0.00399	8	8.00%	99.00%
0.004 but less than 0.00549	1	1.00%	100.00%

(c) Yes, the steel mill is doing a good job at meeting the requirement as there is only one steel part out of a sample of 100 that is as much as 0.005 inches longer than the specified requirement.

2.20 (a), (b)

Bin	*Frequency*	*Percentage*	*Cumulative %*
8.310 -- 8.329	3	6.12%	6.12%
8.330 -- 8.349	2	4.08%	10.20%
8.350 -- 8.369	1	2.04%	12.24%
8.370 -- 8.389	4	8.16%	20.41%
8.390 -- 8.409	5	10.20%	30.61%
8.410 -- 8.429	16	32.65%	63.26%
8.430 -- 8.449	5	10.20%	73.46%
8.450 -- 8.469	5	10.20%	83.66%
8.470 -- 8.489	6	12.24%	95.90%
8.490 -- 8.509	2	4.08%	100.00%

(c) All the troughs will meet the company's requirements of between 8.31 and 8.61 inches wide.

2.21 (a),(b)

Strength	*Frequency*	*Percentage*	*Cumulative Percentage*
1500 -- 1549	1	3.33%	3.33%
1550 -- 1599	2	6.67%	10.00%
1600 -- 1649	2	6.67%	16.67%
1650 -- 1699	7	23.33%	40.00%
1700 -- 1749	5	16.67%	56.67%
1750 -- 1799	7	23.33%	80.00%
1800 -- 1849	3	10.00%	90.00%
1850 -- 1899	3	10.00%	100.00%

(c) The strength of all the insulators meets the company's requirement of at least 1500 lbs.

2.22 (a)

Bulb Life (hrs)	*Frequency Manufacturer A*		*Bulb Life (hrs)*	*Frequency Manufacturer B*
650 -- 749	3		750 -- 849	2
750 -- 849	5		850 -- 949	8
850 -- 949	20		950 -- 1049	16
950 -- 1049	9		1050 -- 1149	9
1050 -- 1149	3		1150 -- 1249	5

(a), (b)

Bulb Life (hrs)	*A*		*B*	
	Percentage	*Cumulative %*	*Percentage*	*Cumulative %*
650 – 749	7.50%	7.50%	.00%	0.00%
750 – 849	12.50%	20.00%	5.00%	5.00%
850 – 949	50.00%	70.00%	20.00%	25.00%
950 – 1049	22.50%	92.50%	40.00%	65.00%
1050 – 1149	7.50%	100.00%	22.50%	87.50%
1150 – 1249	0.00%	100.00%	12.50%	100.00%

(c) Manufacturer B produces bulbs with longer lives than Manufacturer A. The cumulative percentage for Manufacturer B shows 65% of its bulbs lasted less than 1,050 hours, contrasted with 70% of Manufacturer A's bulbs, which lasted less than 950 hours. None of Manufacturer A's bulbs lasted more than 1,149 hours, but 12.5% of Manufacturer B's bulbs lasted between 1,150 and 1,249 hours. At the same time, 7.5% of Manufacturer A's bulbs lasted less than 750 hours, whereas all of Manufacturer B's bulbs lasted at least 750 hours

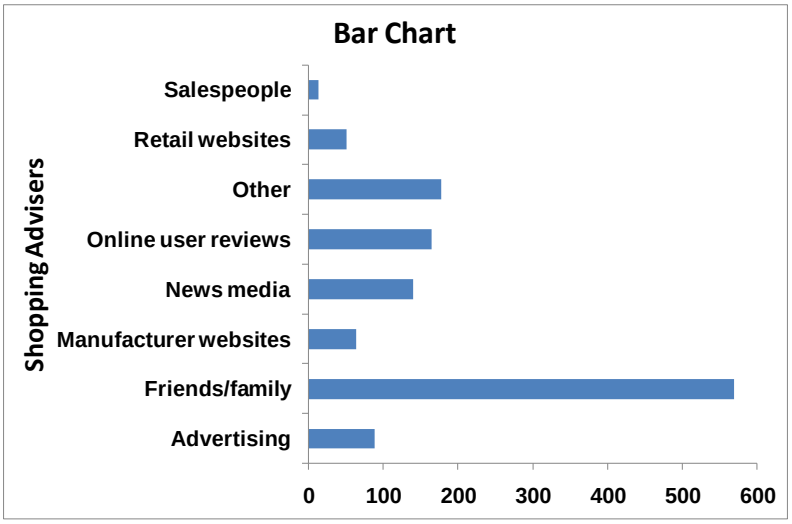
2.23 (a)

Amount of Soft Drink	Frequency	Percentage
1.850 – 1.899	1	2%
1.900 – 1.949	5	10
1.950 – 1.999	18	36
2.000 – 2.049	19	38
2.050 – 2.099	6	12
2.100 – 2.149	1	2

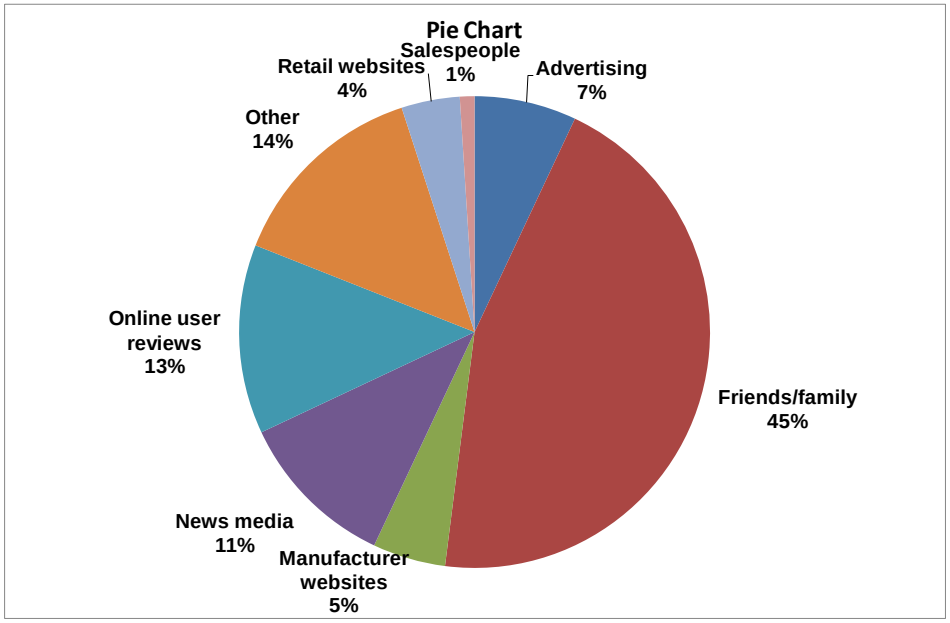
Amount of Soft Drink	Frequency Less Than	Percentage Less Than
1.899	1	2%
1.949	6	12
1.999	24	48
2.049	43	86
2.099	49	98
2.149	50	100

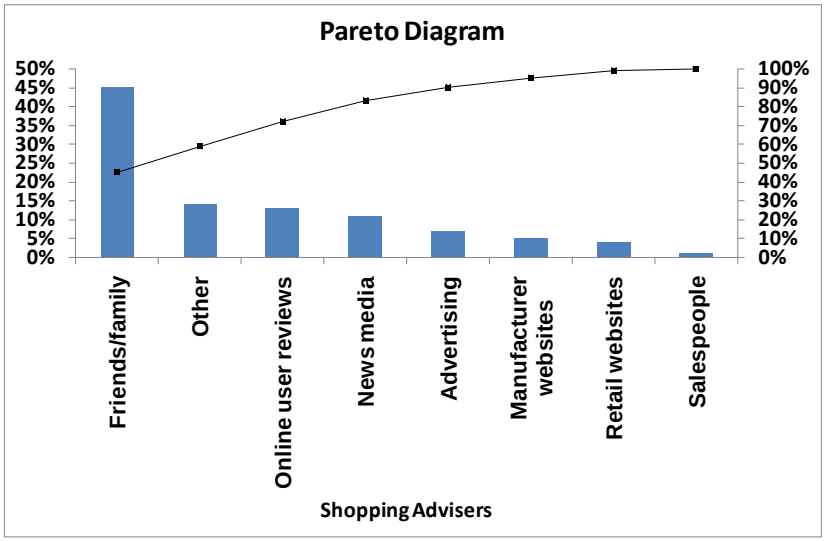
(b) The amount of soft drink filled in the two liter bottles is most concentrated in two intervals on either side of the two-liter mark, from 1.950 to 1.999 and from 2.000 to 2.049 liters. Almost three-fourths of the 50 bottles sampled contained between 1.950 liters and 2.049 liters.

2.24 (a) Note: %s converted to counts. $n = 1264$



2.24 cont. (a)

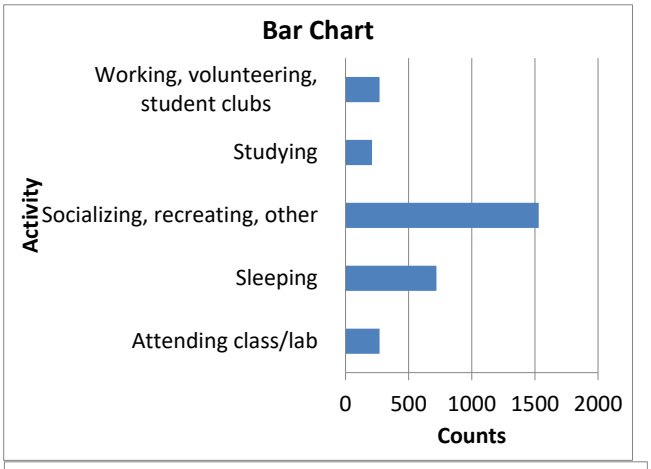


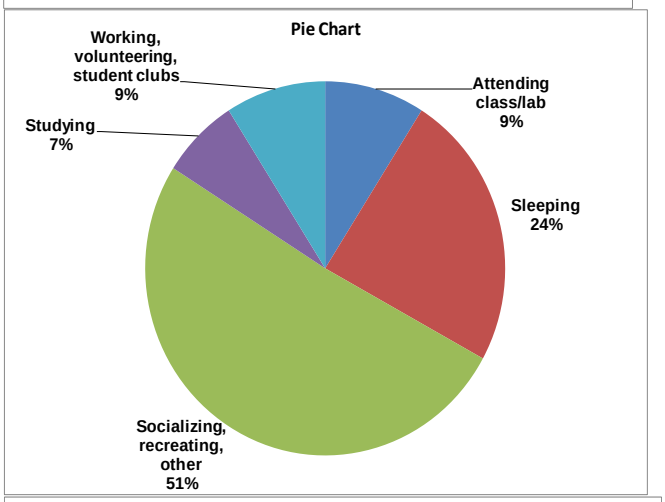


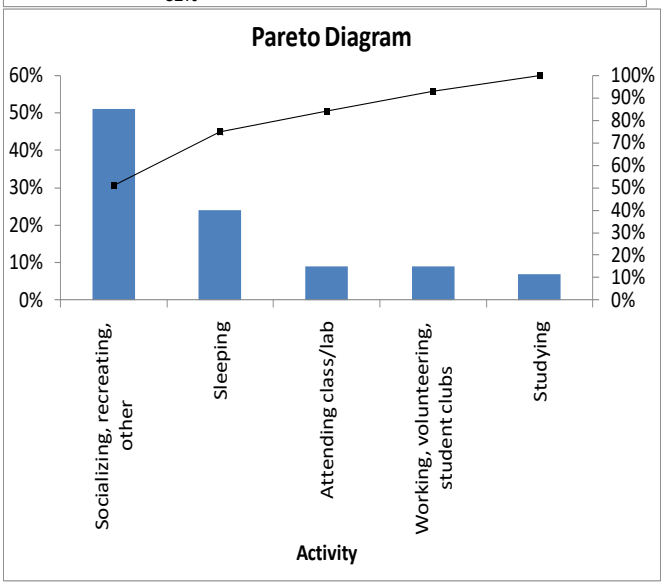
(b) The Pareto diagram is better than the pie chart to portray these data because it not only sorts the frequencies in descending order, it also provides the cumulative polygon on the same scale.

(c) You can conclude that friends/family account for the largest percentage of 45%. When other, news media, and online user reviews are added to friends/family, this accounts for 83%.

2.25 (a)



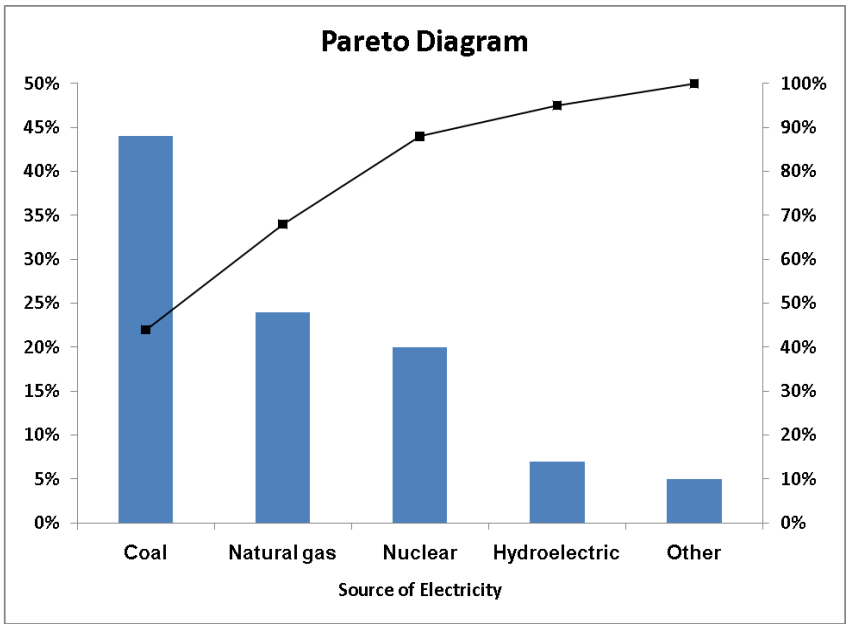




(b) The Pareto diagram is better than the pie chart or the bar chart because it not only sorts the frequencies in descending order, it also provides the cumulative polygon on the same scale.

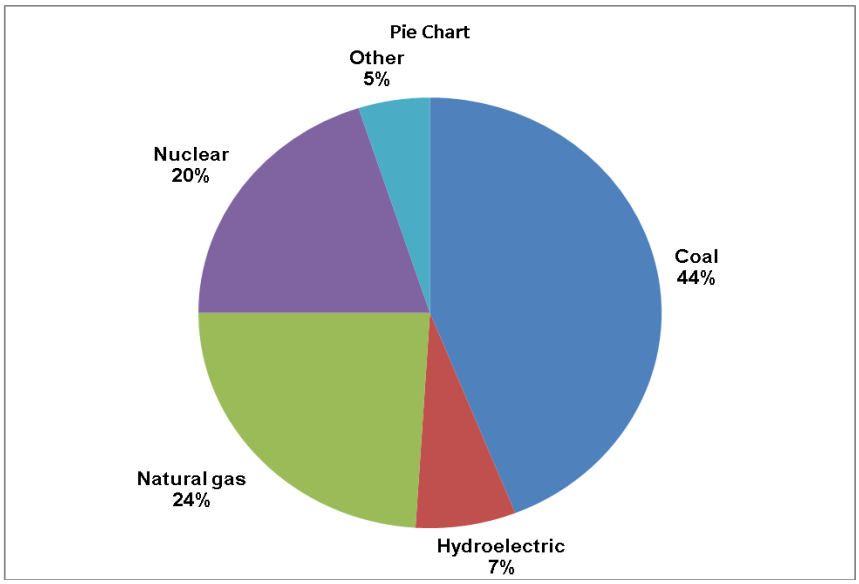
(c) From the Pareto diagram, it is obvious that slightly more than 50% of them were socializing, recreating or performing other activities.

2.26 (a)



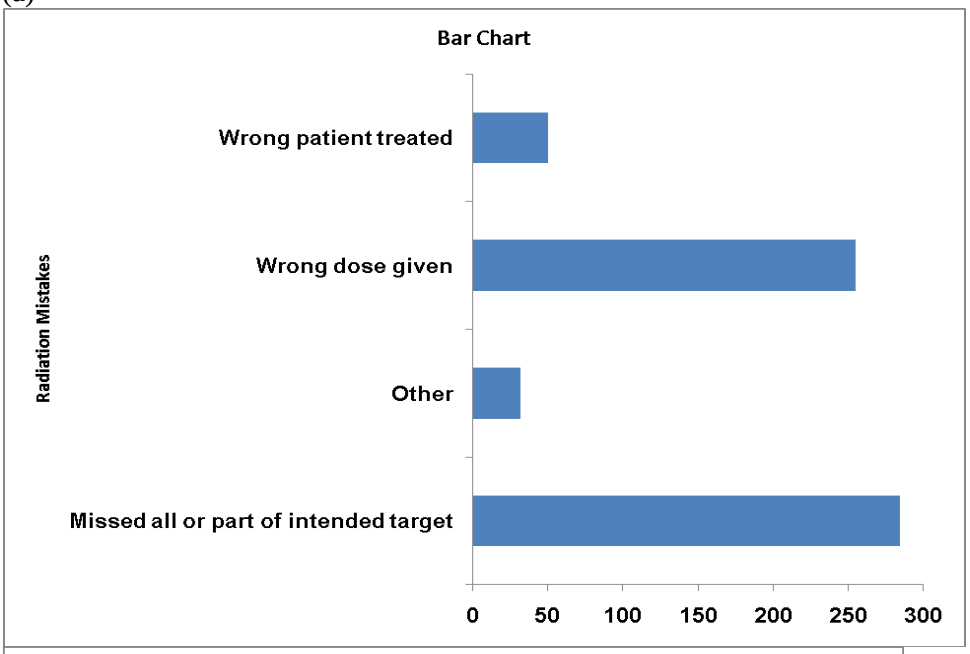
(b) According to the Pareto chart, slightly less than 90% of the power is derived from coal, nuclear, or natural gas.

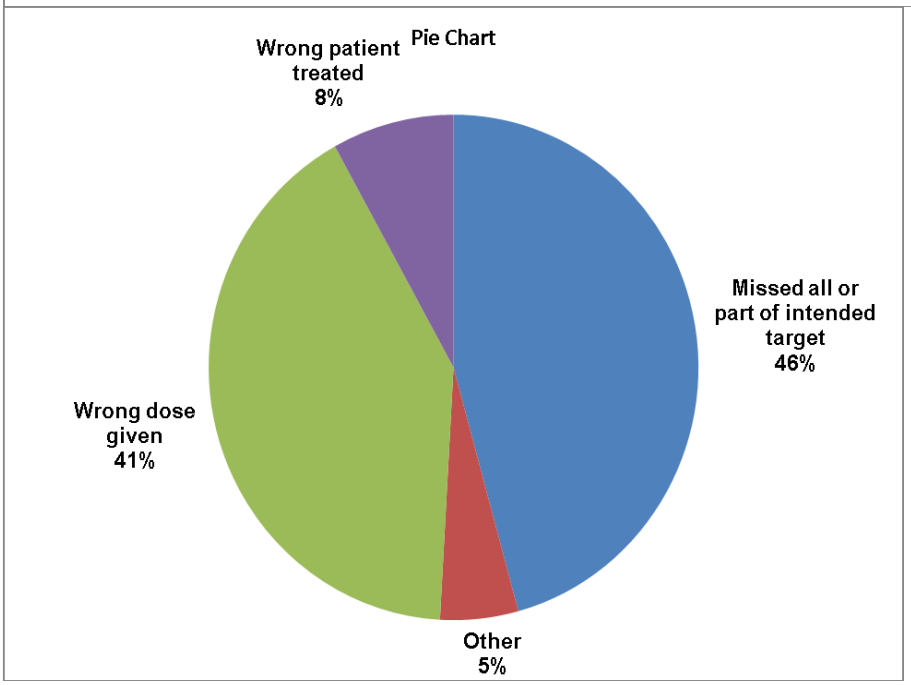
(c)



(d) You will prefer using the Pareto chart over the pie chart because the Pareto chart not only sorts the frequencies in descending order, it also provides the cumulative polygon on the same scale.

2.27 (a)

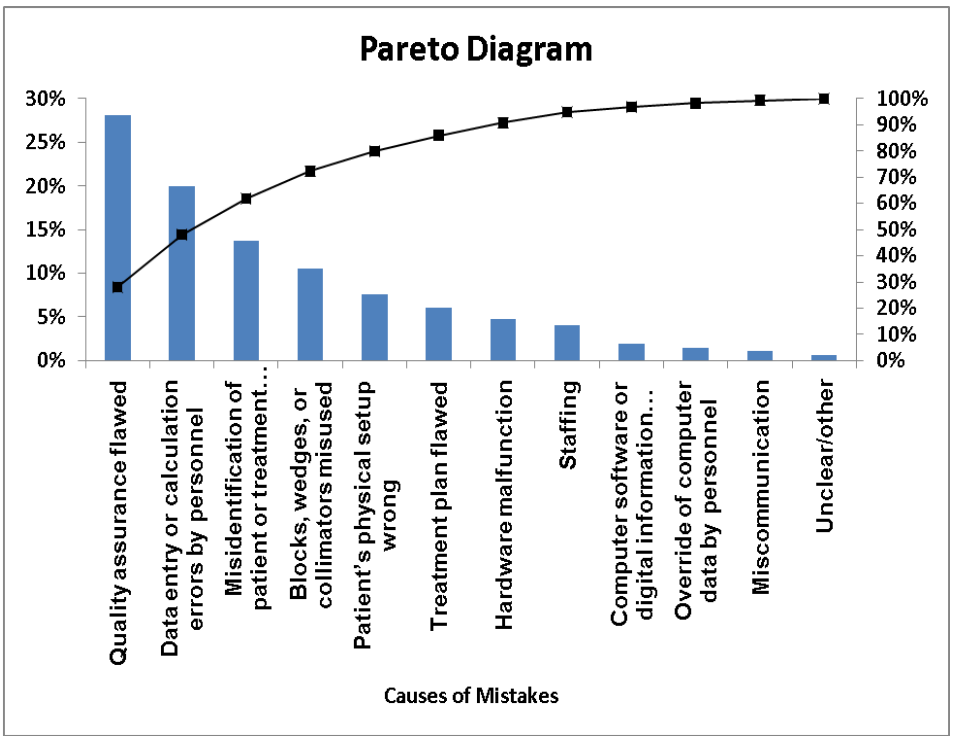




(b) The bar chart is more suitable if the purpose is to compare the categories. The pie chart is more suitable if the main objective is to investigate the portion of the whole that is in a particular category. *

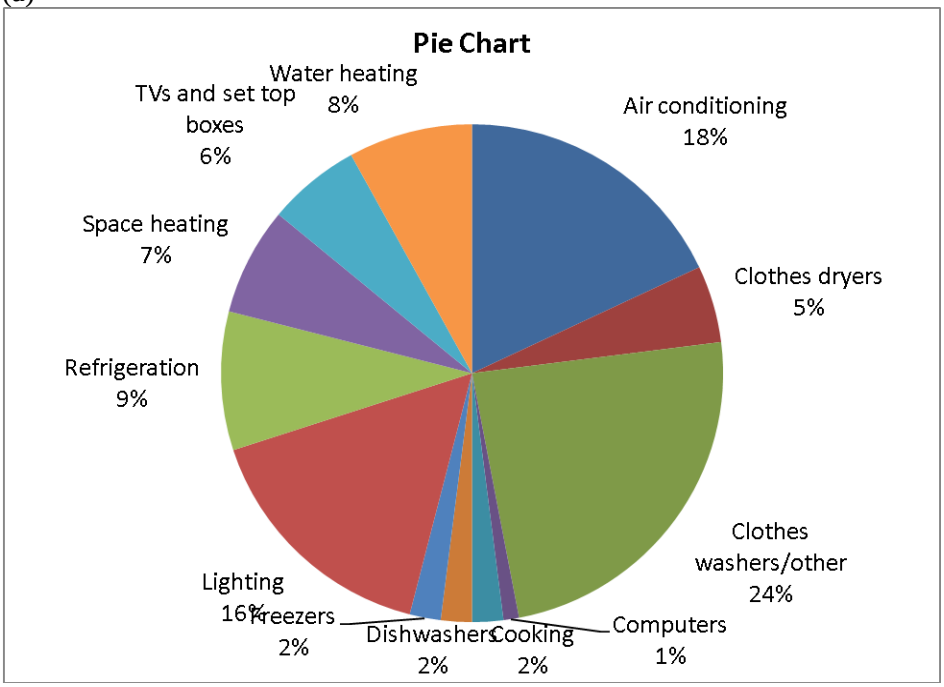
* Note: This is one of the many possible solutions for the question.

2.27 cont. (c)

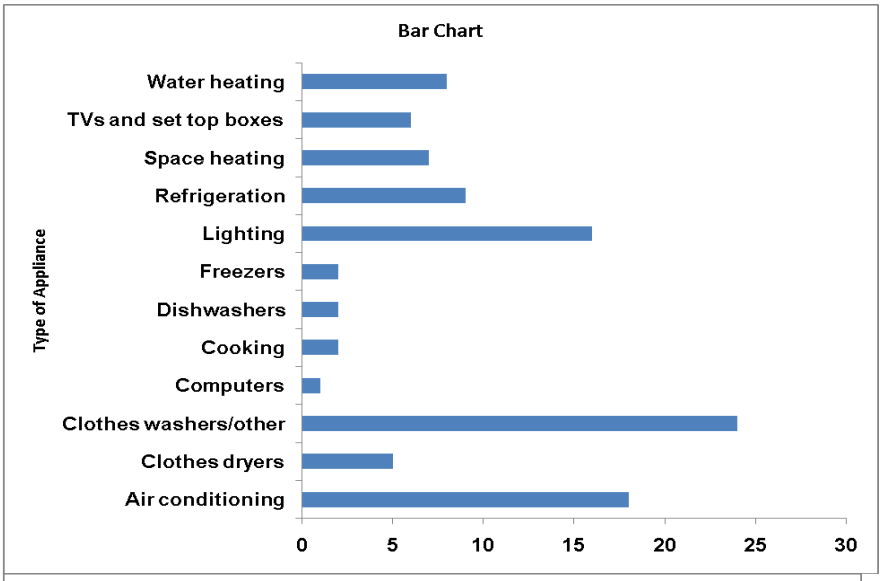


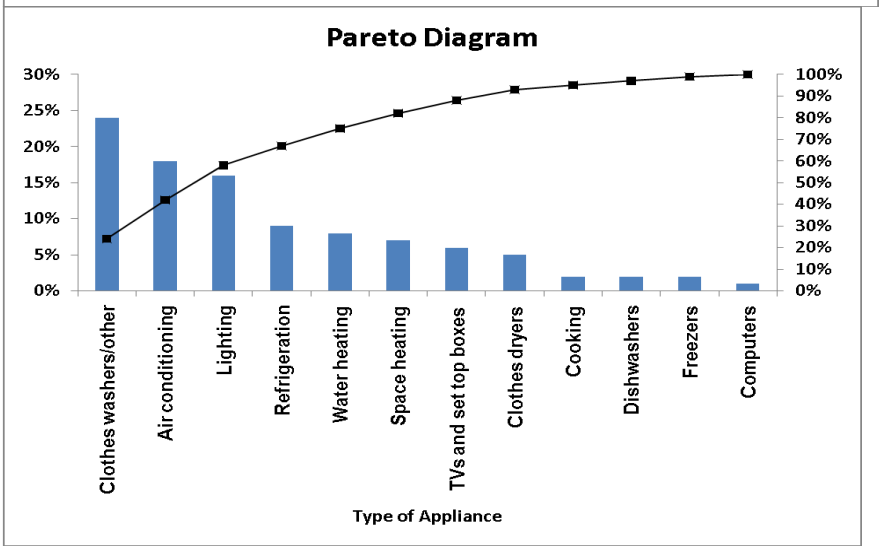
(d) The "vital few" reasons for the causes of mistakes are "Quality assurance flawed", "Data entry or calculation errors by personnel", and "Misidentification of patient or treatment location" which account for more than 60% of the mistakes. The remaining causes are the "trivial many" which make up less than 40% of the mistakes.

2.28 (a)



2.28 cont. (a)

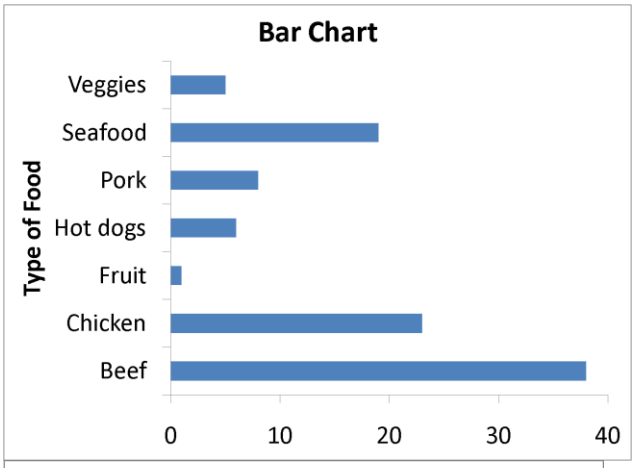


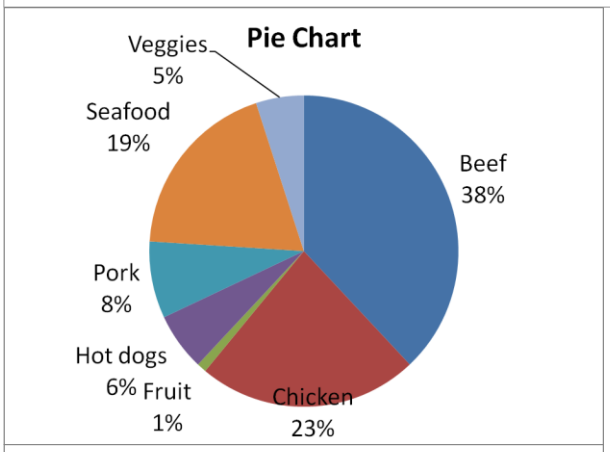


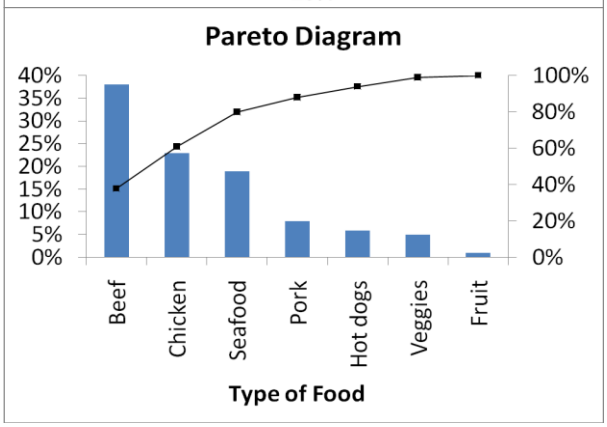
(b) The Pareto diagram is better than the pie chart and bar chart because it not only sorts the frequencies in descending order, it also provides the cumulative polygon on the same scale.

(c) Almost 60% of the residential electricity consumption in the United States is on "Clothes washers/other", "Air conditioning", and "Lighting".

2.29 (a)



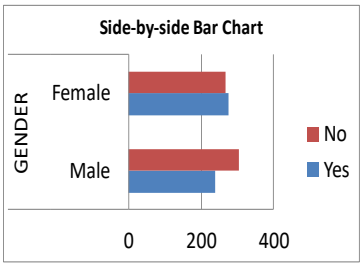




(b) The Pareto diagram is better than the pie chart because it not only sorts the frequencies in descending order, it also provides the cumulative polygon on the same scale.

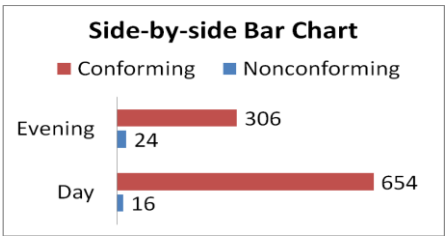
(c) From the Pareto chart, beef, chicken and seafood make up 80% of what folks want sizzling on the grill during barbecue season.

2.30 (a)



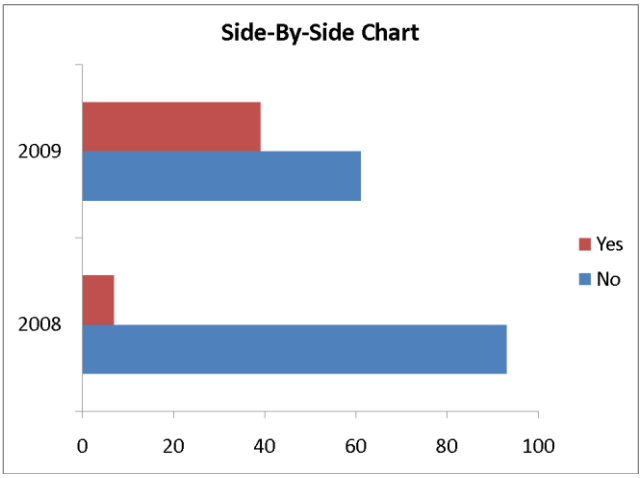
(b) A higher percentage of females enjoy shopping for clothing.

2.31 (a)



(b) The director of the lab may be able to cut the number of nonconforming tests by reducing the number of tests run in the evening, when there is a higher percent of tests run improperly.

2.32 (a)



(b) 32% more online retailers were requiring three or more clicks in 2009 than in 2008.

2.33 Stem-and-leaf of Finance Scores

5	34
6	9
7	4
9	38

2.34 Ordered array: 50 74 74 76 81 89 92

2.35 (a) Ordered array: 9.1 9.4 9.7 10.0 10.2 10.2 10.3 10.8 11.1 11.2
11.5 11.5 11.6 11.6 11.7 11.7 11.7 12.2 12.2 12.3
12.4 12.8 12.9 13.0 13.2

(b) The stem-and-leaf display conveys more information than the ordered array. We can more readily determine the arrangement of the data from the stem-and-leaf display than we can from the ordered array. We can also obtain a sense of the distribution of the data from the stem-and-leaf display.

(c) The most likely gasoline purchase is between 11 and 11.7 gallons.

(d) Yes, the third row is the most frequently occurring stem in the display and it is located in the center of the distribution.

2.36 (a)

Statistics	
Sample Size	30
Mean	194.7
Median	179
Std. Deviation	56.8210
Minimum	115
Maximum	335

Stem-and-Leaf Display

Stem unit: 10

11	5
12	1 7
13	2
14	1
15	1 8
16	0 1 2 8
17	0 2 3 8
18	0 4
19	
20	7 8
21	2 6 7
22	1 2 7 7
23	
24	
25	0
26	
27	
28	
29	
30	
31	6
32	
33	0 5

(b) The results are concentrated between $160 and $227.

2.37 (a) Ordered array: Cost($) 0.55, 0.57, 0.57, 0.68, 0.72, 0.77, 0.86, 0.90, 0.92, 0.94, 1.14, 1.41, 1.42, 1.51

(b)

Stem-and-Leaf Display

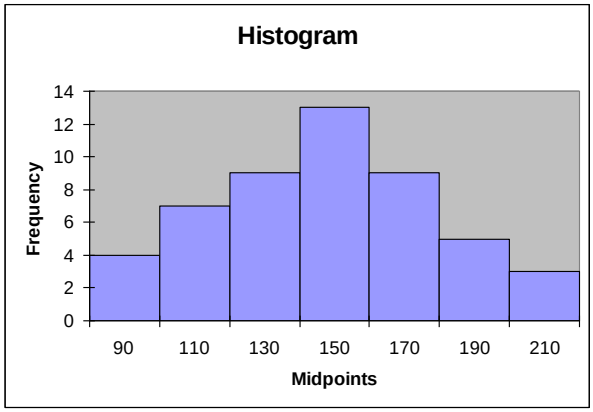
Stem unit: 0.1

5	**5 7 7**
6	**8**
7	**2 7**
8	**6**
9	**0 2 4**
10	
11	**4**
12	
13	
14	**1 2**
15	**1**

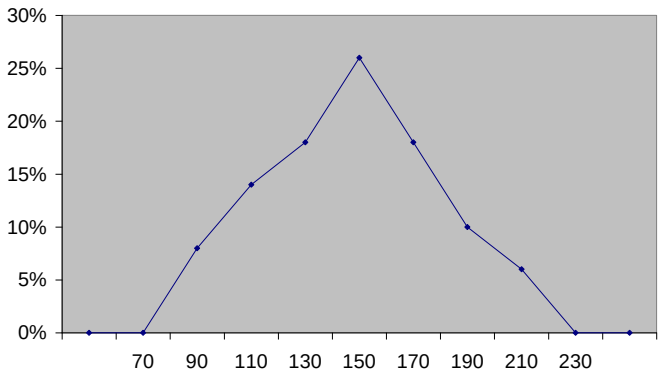
(c) The stem-and-leaf display conveys more information than the ordered array. We can more readily determine the arrangement of the data from the stem-and-leaf display than we can from the ordered array. We can also obtain a sense of the distribution of the data from the stem-and-leaf display.

(d) The cost does not appear to be concentrated around any value.

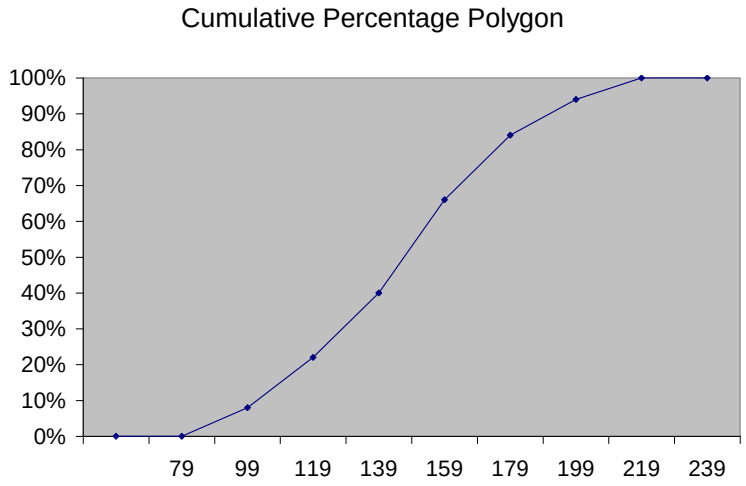
2.38 (a)



Percentage Polygon



2.38 cont. (b)

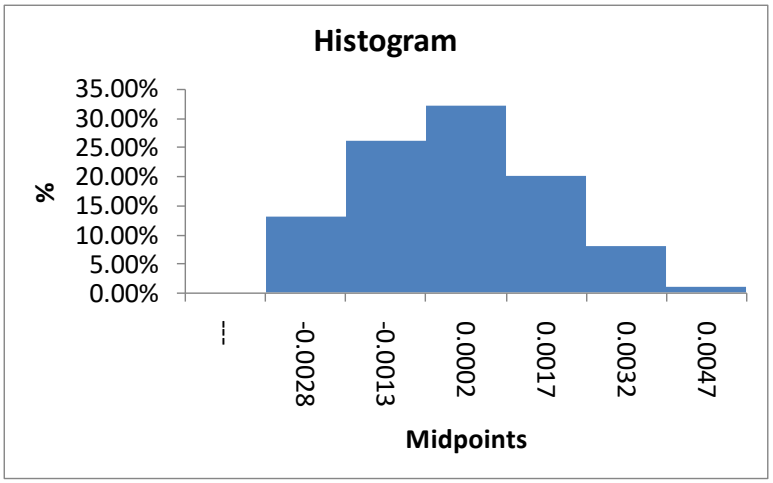


(c) The majority of utility charges are clustered between $120 and $180.

2.39 The costs of attending a baseball game is concentrating around $160 for nine of the teams. Six teams have costs centered around $220. There are a few outliers in the right tail with one team having a cost higher than $410.

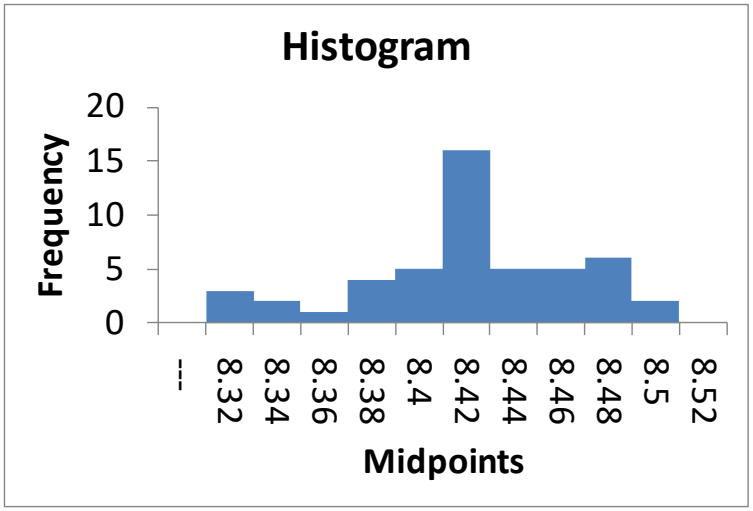
2.40 The property taxes per capita appear to be right-skewed with approximately 90% falling between $399 and $1,700, and the remaining 10% fall between $1,700 and $2,100. The center is at about $1,000.

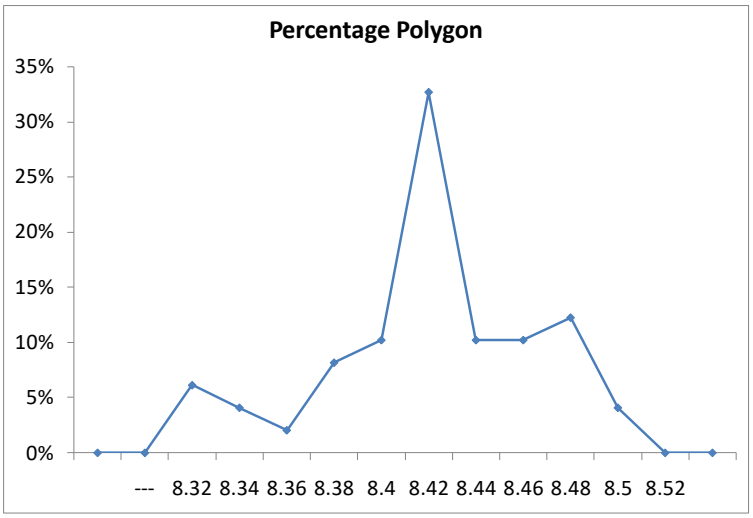
2.41 (a)



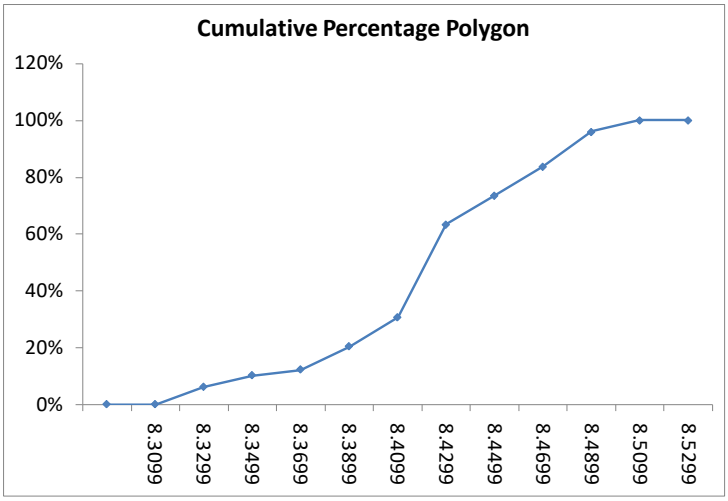
(b) Yes, the steel mill is doing a good job at meeting the requirement as there is only one steel part out of a sample of 100 that is as much as 0.005 inches longer than the specified requirement.

2.42 (a)



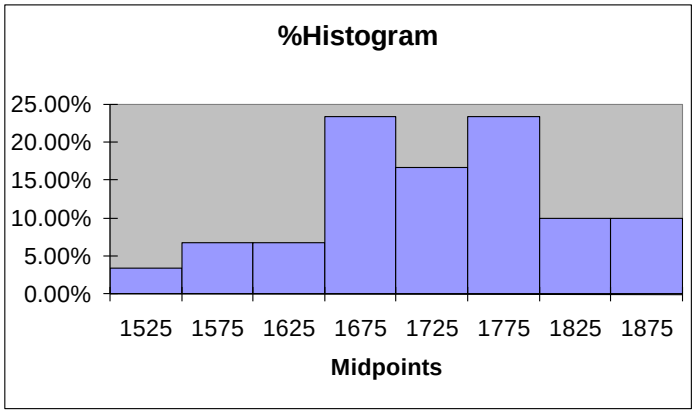


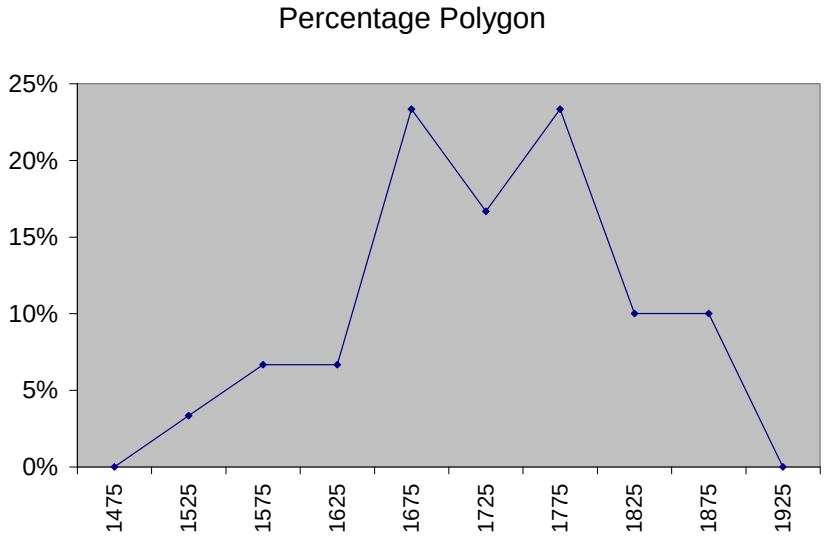
(b)



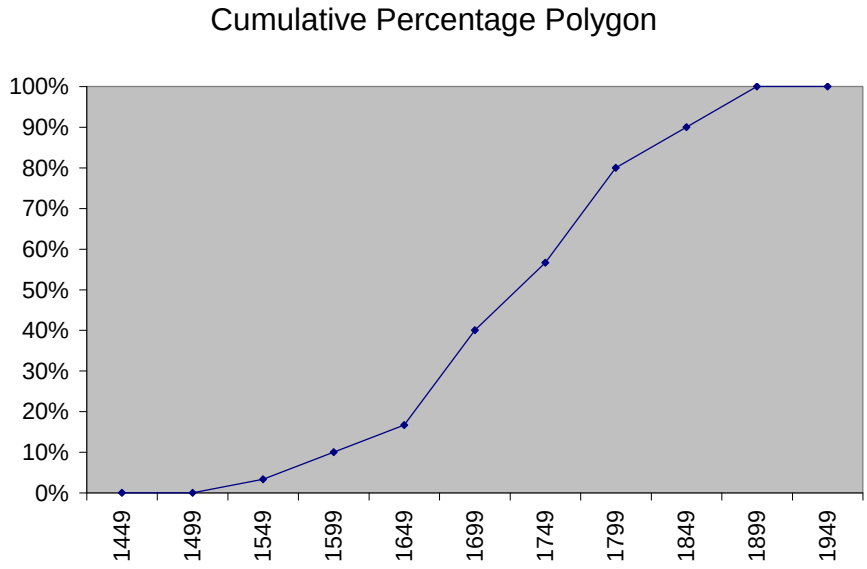
(c) All the troughs will meet the company's requirements of between 8.31 and 8.61 inches wide.

2.43 (a)



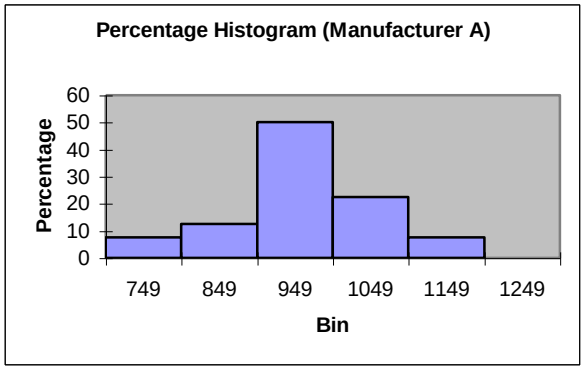


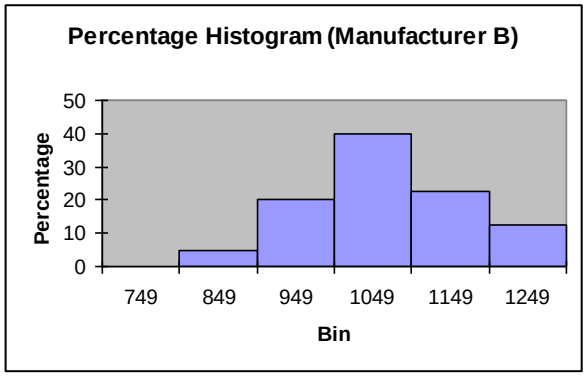
(b)

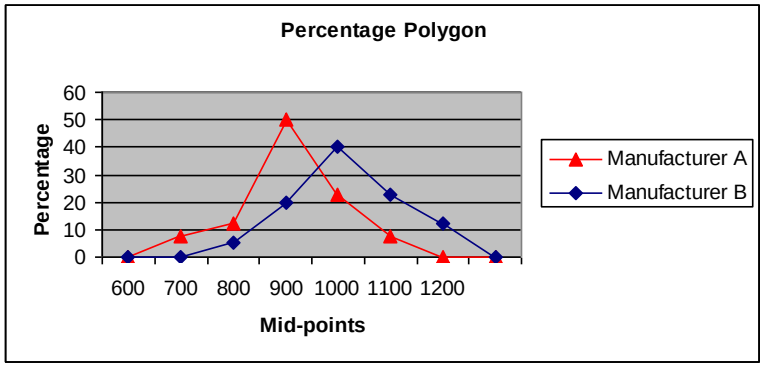


(c) The strength of all the insulators meets the company's requirement of at least 1500 lbs.

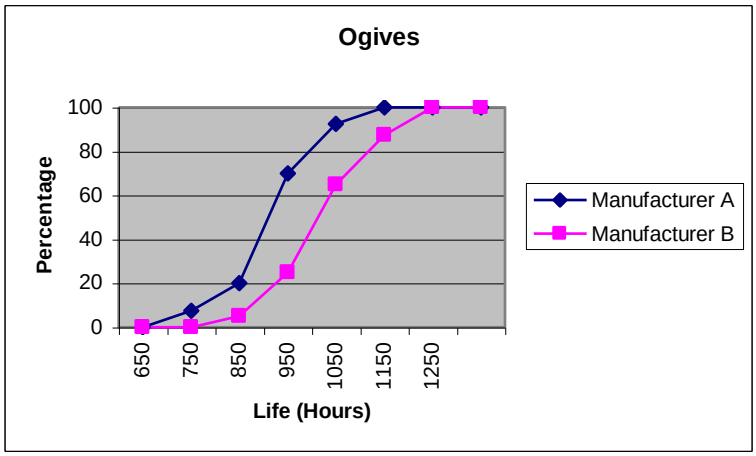
2.44 (a)


Percentage Histogram (Manufacturer A)
Percentage
60
50
40
30
20
10
0
749
849
949
1049
1149
1249
Bin


Percentage Histogram (Manufacturer B)
Percentage
50
40
30
20
10
0
749
849
949
1049
1149
1249
Bin

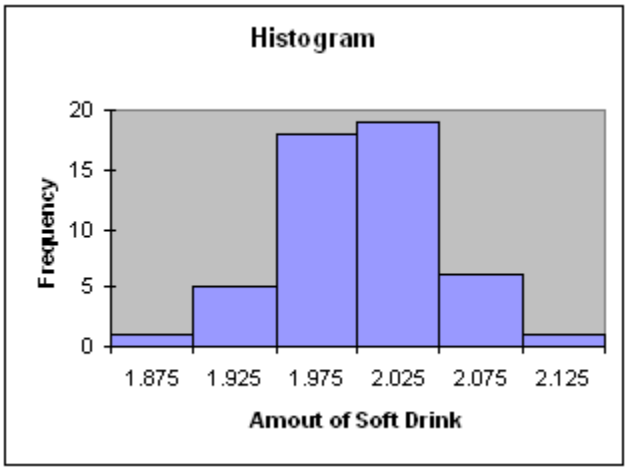

Percentage Polygon
Percentage
60
50
40
30
20
10
0
600
700
800
900
1000
1100
1200
Mid-points
Manufacturer A
Manufacturer B

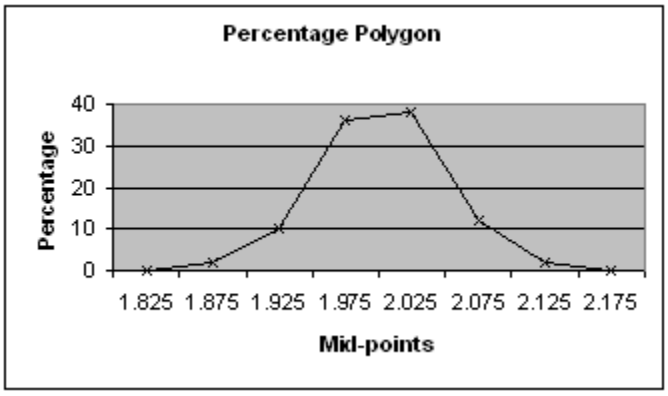
(b)


Ogives
Percentage
100
80
60
40
20
0
650
750
850
950
1050
1150
1250
Life (Hours)
Manufacturer A
Manufacturer B

2.44 cont. (c) Manufacturer B produces bulbs with longer lives than Manufacturer A. The cumulative percentage for Manufacturer B shows 65% of their bulbs lasted 1049 hours or less contrasted with 70% of Manufacturer A's bulbs which lasted 949 hours or less. None of Manufacturer A's bulbs lasted more than 1149 hours, but 12.5% of Manufacturer B's bulbs lasted between 1150 and 1249 hours. At the same time, 7.5% of Manufacturer A's bulbs lasted less than 750 hours, while all of Manufacturer B's bulbs lasted at least 750 hours.

2.45 (a)

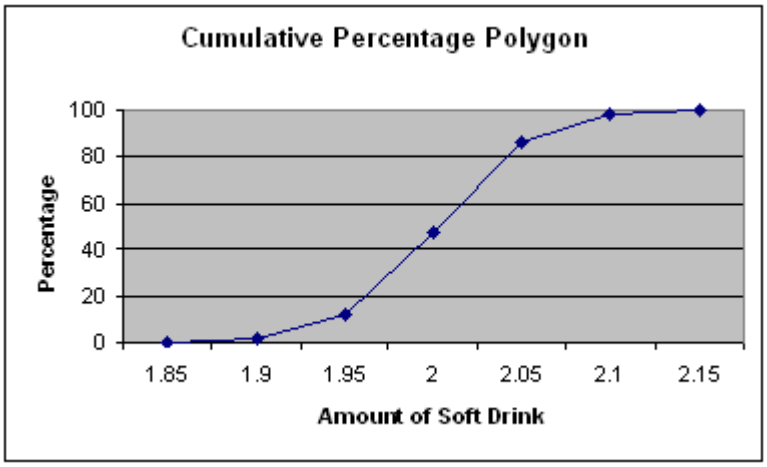




(b)

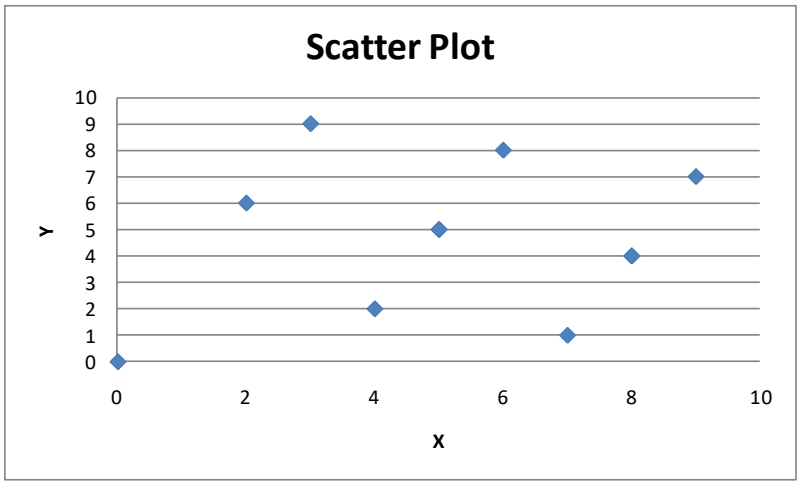
Amount of Soft Drink	Frequency Less Than	Percentage Less Than
1.899	1	2%
1.949	6	12
1.999	24	48
2.049	43	86
2.099	49	98
2.149	50	100

2.45 (b)
cont.



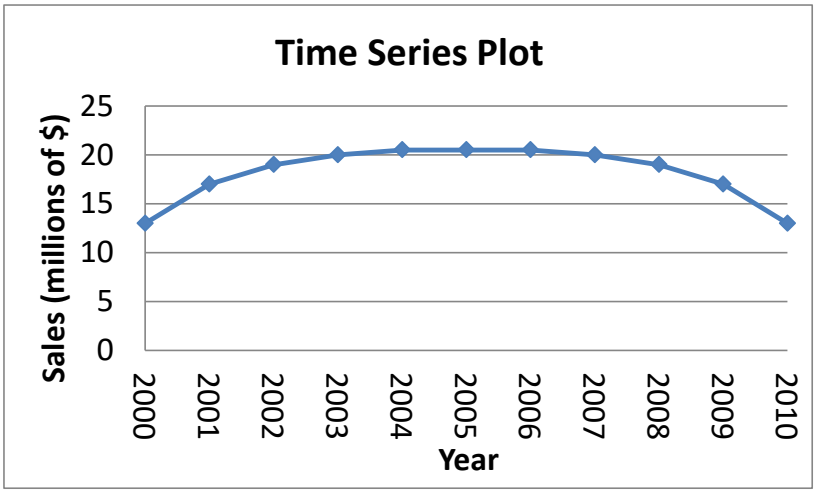
(c) The amount of soft drink filled in the two liter bottles is most concentrated in two intervals on either side of the two-liter mark, from 1.950 to 1.999 and from 2.000 to 2.049 liters. Almost three-fourths of the 50 bottles sampled contained between 1.950 liters and 2.049 liters.

2.46 (a)



(b) There is no relationship between *X* and *Y*.

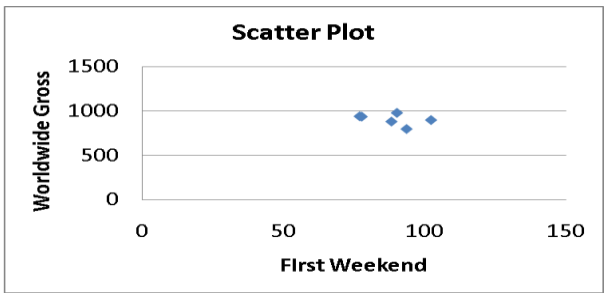
2.47 (a)



(b) Annual sales appear to be increasing in the earlier years before 2004 but start to decline after 2006.

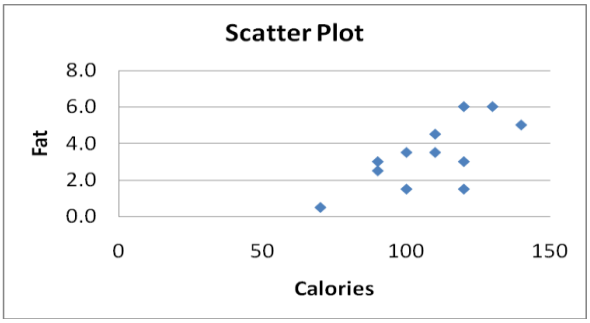
2.48 (a)

(b)



(c) There appears to be a rather weak negative relationship between first weekend gross and U. S. gross and between first weekend gross and worldwide gross. However, due to the small sample size, the relationships should not be taken as conclusive.

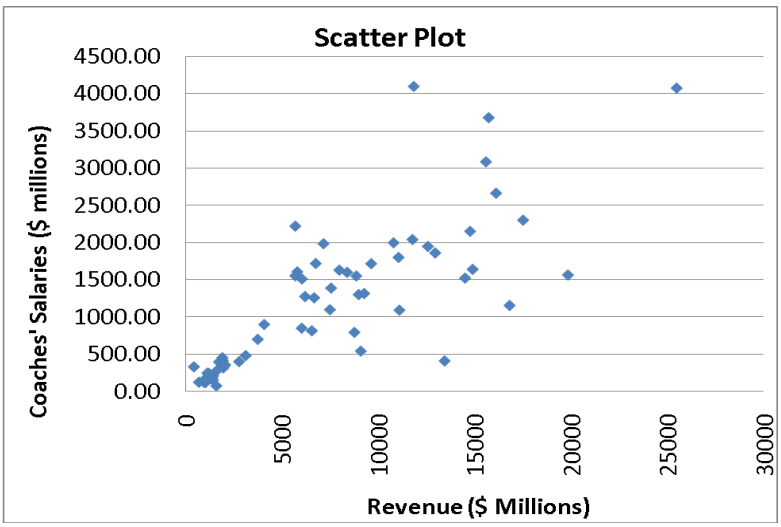
2.49 (a)



(b) There appears to be a positive relationship between the calories and total fat in veggie burgers.

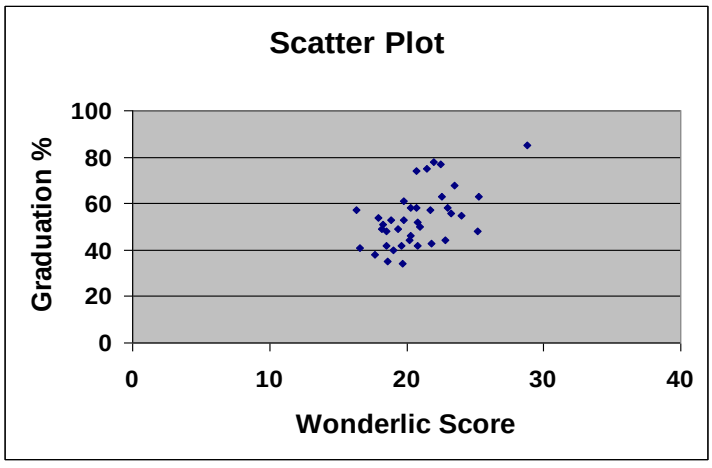
2.50 (a) Yes, schools with higher revenues will also have higher coaches' salaries.

(b)



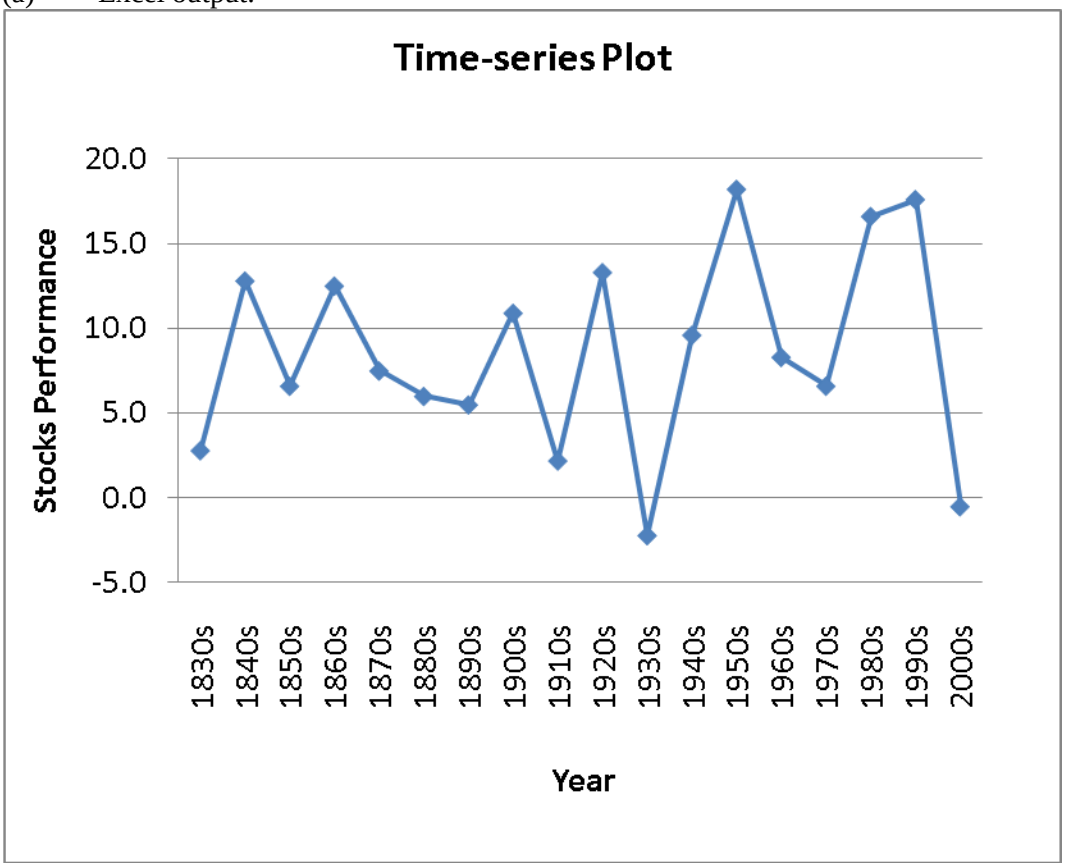
(c) There appears to be a positive relationship between coaches' salary and revenue. Yes, this is borne out by the data.

2.51 (a)



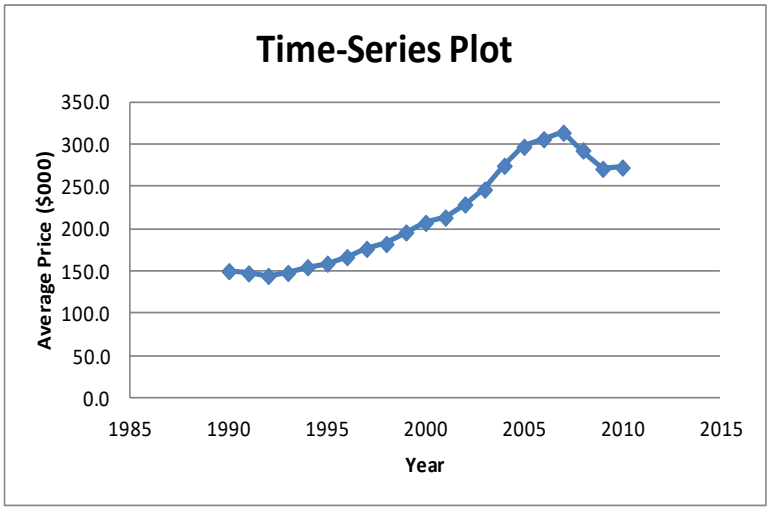
(b) There is a positive relationship between Wonderlic score and graduation rate.

2.52 (a) Excel output:



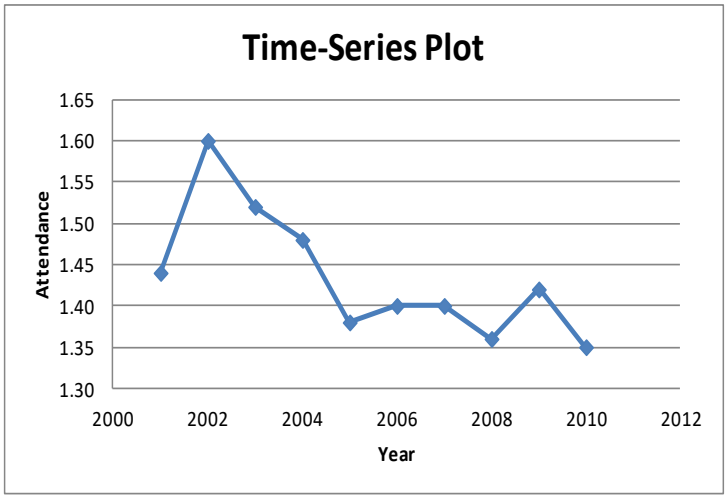
(b) There is no obvious pattern in the data.

2.53 (a)



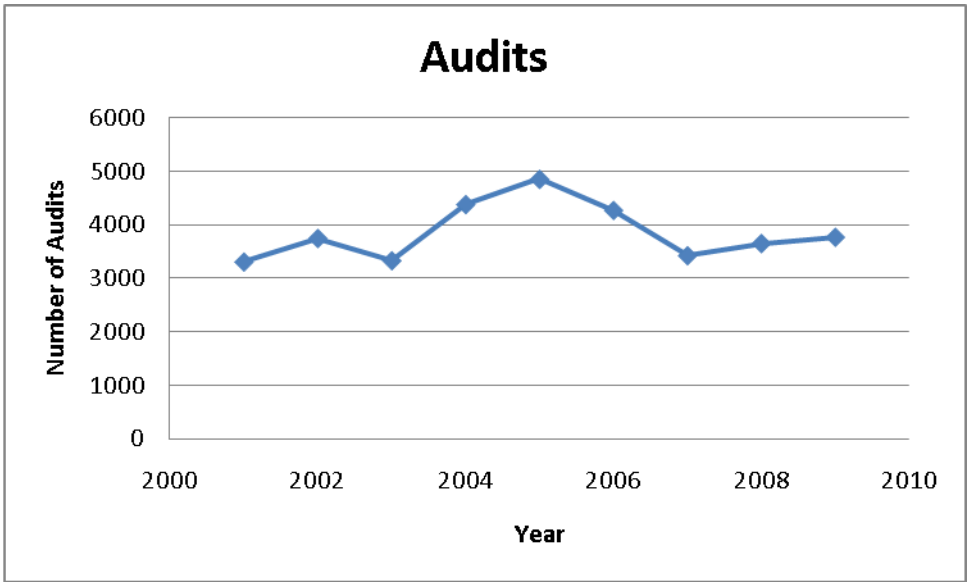
(b) There is an upward trend on the average price till 2007 and the average price started a downward trend from then on.

2.54 (a)



(b) There has been a slight decline in movie attendance between 2001and 2010. During that time, movie attendance increased from 2001 to 2002 but then decreased to a level below that in 2001.

2.55 (a)



(b) There is no obvious pattern in the data.

2.56 (a)

Count of Risk		Fees		
Risk	Type	No	Yes	Grand Total
Above Average	Intermediate Government	9.44%	8.89%	18.33%
	Short Term Corporate	11.11%	2.78%	13.89%
Above Average Total		20.56%	11.67%	32.22%
Average	Intermediate Government	10.56%	5.56%	16.11%
	Short Term Corporate	12.78%	4.44%	17.22%
Average Total		23.33%	10.00%	33.33%
Below Average	Intermediate Government	10.56%	5.00%	15.56%
	Short Term Corporate	16.67%	2.22%	18.89%
Below Average Total		27.22%	7.22%	34.44%
Grand Total		71.11%	28.89%	100.00%

(b) Although the ratio of fee-yes to fee-no bond funds for intermediate government category seems to be about 2-to-3 (19% to 31%), the ratio for above average risk intermediate government bond funds is closer to 1-to-1 (8.9% to 9.4%). While the group "intermediate government funds that do not charge a fee" has nearly equal numbers of above average risk, average risk, and below risk funds, the group "short term corporate bond funds that do not charge a fee" contains about fifty percent more below average risk funds than above average ones. The pattern of risk percentages differs between the fee-yes and fee-no funds in each bond fund category.

(c) The results for type, fee, and risk, in the two years are similar.

2.57 (a)

Count of Fee		Objective		
Category	Fees	Growth	Value	Grand Total
Large Cap	No	137	114	251
	Yes	94	105	199
Large Cap Total		231	219	450
Mid Cap	No	58	39	97
	Yes	53	24	77
Mid Cap Total		111	63	174
Small Cap	No	71	81	152
	Yes	51	41	92
Small Cap Total		122	122	244
Grand Total		464	404	868

Count of Fee		Objective		
Category	Fees	Growth	Value	Grand Total
Large Cap	No	15.78%	13.13%	28.92%
	Yes	10.83%	12.10%	22.93%
Large Cap Total		26.61%	25.23%	51.84%
Mid Cap	No	6.68%	4.49%	11.18%
	Yes	6.11%	2.76%	8.87%
Mid Cap Total		12.79%	7.26%	20.05%
Small Cap	No	8.18%	9.33%	17.51%
	Yes	5.88%	4.72%	10.60%
Small Cap Total		14.06%	14.06%	28.11%
Grand Total		53.46%	46.54%	100.00%

(b) The large cap constitutes the largest percentage among all combinations of objective and fees.

2.58 (a)

Count of Risk		Fees		
Category	Risk	No	Yes	Grand Total
Large Cap	Average	95	79	174
	High	76	51	127
	Low	80	69	149
Large Cap Total		251	199	450
Mid Cap	Average	33	22	55
	High	41	45	86
	Low	23	10	33
Mid Cap Total		97	77	174
Small Cap	Average	52	30	82
	High	84	58	142
	Low	16	4	20
Small Cap Total		152	92	244
Grand Total		500	368	868

Count of Risk		Fees		
Category	Risk	No	Yes	Grand Total
Large Cap	Average	10.94%	9.10%	20.05%
	High	8.76%	5.88%	14.63%
	Low	9.22%	7.95%	17.17%
Large Cap Total		28.92%	22.93%	51.84%
Mid Cap	Average	3.80%	2.53%	6.34%
	High	4.72%	5.18%	9.91%
	Low	2.65%	1.15%	3.80%
Mid Cap Total		11.18%	8.87%	20.05%
Small Cap	Average	5.99%	3.46%	9.45%
	High	9.68%	6.68%	16.36%
	Low	1.84%	0.46%	2.30%
Small Cap Total		17.51%	10.60%	28.11%
Grand Total		57.60%	42.40%	100.00%

(b) Large cap funds without fees are fairly evenly spread in risk while large cap funds with fees are more likely to have average or low risk. Mid cap and small cap funds regardless of fees are more likely to have average or high risk.

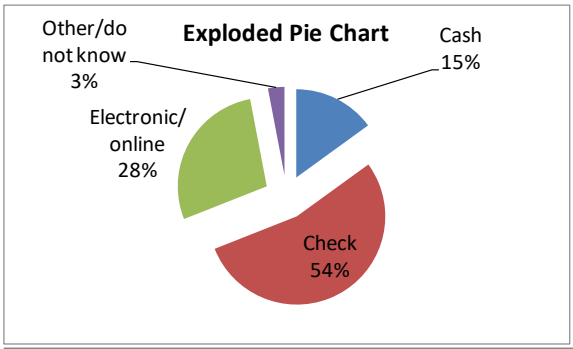
2.59 (a)

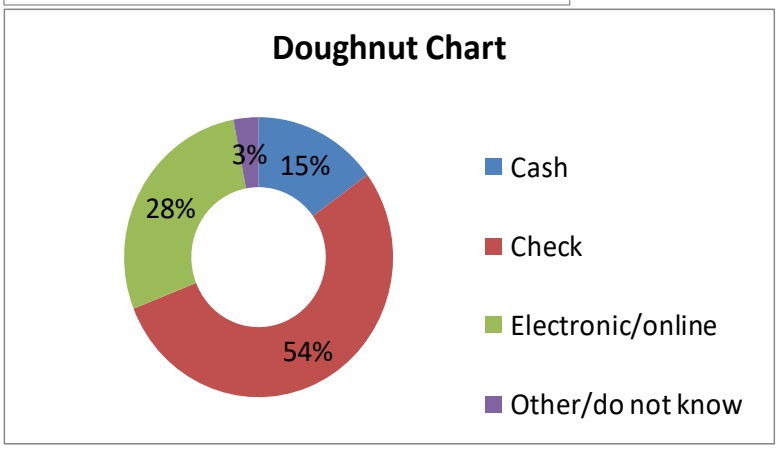
Count of Ris		Objective	Risk							
		Growth			Growth Total	Value			Value Total	Grand Total
Category	Fees	Average	High	Low		Average	High	Low		
Large Cap	No	59	68	10	137	36	8	70	114	251
	Yes	38	48	8	94	41	3	61	105	199
Large Cap Total		97	116	18	231	77	11	131	219	450
Mid Cap	No	22	36		58	11	5	23	39	97
	Yes	10	40	3	53	12	5	7	24	77
Mid Cap Total		32	76	3	111	23	10	30	63	174
Small Cap	No	9	61	1	71	43	23	15	81	152
	Yes	2	49		51	28	9	4	41	92
Small Cap Total		11	110	1	122	71	32	19	122	244
Grand Total		140	302	22	464	171	53	180	404	868

Count of Ris		Objective	Risk							
		Growth			Growth Total	Value			Value Total	Grand Total
Category	Fees	Average	High	Low		Average	High	Low		
Large Cap	No	6.80%	7.83%	1.15%	15.78%	4.15%	0.92%	8.06%	13.13%	28.92%
	Yes	4.38%	5.53%	0.92%	10.83%	4.72%	0.35%	7.03%	12.10%	22.93%
Large Cap Total		11.18%	13.36%	2.07%	26.61%	8.87%	1.27%	15.09%	25.23%	51.84%
Mid Cap	No	2.53%	4.15%	0.00%	6.68%	1.27%	0.58%	2.65%	4.49%	11.18%
	Yes	1.15%	4.61%	0.35%	6.11%	1.38%	0.58%	0.81%	2.76%	8.87%
Mid Cap Total		3.69%	8.76%	0.35%	12.79%	2.65%	1.15%	3.46%	7.26%	20.05%
Small Cap	No	1.04%	7.03%	0.12%	8.18%	4.95%	2.65%	1.73%	9.33%	17.51%
	Yes	0.23%	5.65%	0.00%	5.88%	3.23%	1.04%	0.46%	4.72%	10.60%
Small Cap Total		1.27%	12.67%	0.12%	14.06%	8.18%	3.69%	2.19%	14.06%	28.11%
Grand Total		16.13%	34.79%	2.53%	53.46%	19.70%	6.11%	20.74%	46.54%	100.00%

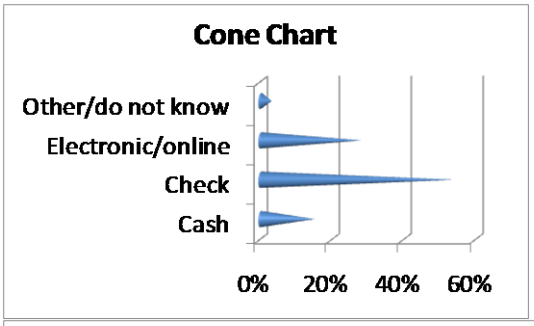
(b) The large cap constitute the largest percentage among the various combinations of fees, risk factor, and objective except the high risk, growth and fee; average risk, value and no fee; high risk, value and fee combinations that are dominated by the small cap.

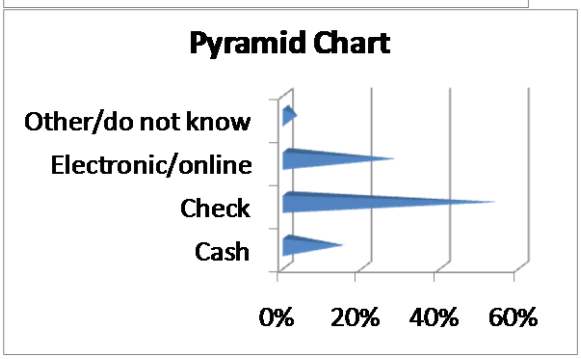
2.67 (a)





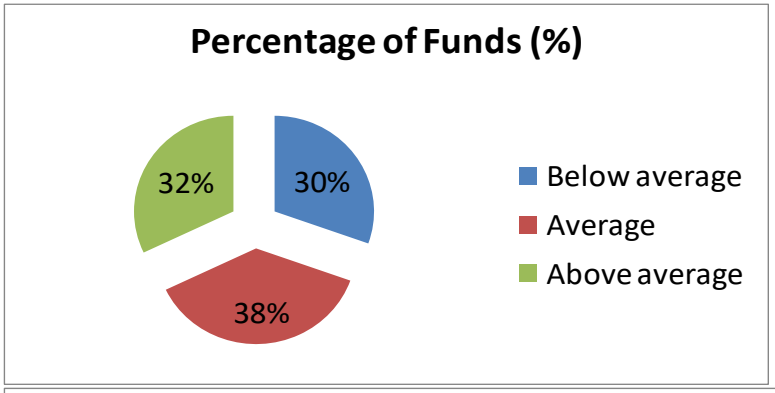
2.67 (a) cont.

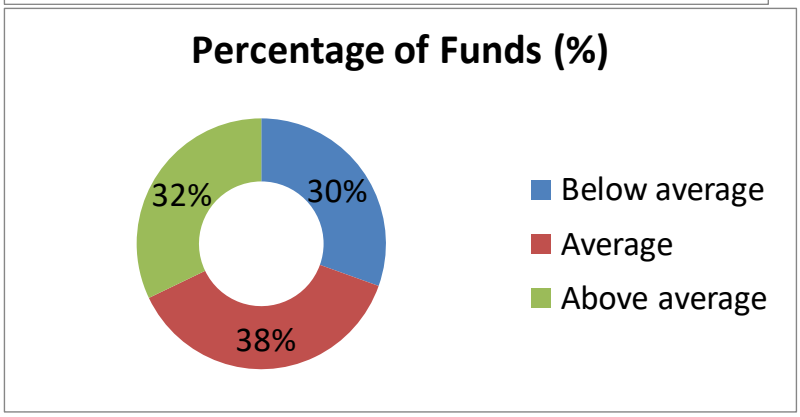




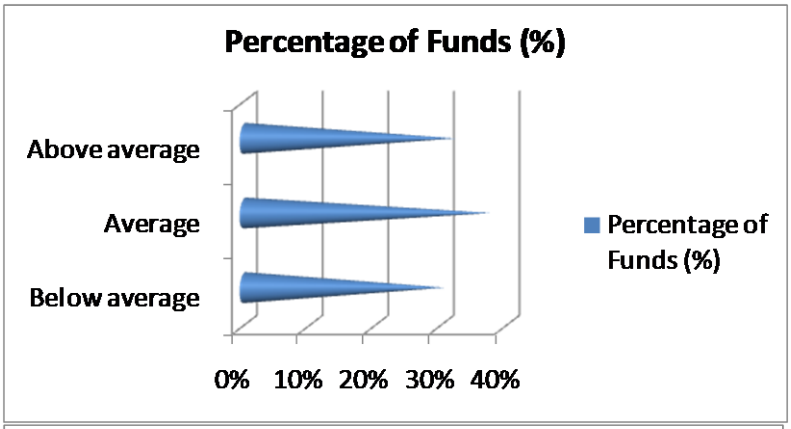
(b) The bar chart and the pie chart should be preferred over the exploded pie chart, doughnut chart, the cone chart and the pyramid chart since the former set is simpler and easier to interpret.

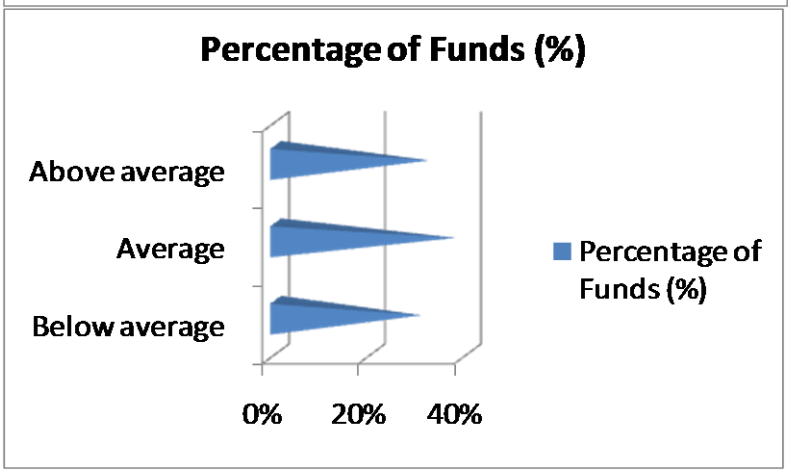
2.68 (a)





2.68 cont. (a)





(b) The bar chart and the pie chart should be preferred over the exploded pie chart, doughnut chart, the cone chart and the pyramid chart since the former set is simpler and easier to interpret.

2.69 A histogram uses bars to represent each class while a polygon uses a single point. The histogram should be used for only one group, while several polygons can be plotted on a single graph.

2.70 A summary table allows one to determine the frequency or percentage of occurrences in each category.

2.71 A bar chart is useful for comparing categories. A pie chart is useful when examining the portion of the whole that is in each category. A Pareto diagram is useful in focusing on the categories that make up most of the frequencies or percentages.

2.72 The bar chart for categorical data is plotted with the categories on the vertical axis and the frequencies or percentages on the horizontal axis. In addition, there is a separation between categories. The histogram is plotted with the class grouping on the horizontal axis and the frequencies or percentages on the vertical axis. This allows one to more easily determine the distribution of the data. In addition, there are no gaps between classes in the histogram.

2.73 A time-series plot is a type of scatter diagram with time on the x-axis.

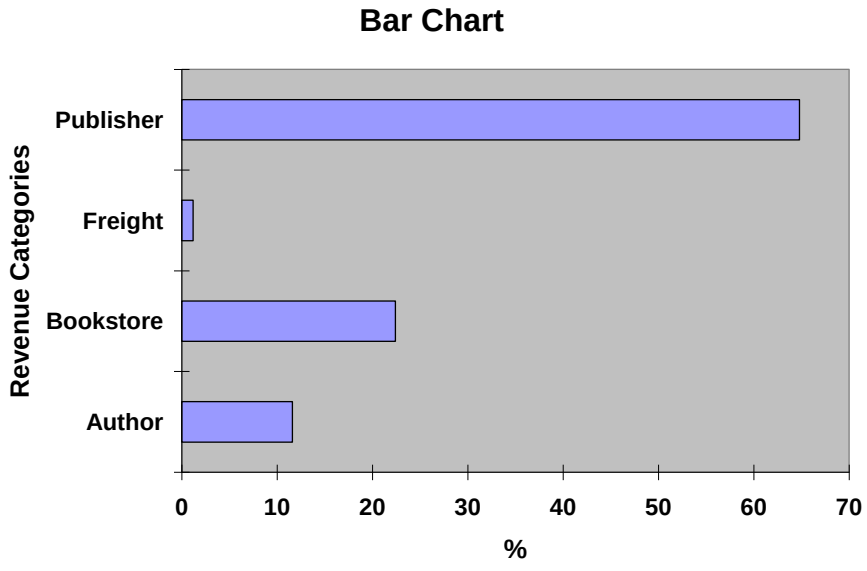
2.74 Because the categories are arranged according to frequency or importance, it allows the user to focus attention on the categories that have the greatest frequency or importance.

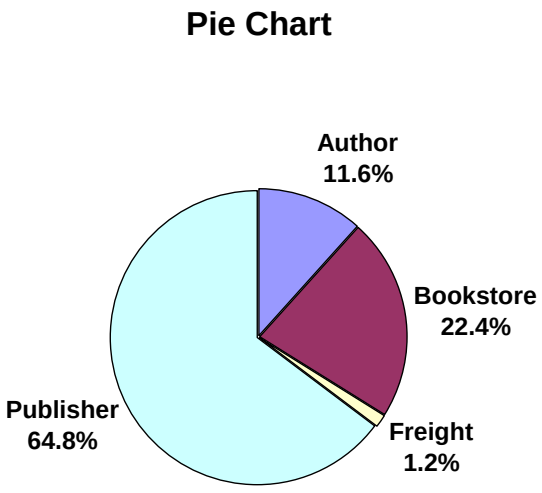
2.75 Percentage breakdowns according to the total percentage, the row percentage, and/or the column percentage allow the interpretation of data in a two-way contingency table from several different perspectives.

2.76 A contingency table contains information on two categorical variables whereas a multidimensional table can display information on more than two categorical variables.

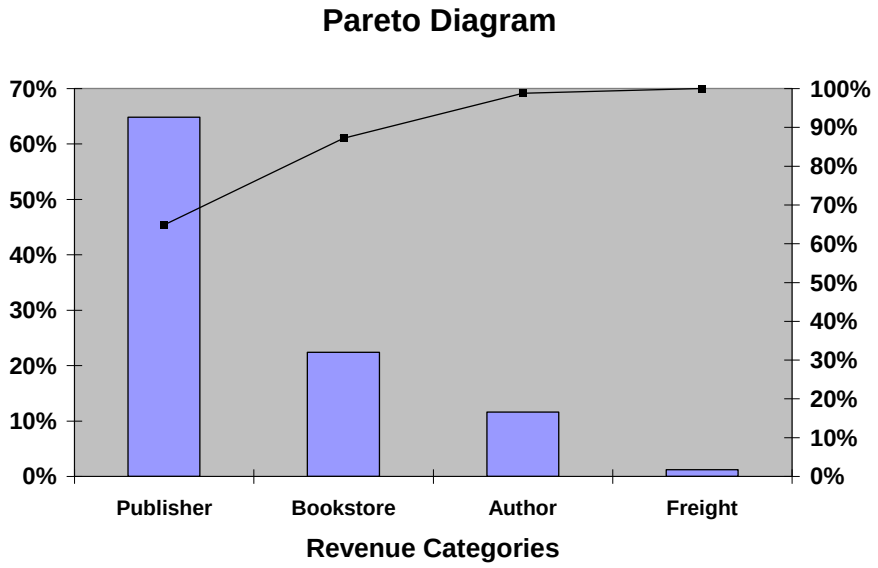
2.77 The multidimensional PivotTable can reveal additional patterns that cannot be seen in the a contingency table. One can also change the statistic displayed and compute descriptive statistics which can add insight into the data.

2.78 (a)

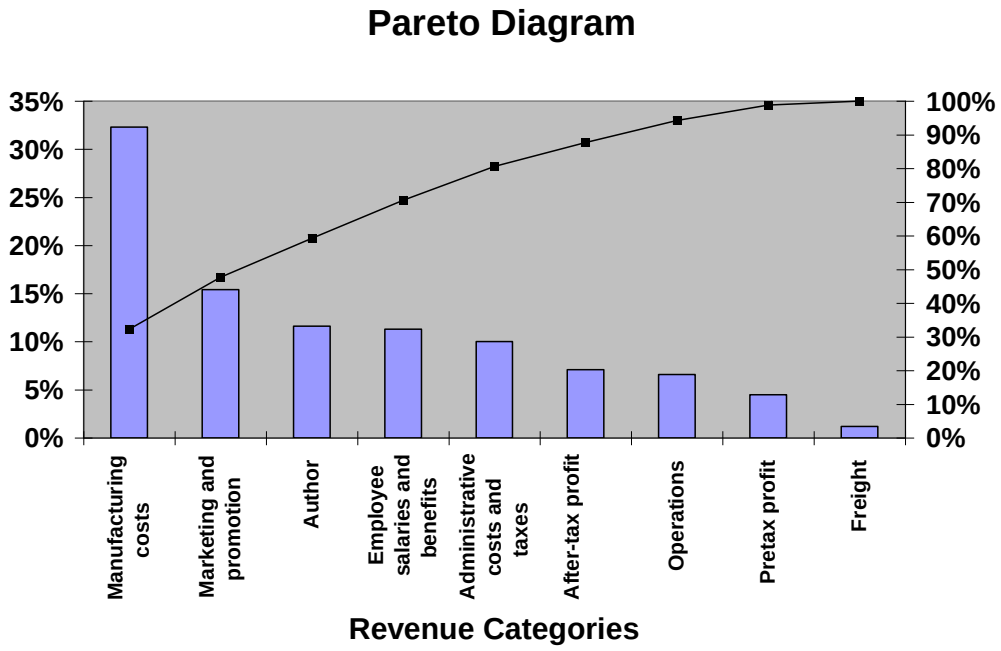




2.78 cont. (a)

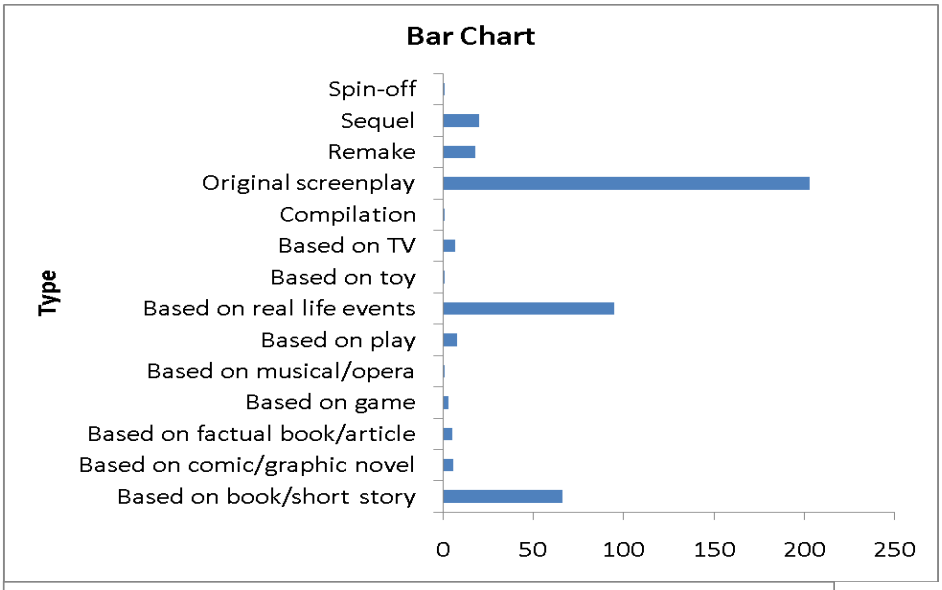


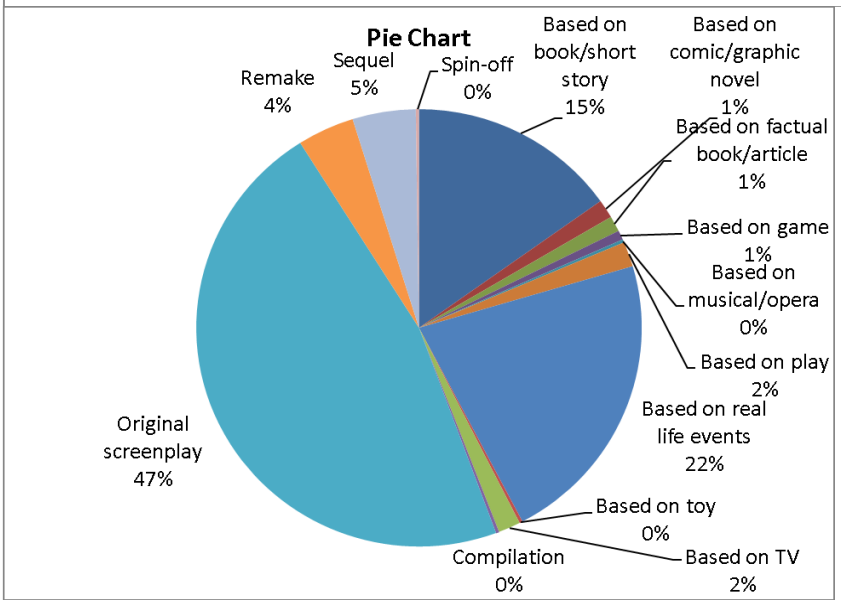
(b)



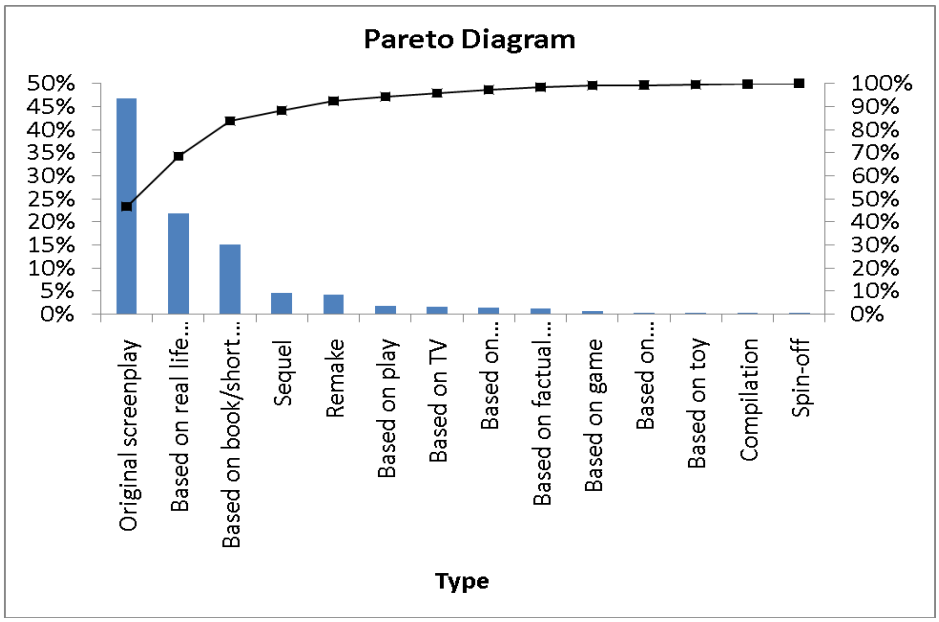
(c) The publisher gets the largest portion (64.8%) of the revenue. About half (32.3%) of the revenue received by the publisher covers manufacturing costs. The publisher's marketing and promotion account for the next largest share of the revenue, at 15.4%. Author, bookstore employee salaries and benefits, and publisher administrative costs and taxes each account for around 10% of the revenue, whereas the publisher after-tax profit, bookstore operations, bookstore pretax profit, and freight constitute the "trivial few" allocations of the revenue. Yes, the bookstore gets twice the revenue of the authors.

2.79 (a) **Number of Movies:**

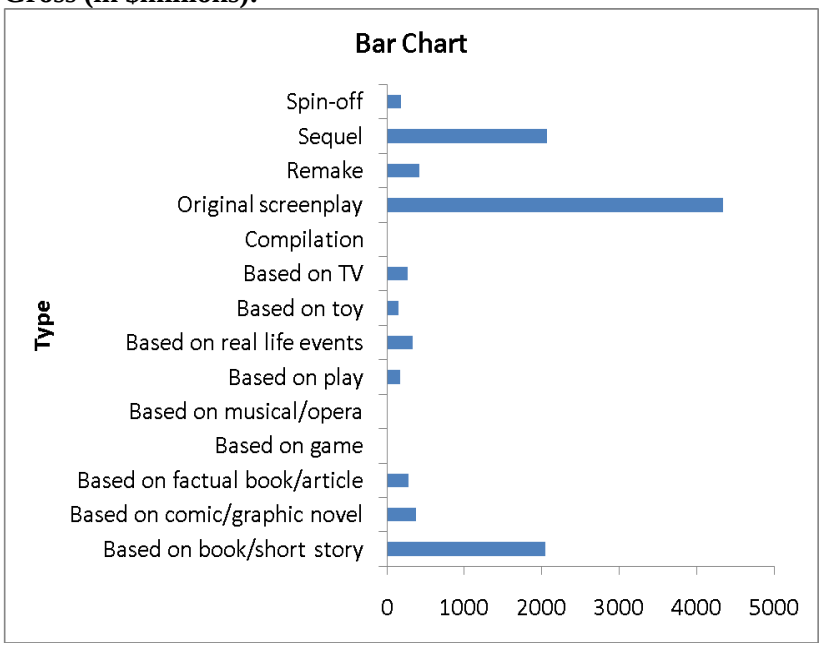




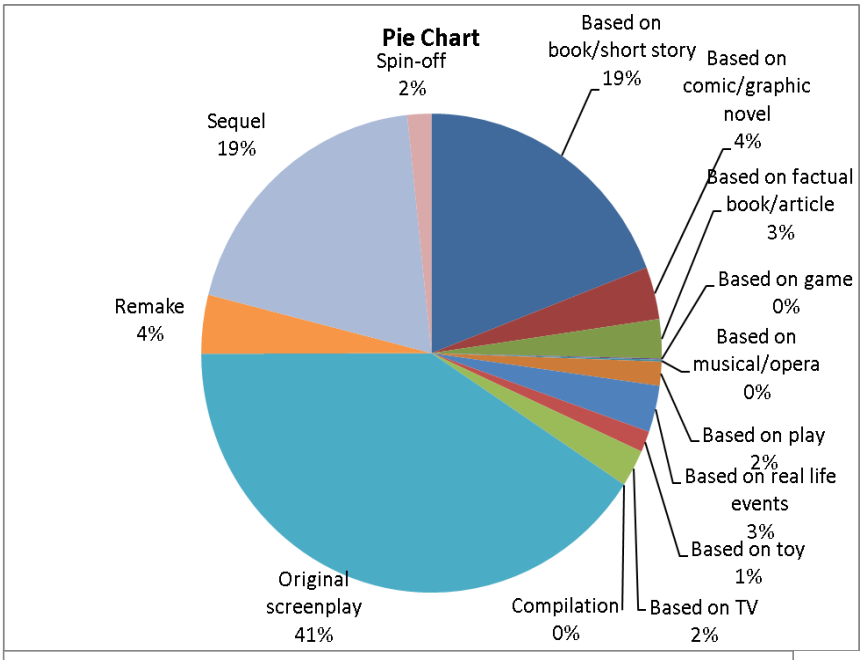
2.79 cont. (a)

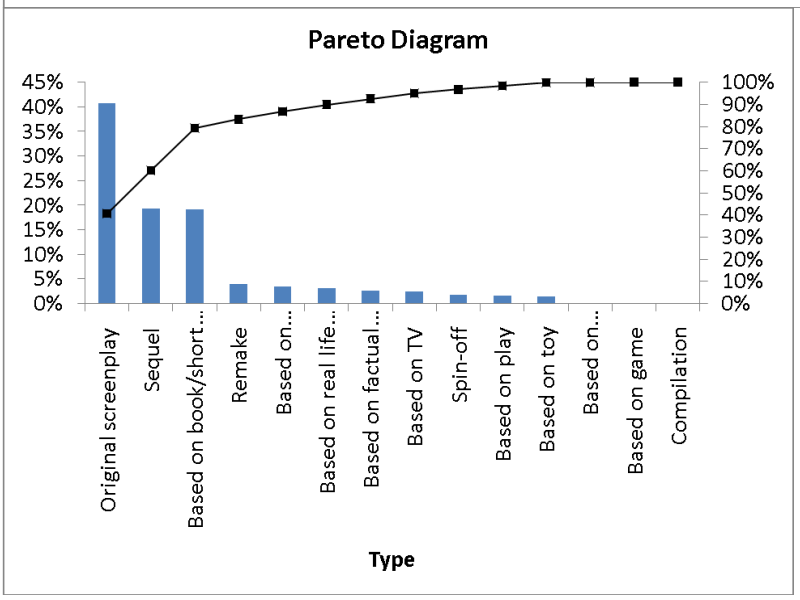


Gross (in $millions):

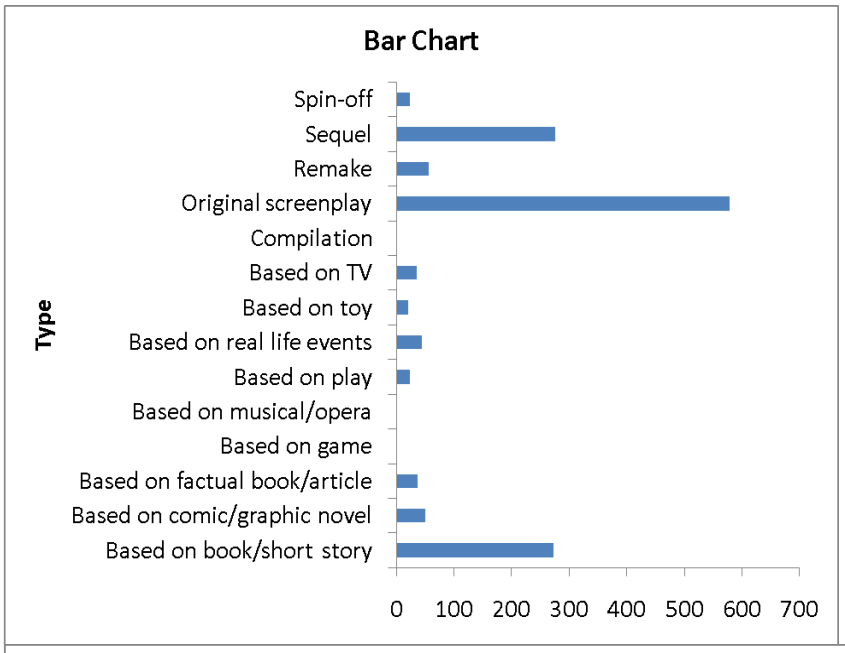


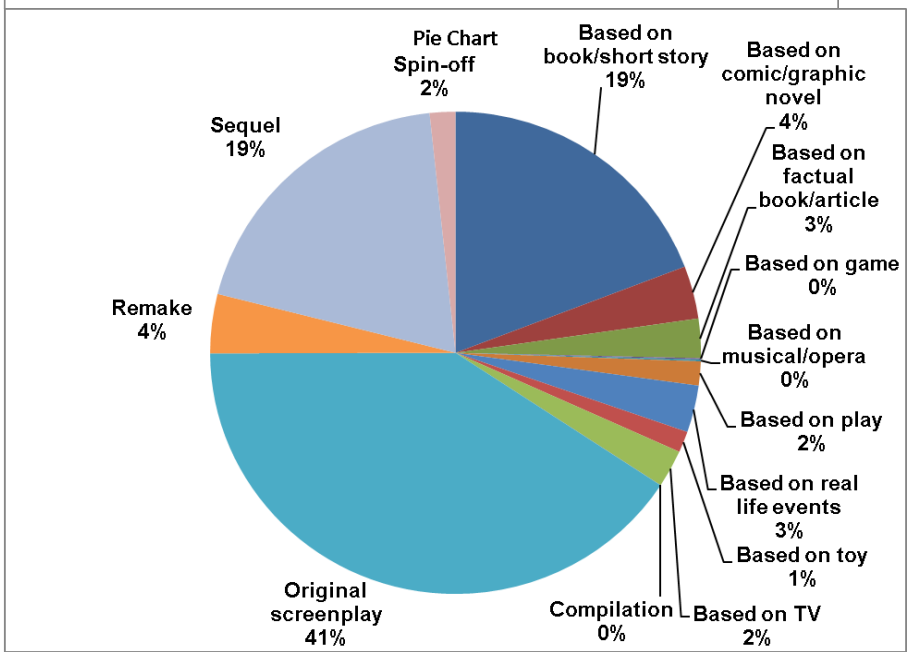
2.79 (a)
cont.


Pie Chart
Spin-off 2%
Based on book/short story 19%
Based on comic/graphic novel 4%
Based on factual book/article 3%
Based on game 0%
Based on musical/opera 0%
Based on play 2%
Based on real life events 3%
Based on toy 1%
Based on TV 2%
Compilation 0%
Original screenplay 41%
Sequel 19%
Remake 4%

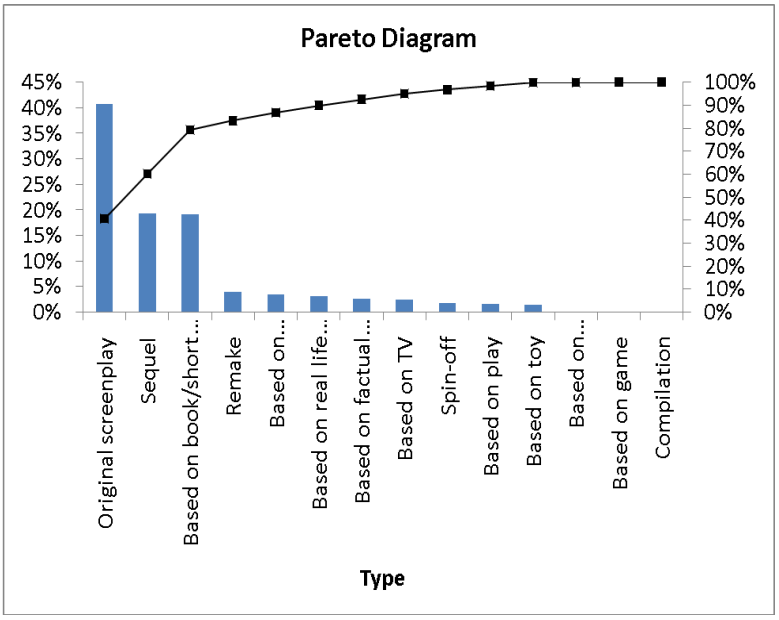

Pareto Diagram
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Original screenplay
Sequel
Based on book/short...
Remake
Based on...
Based on real life...
Based on factual...
Based on TV
Spin-off
Based on play
Based on toy
Based on...
Based on game
Compilation
Type

2.79 cont. (a) **Number of Tickets Sold (millions):**



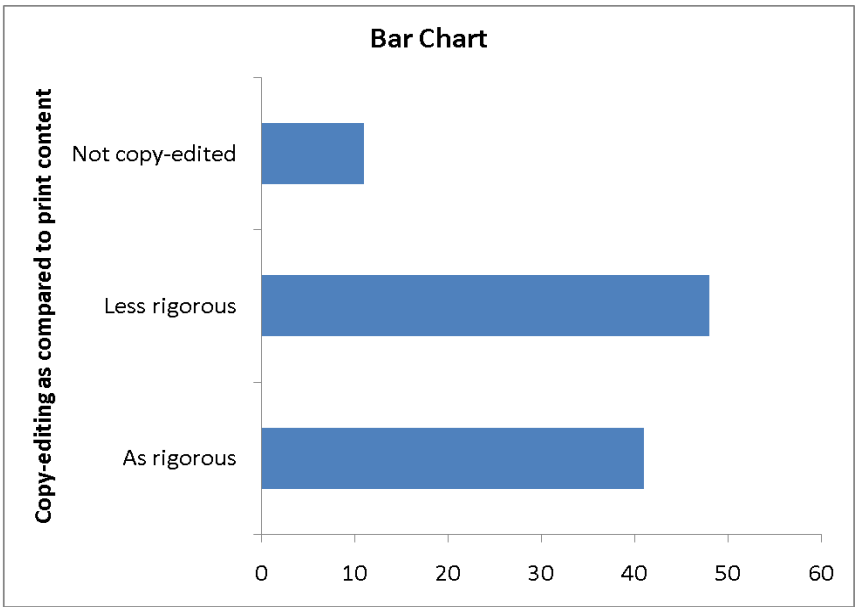


2.79 (a) cont.

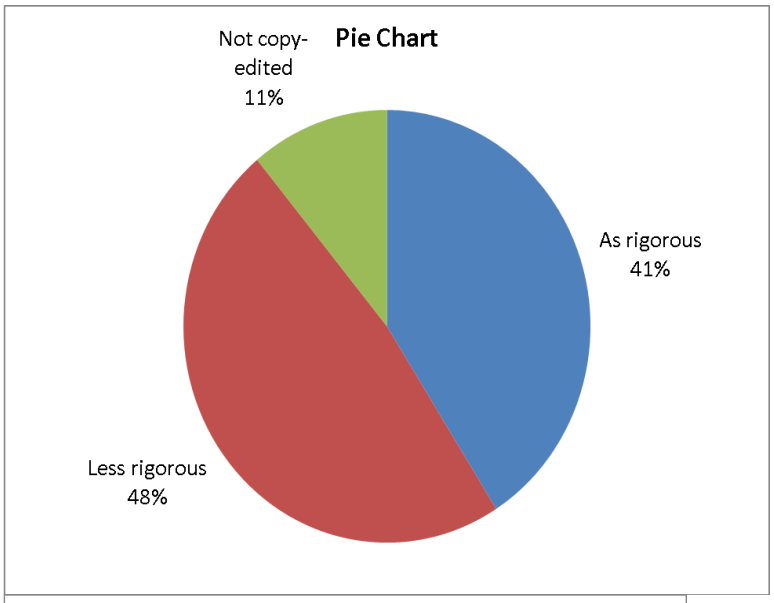


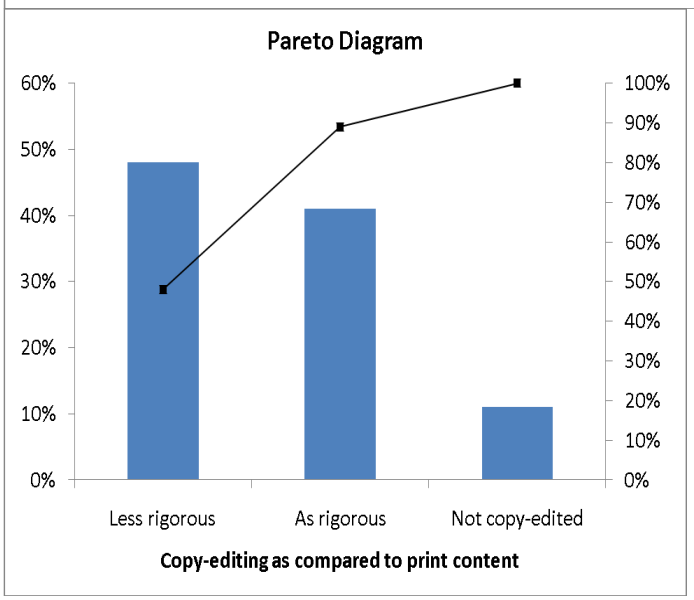
(b) Based on the Pareto chart for the number of movies, "Original screenplay", "Based on real life events" and "Based on book/short story" are the "vital few" and capture more than 80% of the market share. According to the Pareto chart for gross (in $millions) and number of ticket sold in millions, "Original screenplay", "Sequel" and "Based on book/short story" are the "vital few" and capture about 80% of the market share.

2.80 (a)



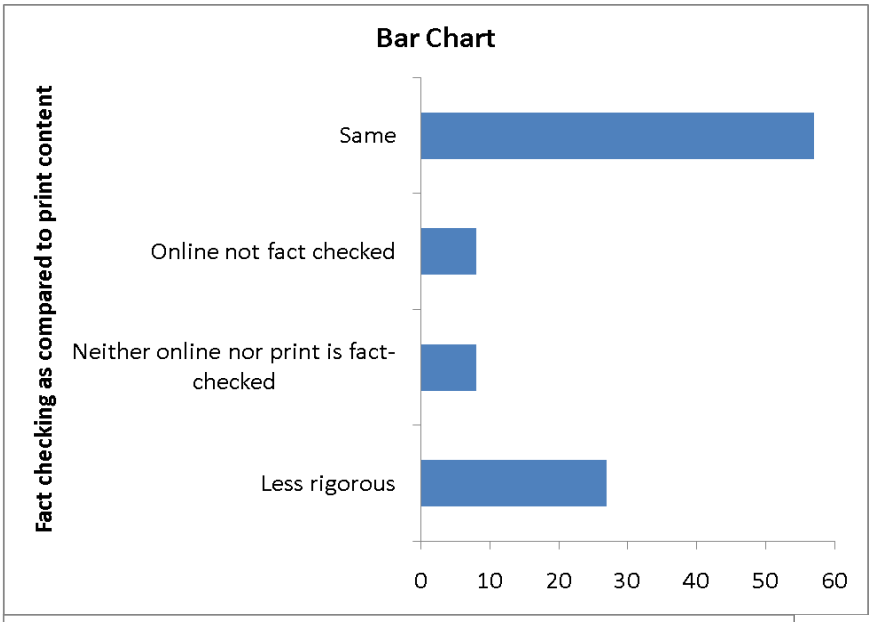
2.80 cont. (a)

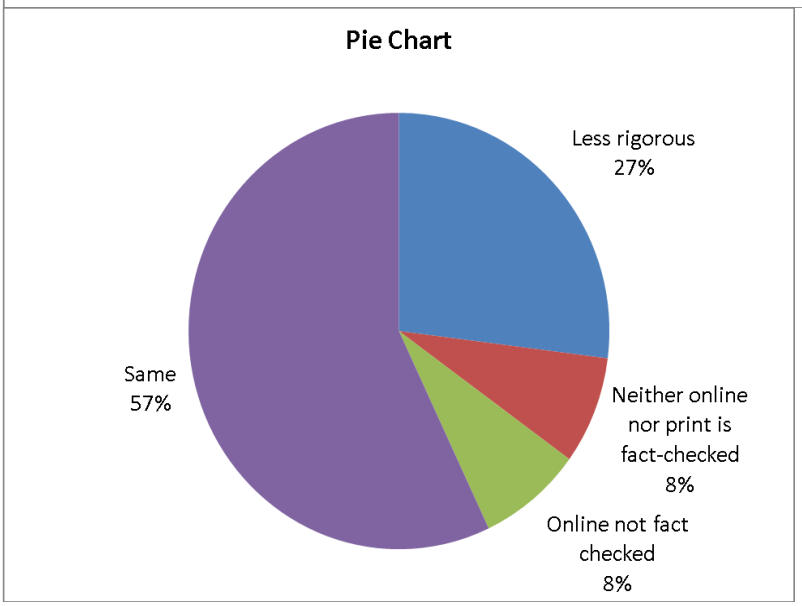




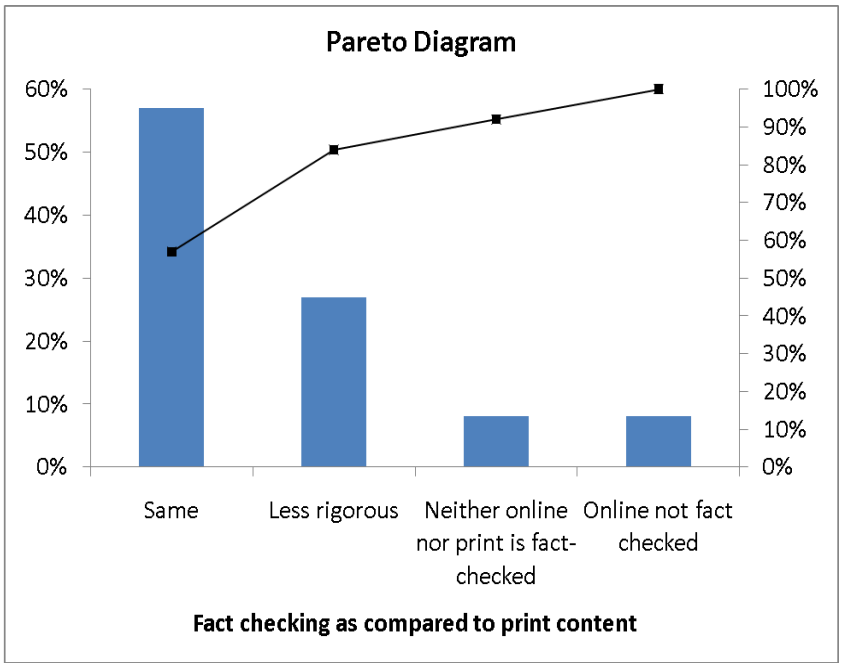
(b) Since there are only three categories, all the three graphical methods are capable of portraying these data well. The Pareto diagram, however, is better than the pie chart and bar chart because it not only sorts the frequencies in descending order, it also provides the cumulative polygon on the same scale.

2.80 (c)
cont.


Bar Chart
Fact checking as compared to print content
Same
Online not fact checked
Neither online nor print is fact-checked
Less rigorous
0
10
20
30
40
50
60


Pie Chart
Less rigorous 27%
Neither online nor print is fact-checked 8%
Online not fact checked 8%
Same 57%

2.80 cont. (c)



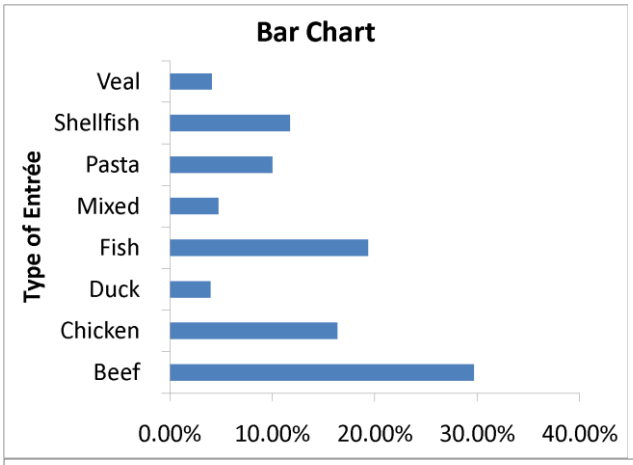
(d) Since there are only four categories, all the three graphical methods are capable of portraying these data well. The Pareto diagram, however, is better than the pie chart and bar chart because it not only sorts the frequencies in descending order, it also provides the cumulative polygon on the same scale.

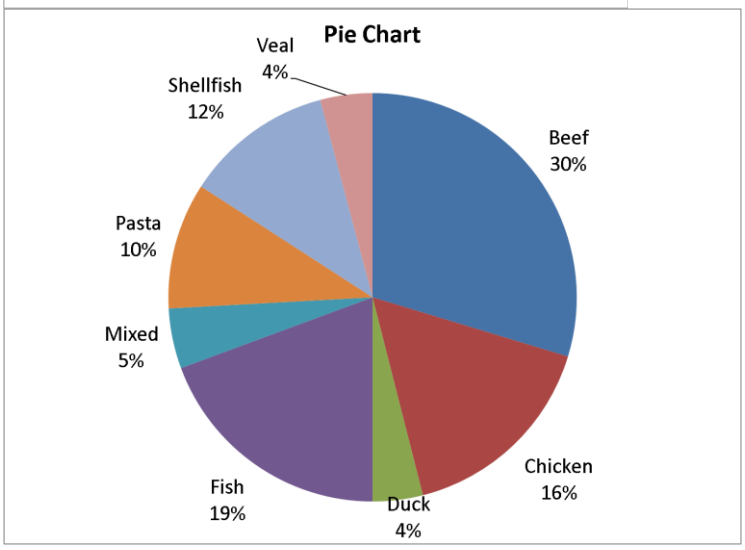
(e) Based on the Pareto chart for copy-editing, about 50% of the contents in online consumer magazines receive less rigorous copy-editing. Based on the Pareto chart for fact-checking, more than 50% of the contents in online consumer magazines receive the same amount of fact-checking.

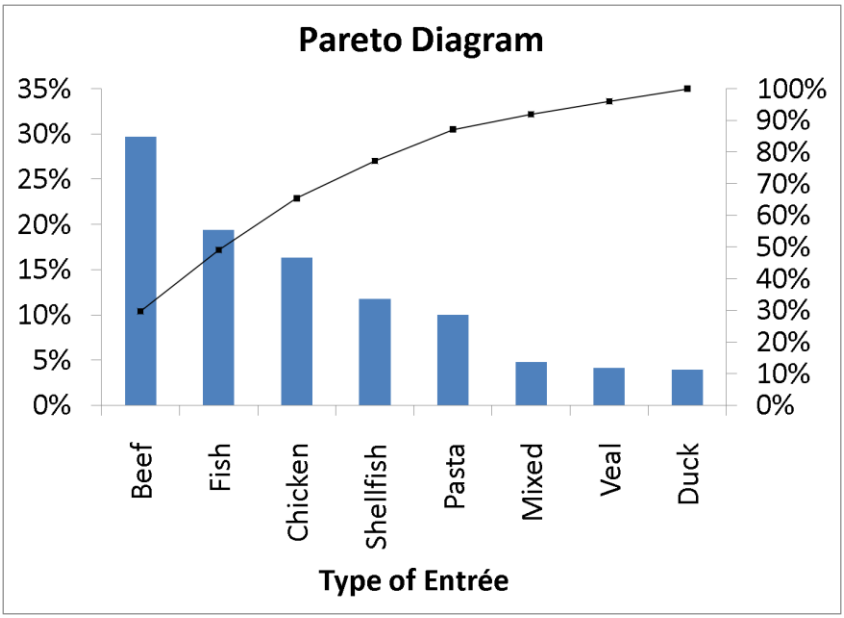
2.81 (a)

Type of Entrée	%	Number S
Beef	29.68%	187
Chicken	16.35%	103
Mixed	4.76%	30
Duck	3.97%	25
Fish	19.37%	122
Pasta	10.00%	63
Shellfish	11.75%	74
Veal	4.13%	26
Total	100.00%	630

2.81 (b)
cont.


Bar Chart
Type of Entrée
Veal
Shellfish
Pasta
Mixed
Fish
Duck
Chicken
Beef
0.00%
10.00%
20.00%
30.00%
40.00%


Pie Chart
Veal 4%
Shellfish 12%
Beef 30%
Pasta 10%
Mixed 5%
Chicken 16%
Fish 19%
Duck 4%


Pareto Diagram
35%
30%
25%
20%
15%
10%
5%
0%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Beef
Fish
Chicken
Shellfish
Pasta
Mixed
Veal
Duck
Type of Entrée

2.81 cont. (c) The Pareto diagram has the advantage of offering the cumulative percentage view of the categories and, hence, enables the viewer to separate the "vital few" from the "trivial many".

(d) Beef and fish account for nearly 50% of all entrees ordered by weekend patrons of a continental restaurant. When chicken is included, nearly two-thirds of the entrees are accounted for.

2.82 (a)

	Gender			Beef Entrée			
Dessert Ordered	**Male**	**Female**	**Total**	**Dessert Ordered**	**Yes**	**No**	**Total**
Yes	71%	29%	100%	**Yes**	52%	48%	100%
No	48%	52%	100%	**No**	25%	75%	100%
Total	53%	47%	100%	**Total**	31%	69%	100%

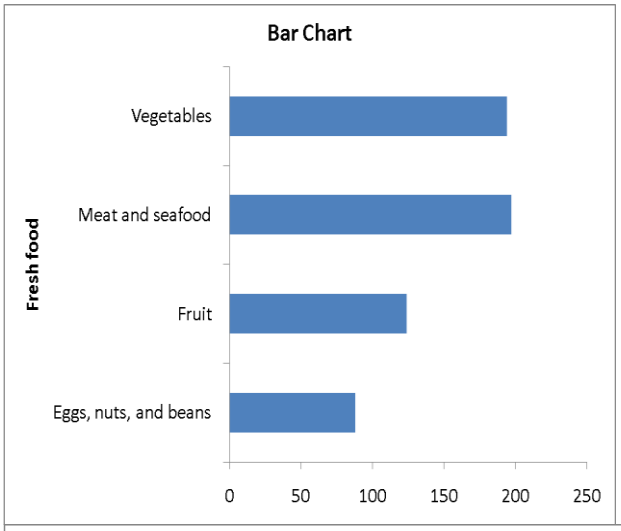
	Gender			Beef Entrée			
Dessert Ordered	**Male**	**Female**	**Total**	**Dessert Ordered**	**Yes**	**No**	**Total**
Yes	30%	14%	23%	**Yes**	38%	16%	23%
No	70%	86%	77%	**No**	62%	84%	77%
Total	100%	100%	100%	**Total**	100%	100%	100%

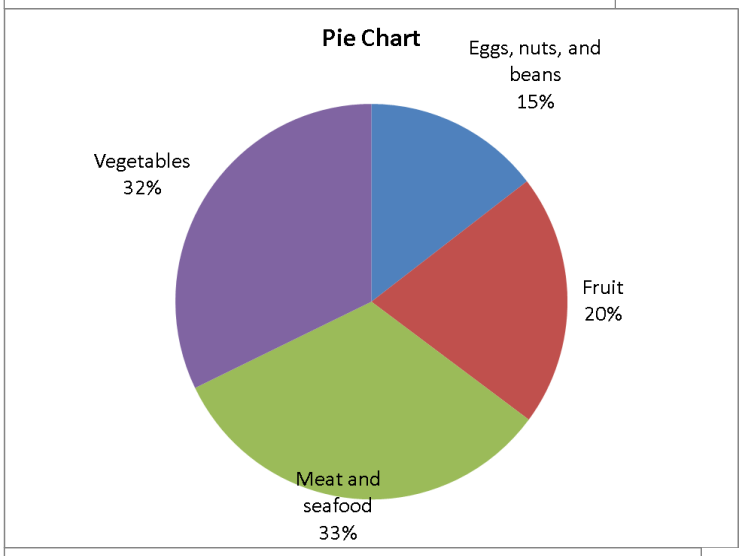
	Gender			Beef Entrée			
Dessert Ordered	**Male**	**Female**	**Total**	**Dessert Ordered**	**Yes**	**No**	**Total**
Yes	16%	7%	23%	**Yes**	12%	11%	23%
No	37%	40%	77%	**No**	19%	58%	77%
Total	53%	47%	100%	**Total**	31%	69%	100%

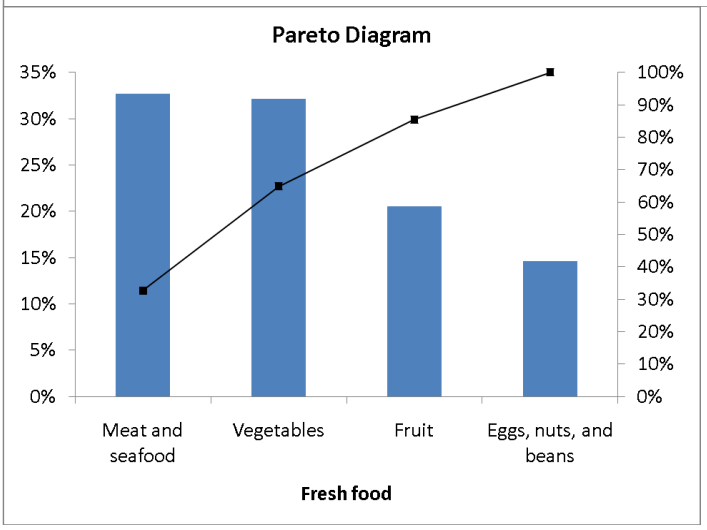
(b) If the owner is interested in finding out the percentage of joint occurrence of gender and ordering of dessert or the percentage of joint occurrence of ordering a beef entrée and a dessert among all patrons, the table of total percentages is most informative. If the owner is interested in the effect of gender on ordering of dessert or the effect of ordering a beef entrée on the ordering of dessert, the table of column percentages will be most informative. Since dessert will usually be ordered after the main entree and the owner has no direct control over the gender of patrons, the table of row percentages is not very useful here.

(c) 30% of the men sampled ordered desserts compared to 14% of the women. Men are more than twice as likely to order desserts as women. Almost 38% of the patrons ordering a beef entree ordered dessert compared to less than 16% of patrons ordering all other entrees. Patrons ordering beef are better than 2.3 times as likely to order dessert as patrons ordering any other entree.

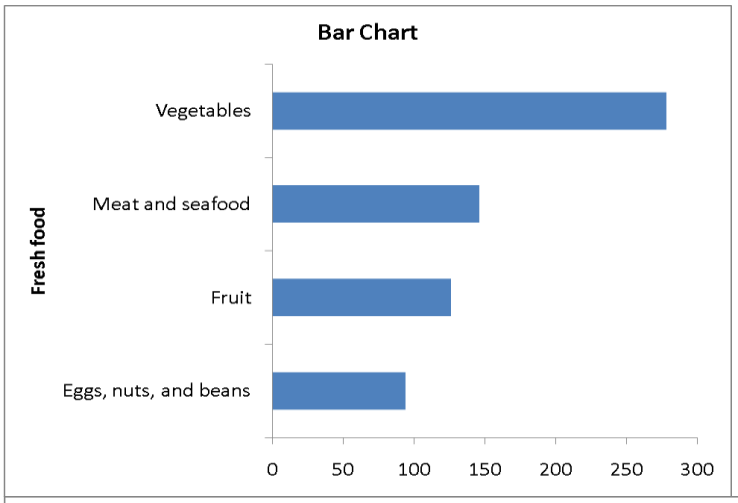
2.83 (a) **United States Fresh Food Consumed:**

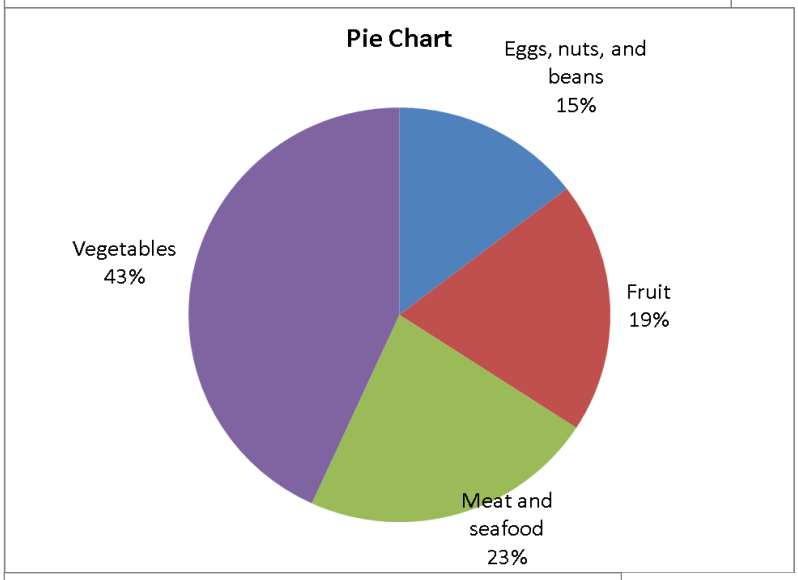


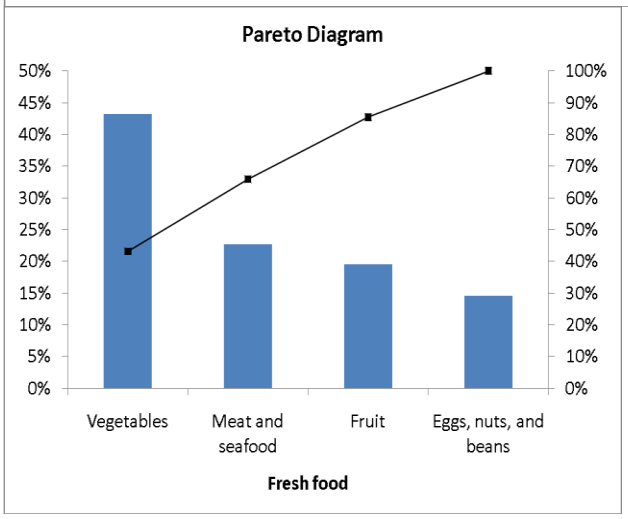




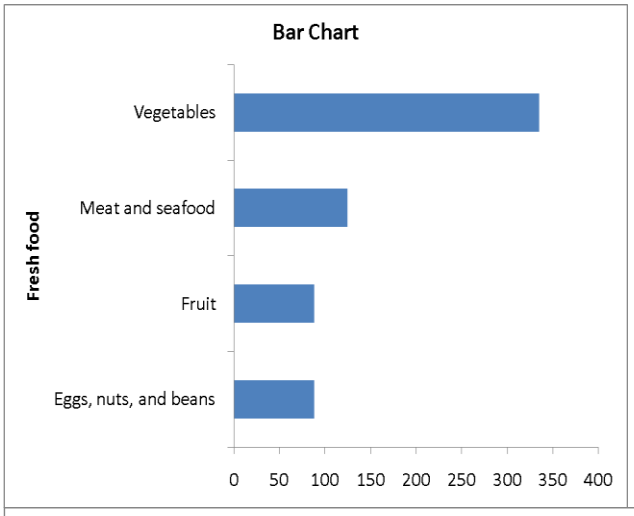
2.83 cont. (a) **Japan Fresh Food Consumed:**

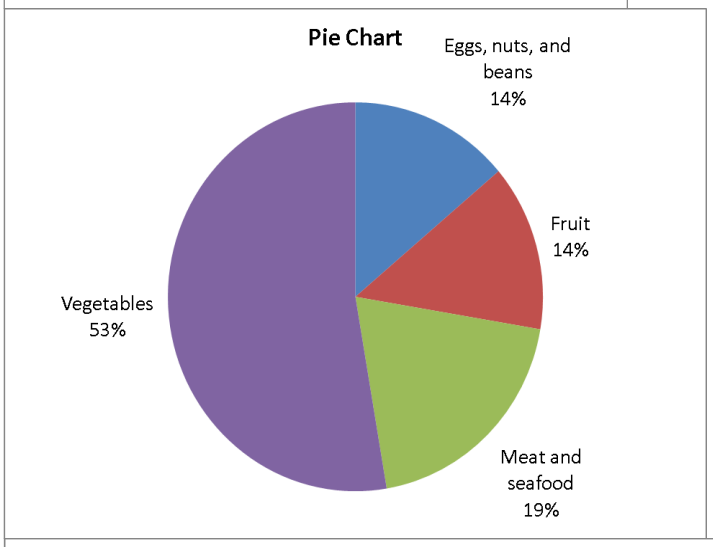


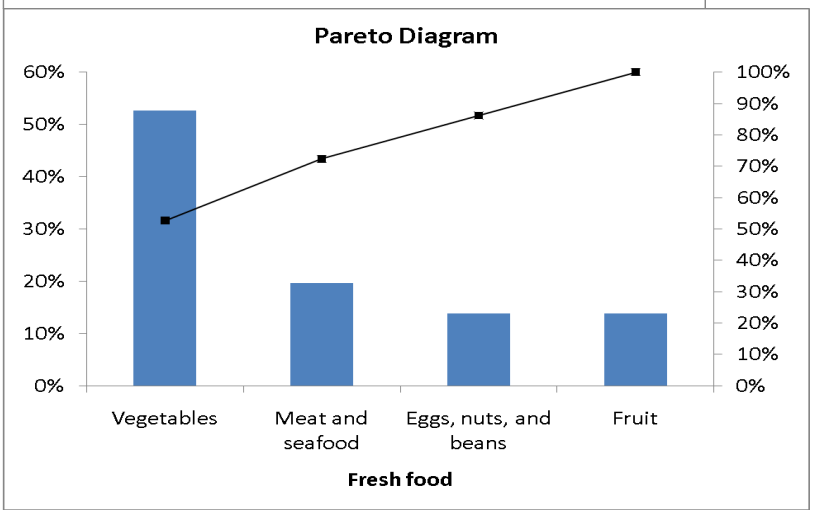




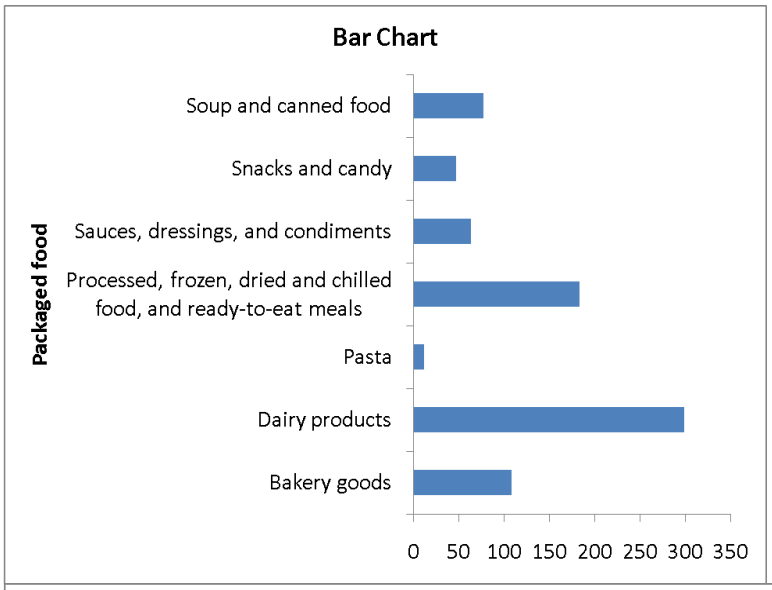
2.83 cont. (a) **Russia Fresh Food Consumed:**

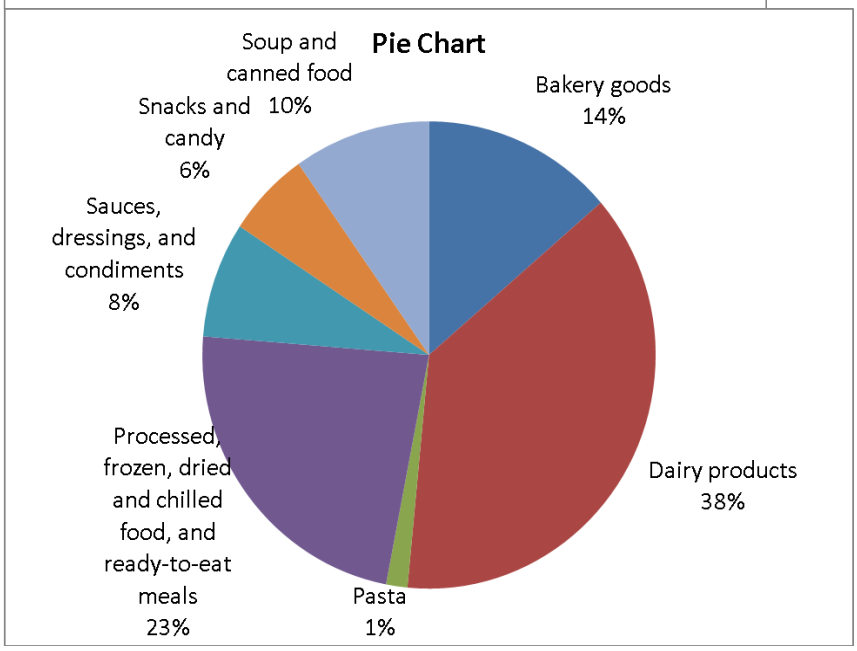




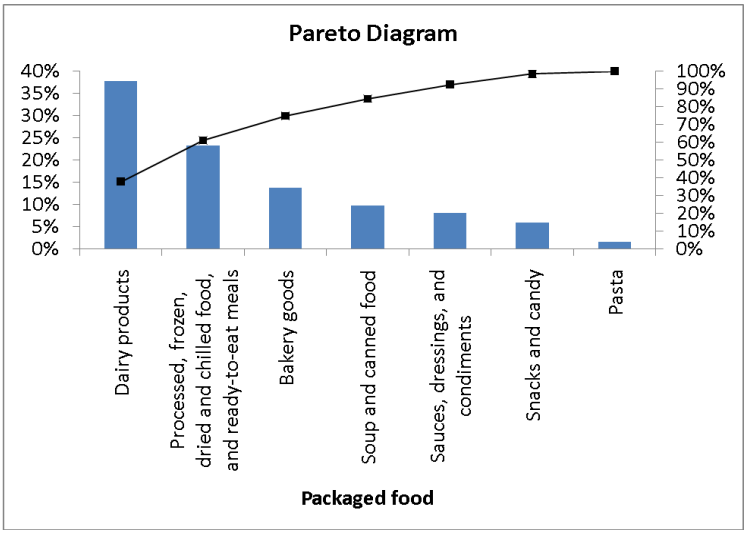


2.83 cont. (b) **United States Packaged Food Consumed:**

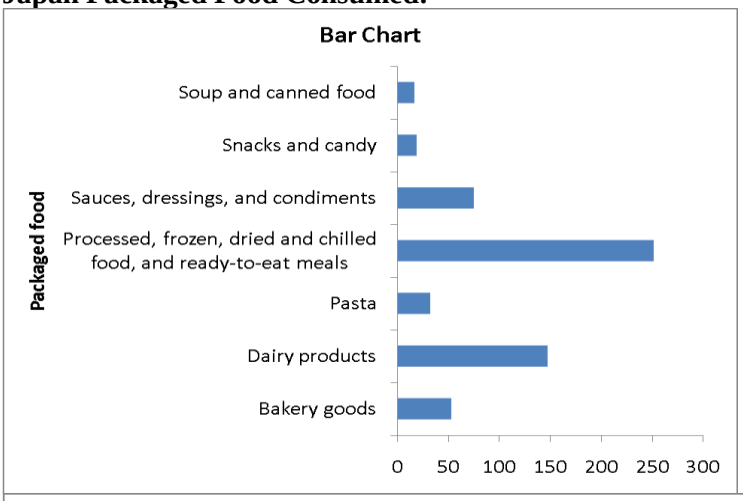


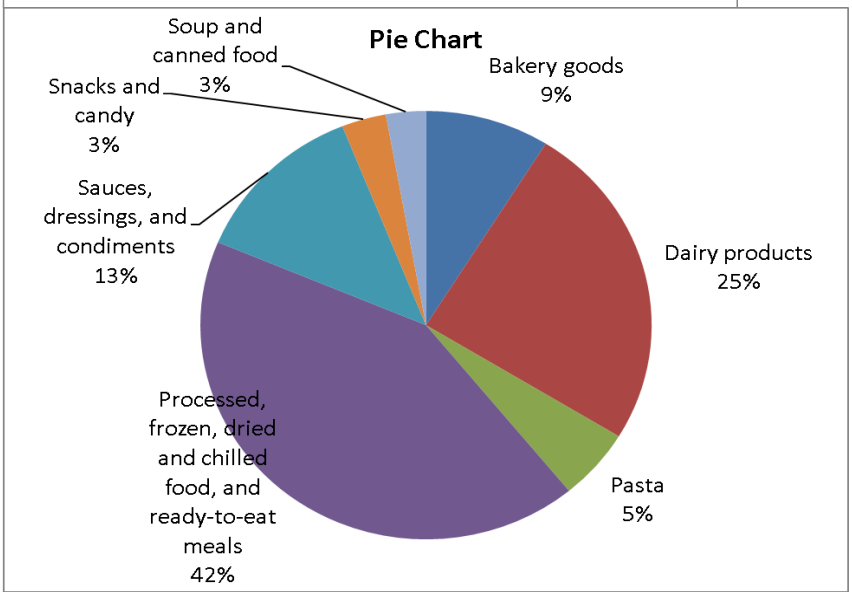


2.83 (b)
cont.

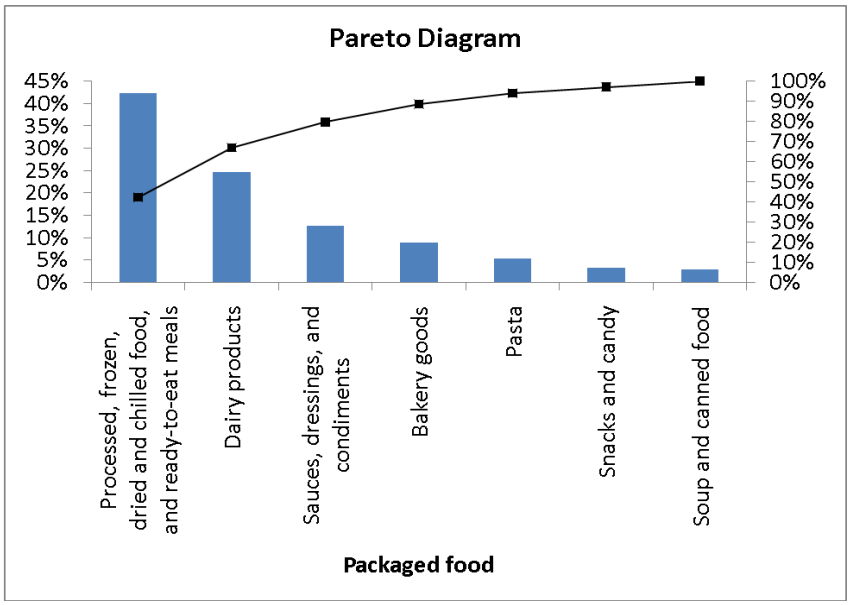


Japan Packaged Food Consumed:

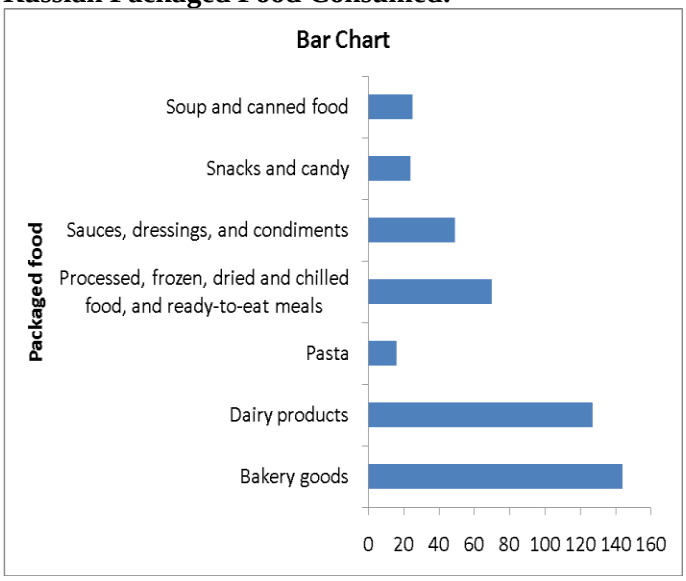




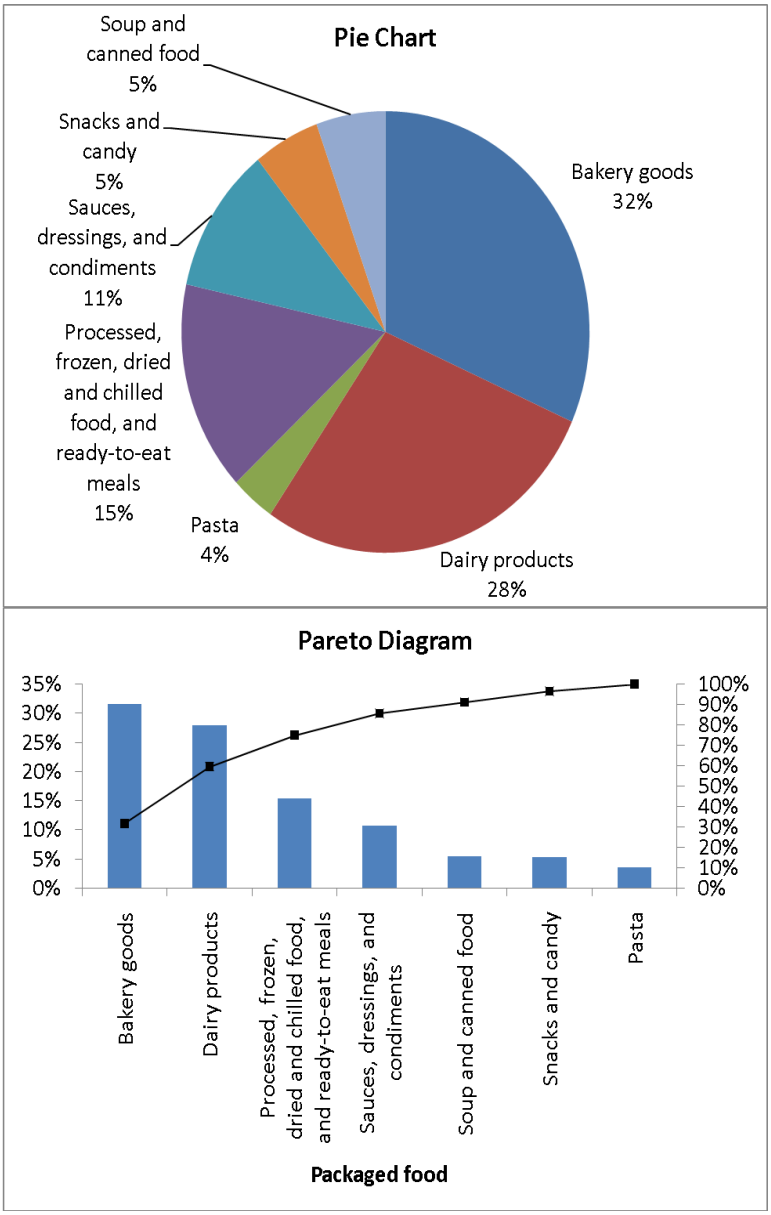
2.83 (b) cont.



Russian Packaged Food Consumed:

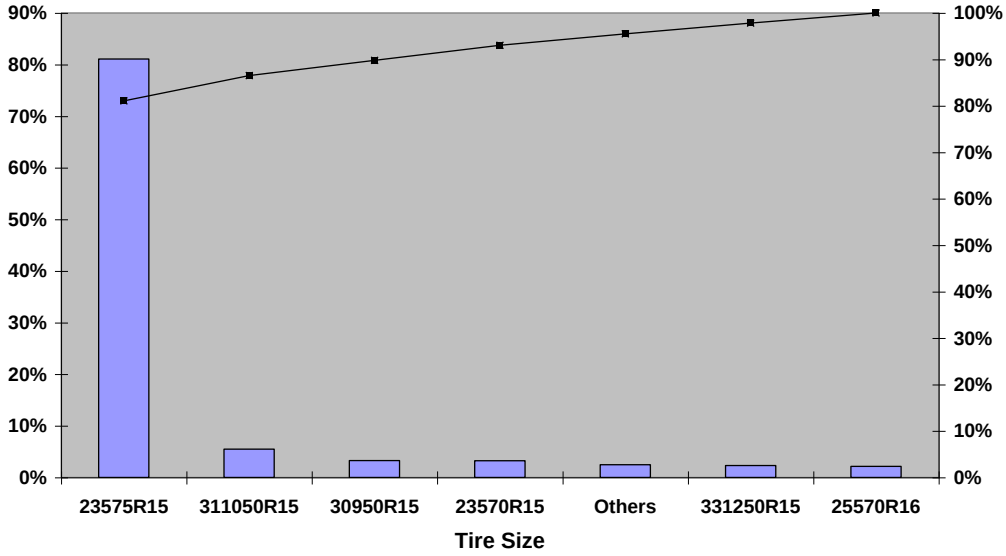


2.83 (b)
cont.



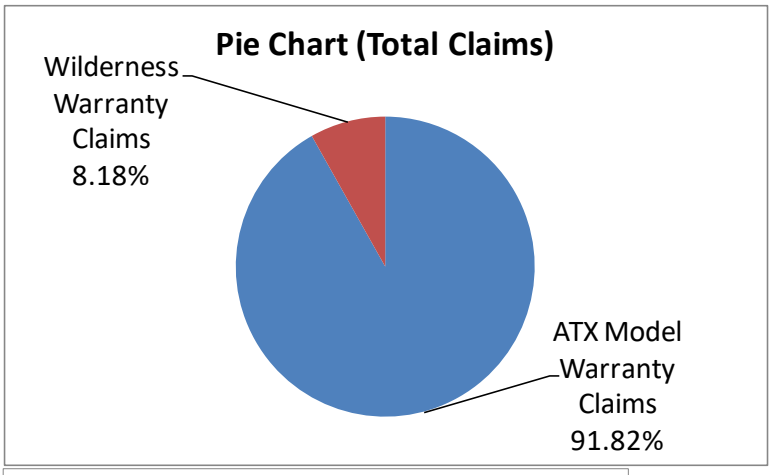
(c) The fresh food consumption pattern between Japanese and Russians are quite similar with vegetables taking up the largest share followed by meats and seafood while Americans consume about the same amount of meats and seafood, and vegetables. Among the three countries, vegetables, and meats and seafood constitute more than 60% of the fresh food consumption.
For Americans, dairy products, and processed, frozen, dried and chilled food and ready-to-eat meals make up slightly more than 60% of the packaged food consumption. For Japanese, processed, frozen, dried and chilled food, and ready-to-eat meals, and dairy products constitute more than 60% of their packaged food consumption. For the Russians, bakery goods and dairy products take up 60% of the share of their packaged food consumption.

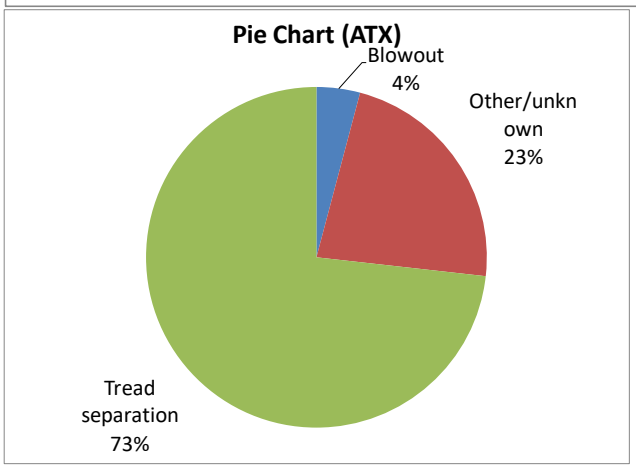
2.84 (a)



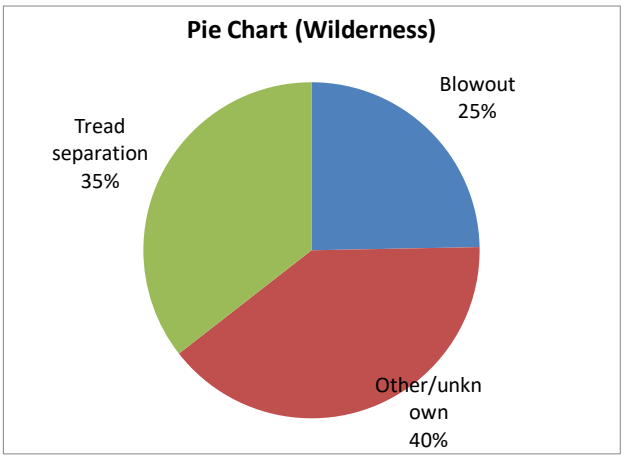
23575R15 accounts for over 80% of the warranty claims.

(b)



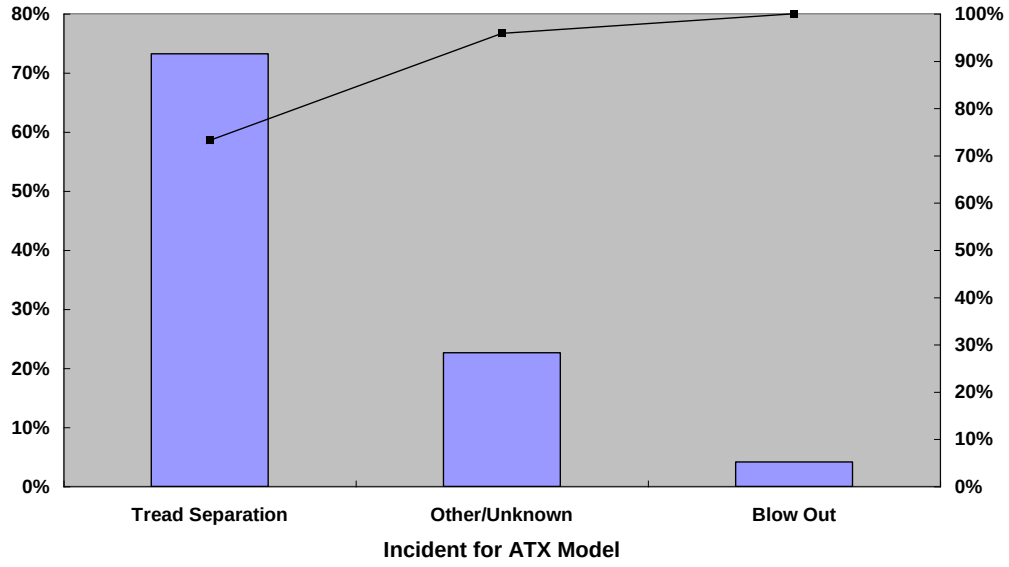


2.84 cont. (b)



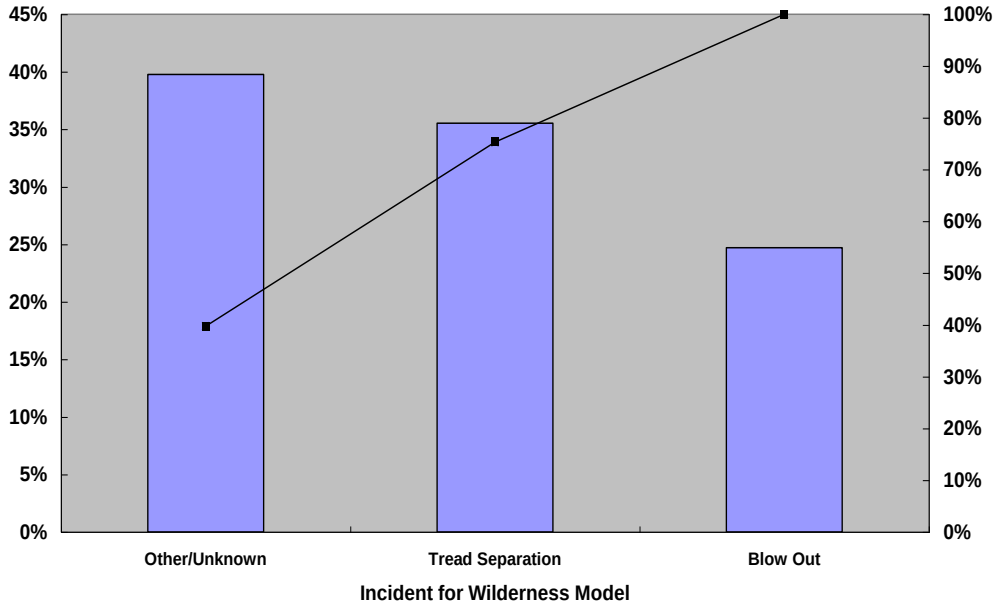
91.82% of the warranty claims are from the ATX model.

(c)



Tread separation accounts for 73.23% of the warranty claims among the ATX model..

2.84 (d) cont.

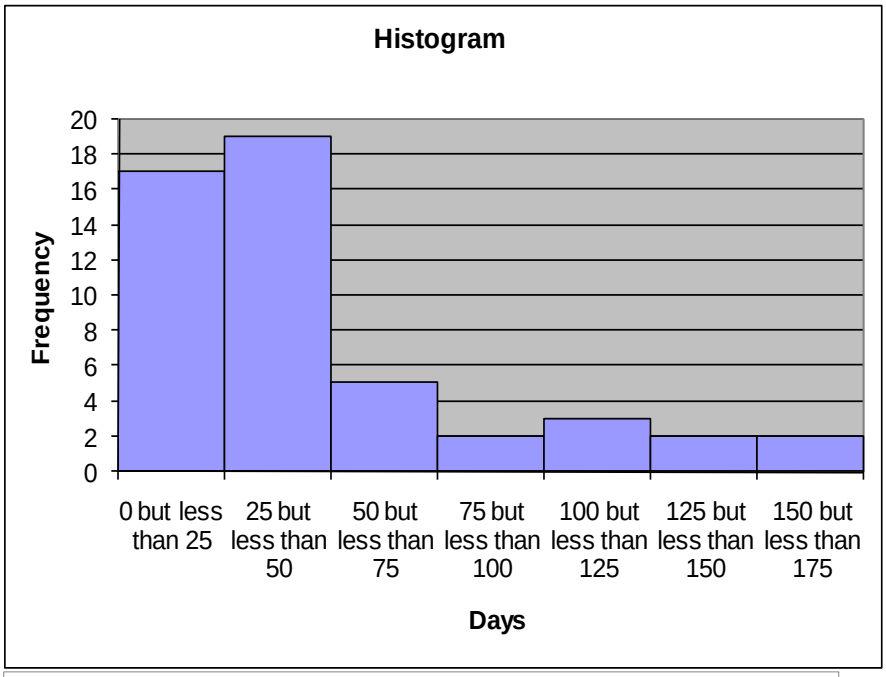


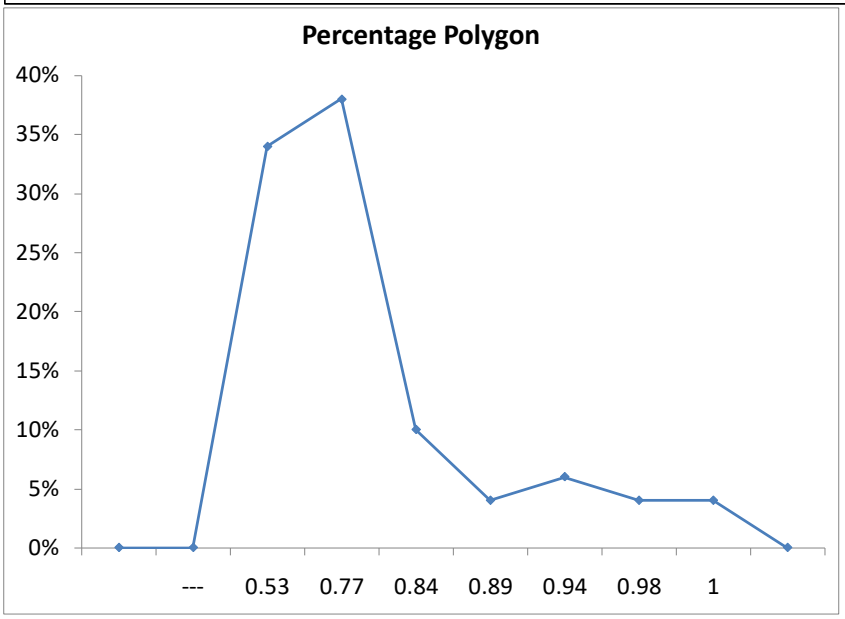
The number of claims is fairly evenly distributed among the three incidents; other/unknown incidents account for almost 40% of the claims, tread separation accounts for about 35% of the claims, and blowout accounts for about 25% of the claims.

2.85 (a)

Range	*Frequency*	*Percentage*
0 but less than 25	17	34%
25 but less than 50	19	38%
50 but less than 75	5	10%
75 but less than 100	2	4%
100 but less than 125	3	6%
125 but less than 150	2	4%
150 but less than 175	2	4%

2.85 (b)
cont.

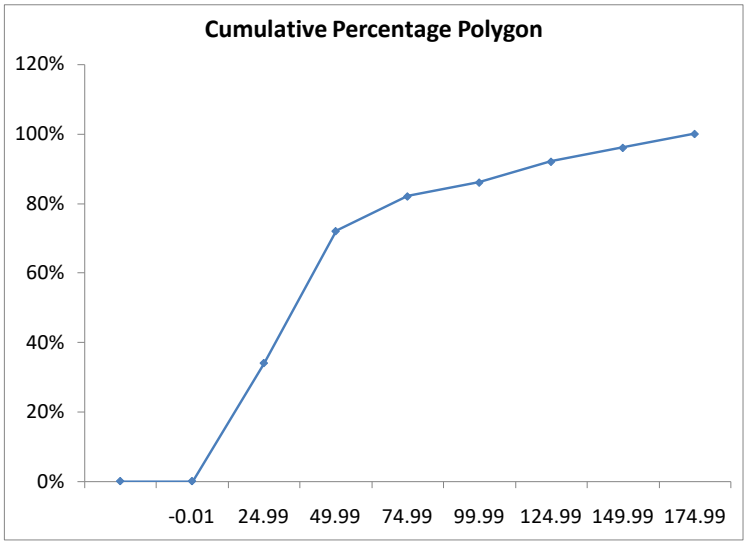

Histogram
Frequency
20
18
16
14
12
10
8
6
4
2
0
0 but less than 25
25 but less than 50
50 but less than 75
75 but less than 100
100 but less than 125
125 but less than 150
150 but less than 175
Days


Percentage Polygon
40%
35%
30%
25%
20%
15%
10%
5%
0%

0.53
0.77
0.84
0.89
0.94
0.98
1

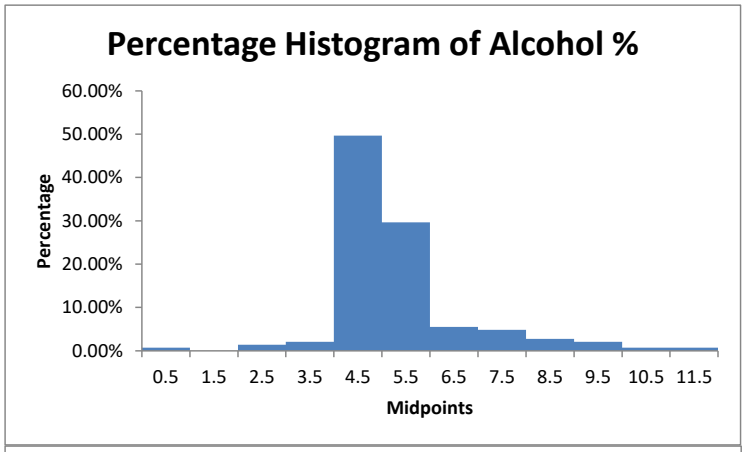
2.85 cont. (c)

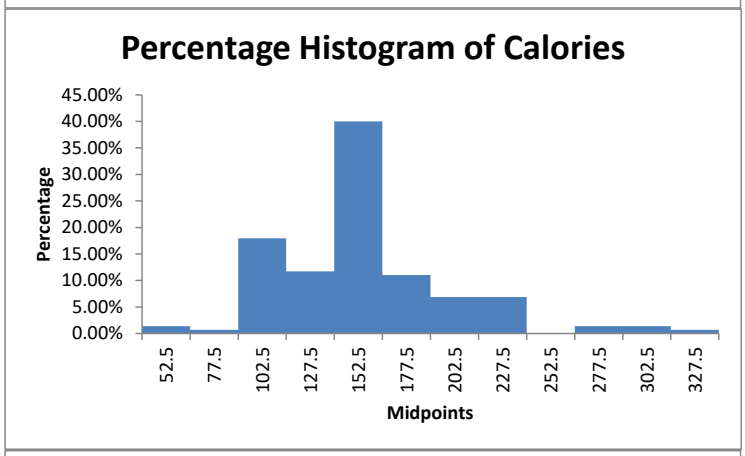
Range	*Cumulative %*
0 but less than 25	34%
25 but less than 50	72%
50 but less than 75	82%
75 but less than 100	86%
100 but less than 125	92%
125 but less than 150	96%
150 but less than 175	100%

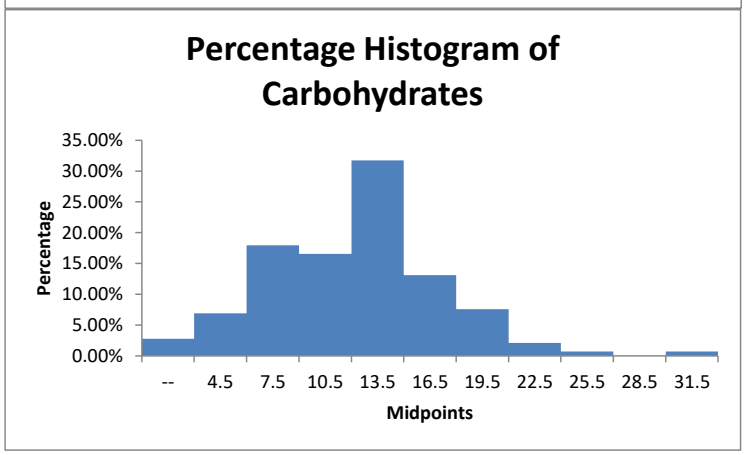


(d) You should tell the president of the company that over half of the complaints are resolved within a month, but point out that some complaints take as long as three or four months to settle.

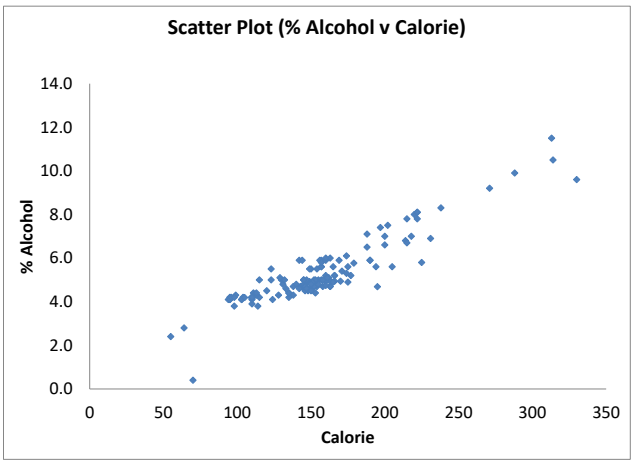
2.86 (a)

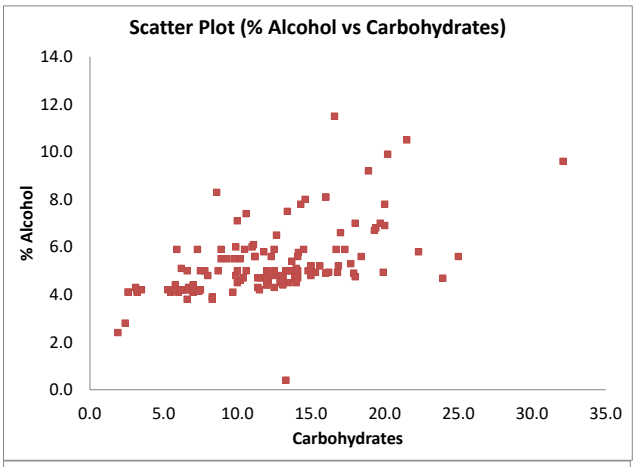

Percentage Histogram of Alcohol %
Percentage
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5
Midpoints

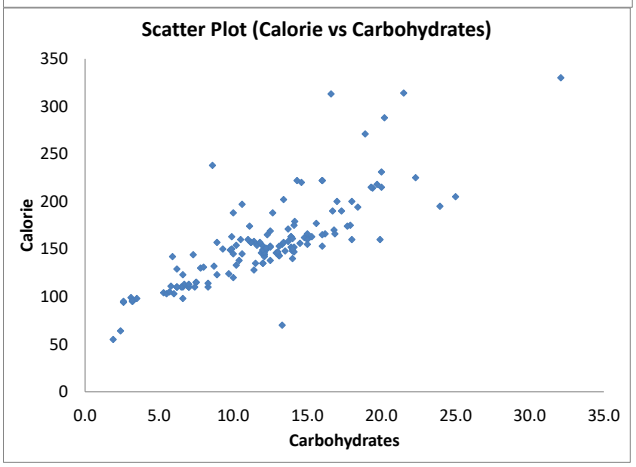

Percentage Histogram of Calories
Percentage
45.00%
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
52.5 77.5 102.5 127.5 152.5 177.5 202.5 227.5 252.5 277.5 302.5 327.5
Midpoints


Percentage Histogram of Carbohydrates
Percentage
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
-- 4.5 7.5 10.5 13.5 16.5 19.5 22.5 25.5 28.5 31.5
Midpoints

2.86 (b) cont.


Scatter Plot (% Alcohol v Calorie)
% Alcohol
Calorie
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
0
50
100
150
200
250
300
350


Scatter Plot (% Alcohol vs Carbohydrates)
% Alcohol
Carbohydrates
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0


Scatter Plot (Calorie vs Carbohydrates)
Calorie
Carbohydrates
0
50
100
150
200
250
300
350
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0

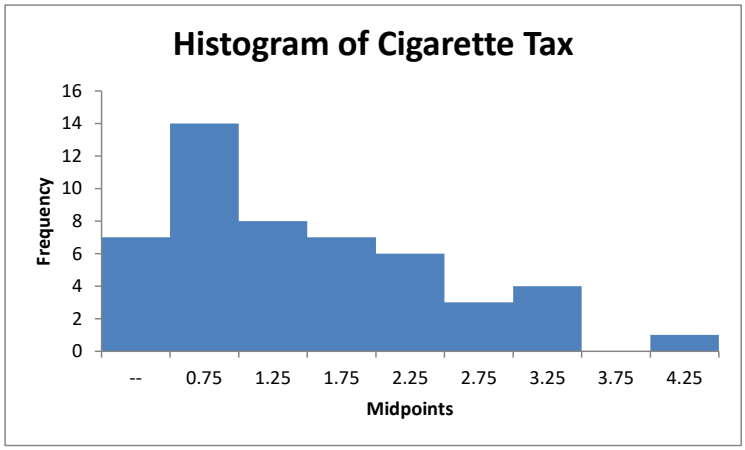
2.86 cont. (c) The alcohol percentage is concentrated between 4% and 6%, with the largest concentration between 4% and 5%. The calories are concentrated between 140 and 160. The carbohydrates are concentrated between 12 and 15. There are outliers in the percentage of alcohol in both tails. The outlier in the lower tail is due to the non-alcoholic beer O'Doul's with only a 0.4% alcohol content. There are a few beers with alcohol content as high as around 11.5%. There are a few beers with calorie content as high as 330 and carbohydrates as high as 32.1. There is a strong positive relationship between percentage alcohol and calories, and calories and carbohydrates and a moderately positive relationship between percentage alcohol and carbohydrates.

There is a strong positive relationship between percentage alcohol and calories, and calories and carbohydrates and a moderately positive relationship between percentage alcohol and carbohydrates.

2.87 (a) Ordered array:

0.170, 0.300, 0.360, 0.370, 0.425, 0.440, 0.450, 0.550, 0.570, 0.570, 0.600, 0.600, 0.620, 0.640, 0.680, 0.790, 0.800, 0.840, 0.870, 0.980, 0.995, 1.030, 1.150, 1.180, 1.230, 1.250, 1.339, 1.360, 1.410, 1.530, 1.600, 1.600, 1.660, 1.700, 1.700, 1.780, 2.000, 2.000, 2.000, 2.000, 2.000, 2.240, 2.510, 2.520, 2.700, 3.000, 3.000, 3.025, 3.460, 4.350

(b)



(c) There is a 4.18% difference in the state cigarette tax between the lowest and highest. The distribution of the cigarette tax is somewhat right-skewed with a few states having a cigarette tax higher than 3.0%. Majority of the states though have cigarette tax concentrated around 0.75%.

2.88 (a) 1-year CD

Stem-and-Leaf Display

Stem unit: 0.1

Statistics	
Sample Size	23
Mean	1.046957
Median	1.16
Std. Deviation	0.219968
Minimum	0.6
Maximum	1.26

6	0 0
7	5
8	0 0 5
9	0 1
10	0
11	1 5 6
12	0 0 0 0 0 1 4 4 5 5 6

5-year CD

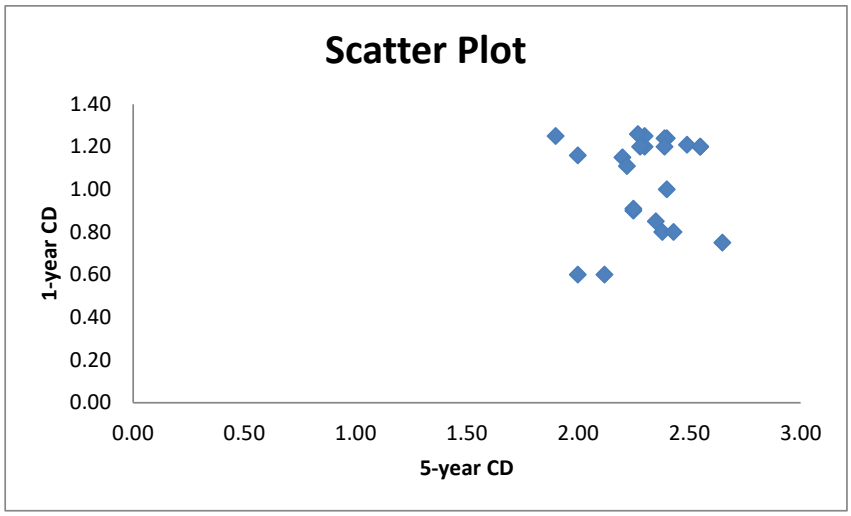
Stem-and-Leaf Display

Stem unit: 0.1

Statistics	
Sample Size	23
Mean	2.307391
Median	2.3
Std. Deviation	0.183333
Minimum	1.9
Maximum	2.65

19	0
20	0 0
21	2
22	0 2 5 5 7 8
23	0 0 5 8 9 9
24	0 0 3 9
25	5 5
26	5

2.88 cont. (b)

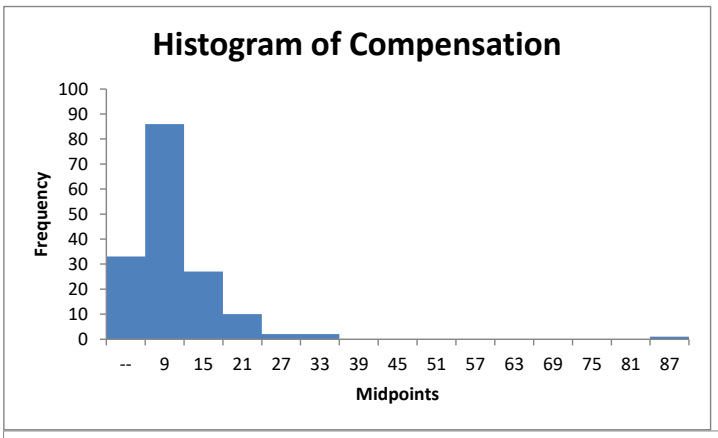


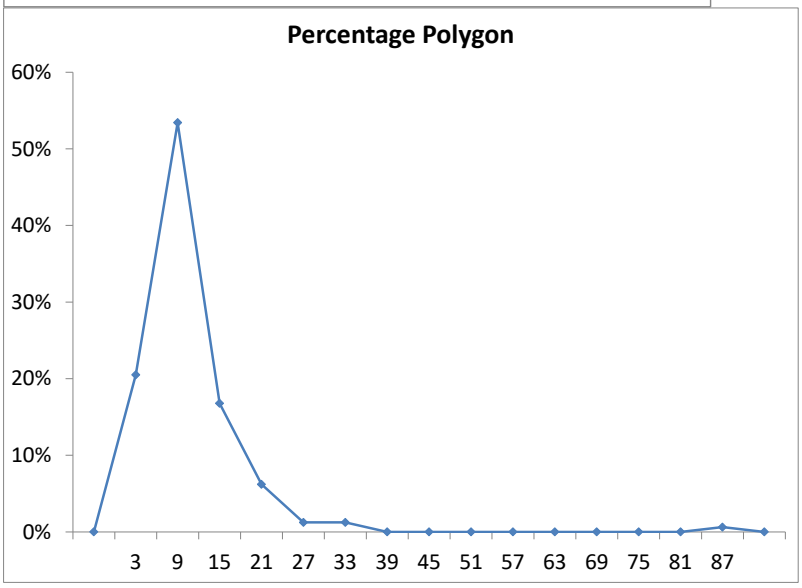
(c) The one-year CD return is concentrated between 1.2%. The five-year CD return is concentrated between 2.2% and 2.5%. In general, the five-year CD has the higher yield.
There does not appear to be a positive relationship between the yield of the money market and the five-year CD.

2.89 (a),(c)

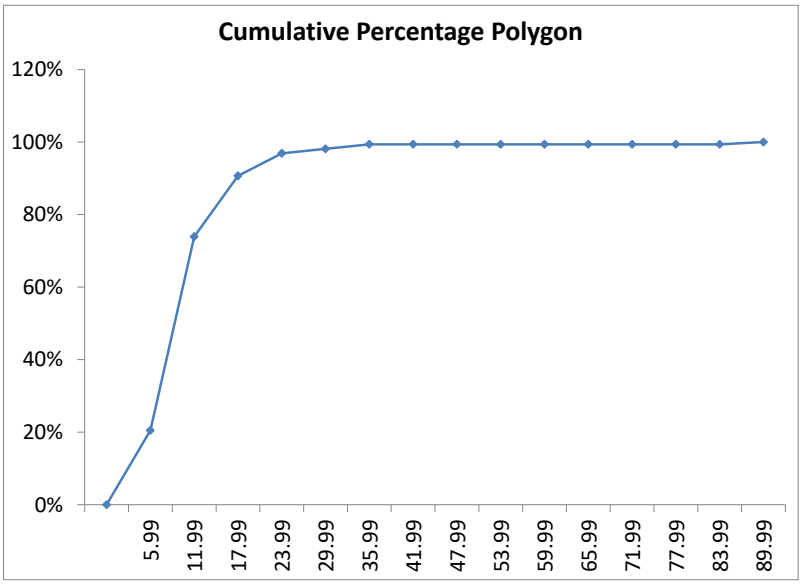
bin	Frequency	Percentage	Cumulative Pctage.	Midpts.
0 but less than 6	33	20.50%	20.50%	--
6 but less than 12	86	53.42%	73.91%	9
12 but less than 18	27	16.77%	90.68%	15
18 but less than 24	10	6.21%	96.89%	21
24 but less than 30	2	1.24%	98.14%	27
30 but less than 36	2	1.24%	99.38%	33
36 but less than 42	0	0.00%	99.38%	39
42 but less than 48	0	0.00%	99.38%	45
48 but less than 54	0	0.00%	99.38%	51
54 but less than 60	0	0.00%	99.38%	57
60 but less than 66	0	0.00%	99.38%	63
66 but less than 72	0	0.00%	99.38%	69
72 but less than 78	0	0.00%	99.38%	75
78 but less than 84	0	0.00%	99.38%	81
84 but less than 90	1	0.62%	100.00%	87

2.89 cont. (b)


Histogram of Compensation
Frequency
100
90
80
70
60
50
40
30
20
10
0
-- 9 15 21 27 33 39 45 51 57 63 69 75 81 87
Midpoints

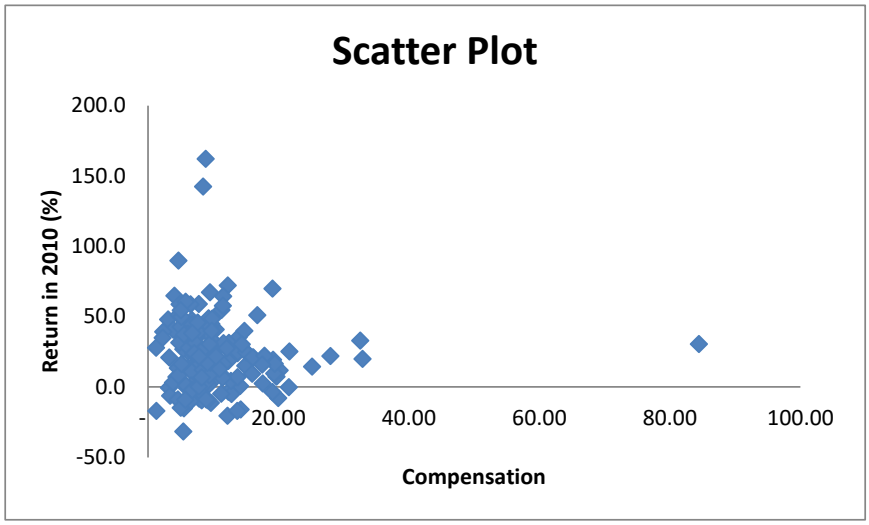

Percentage Polygon
60%
50%
40%
30%
20%
10%
0%
3 9 15 21 27 33 39 45 51 57 63 69 75 81 87

(c)


Cumulative Percentage Polygon
120%
100%
80%
60%
40%
20%
0%
5.99 11.99 17.99 23.99 29.99 35.99 41.99 47.99 53.99 59.99 65.99 71.99 77.99 83.99 89.99

2.89 cont. (d) CEO compensation in 2010 is extremely right skewed. More than 90% of the CEOs have compensation lower than $18,000,000. On the other end, 0.62% of the CEOs have compensation higher than $84,000,000.

(e)



(f) There is not any obvious relationship between the total compensation and investment return in 2009.

2.90 (a)

Frequencies (Boston)

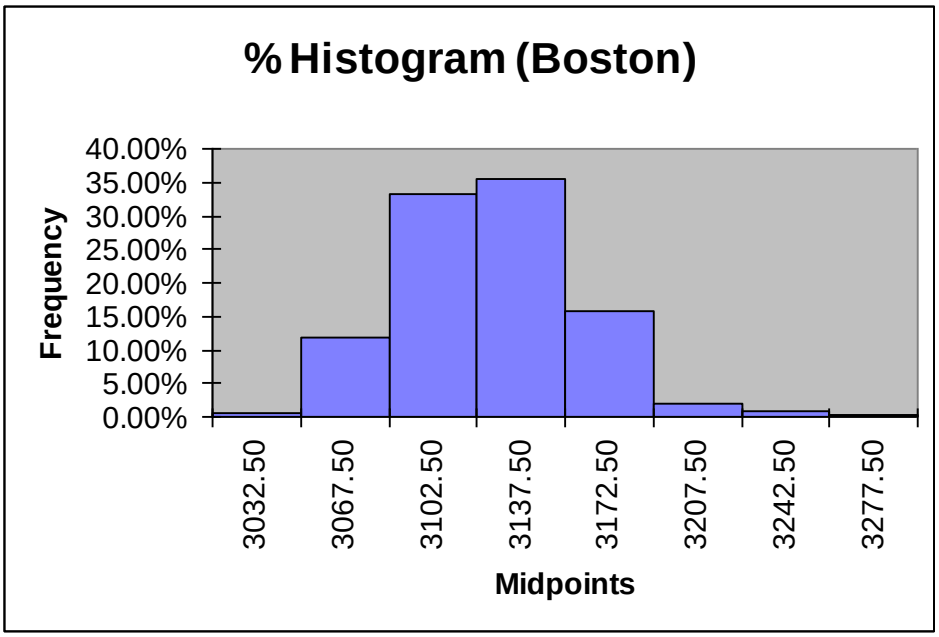
Weight (Boston)	*Frequency*	*Percentage*
3015 but less than 3050	2	0.54%
3050 but less than 3085	44	11.96%
3085 but less than 3120	122	33.15%
3120 but less than 3155	131	35.60%
3155 but less than 3190	58	15.76%
3190 but less than 3225	7	1.90%
3225 but less than 3260	3	0.82%
3260 but less than 3295	1	0.27%

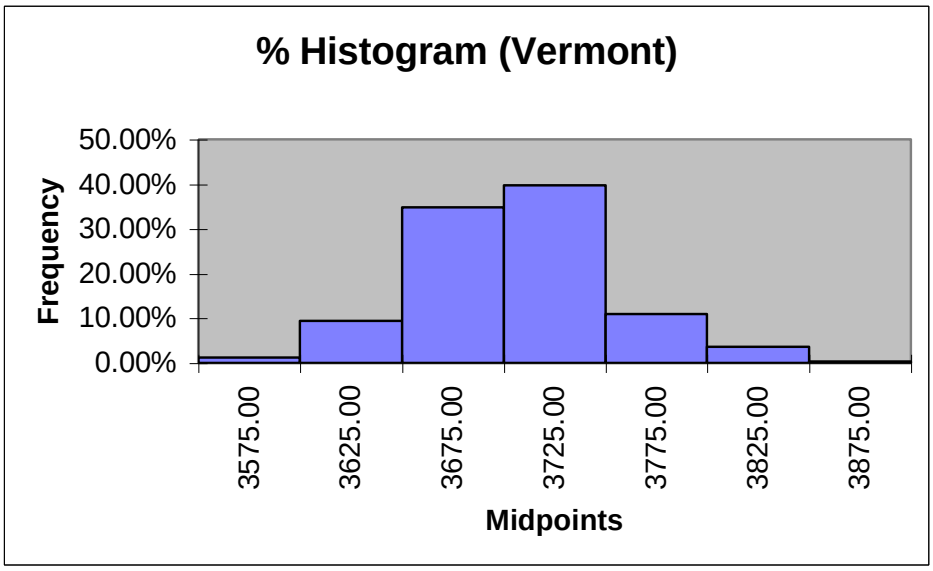
(b)

Frequencies (Vermont)

Weight (Vermont)	*Frequency*	*Percentage*
3550 but less than 3600	4	1.21%
3600 but less than 3650	31	9.39%
3650 but less than 3700	115	34.85%
3700 but less than 3750	131	39.70%
3750 but less than 3800	36	10.91%
3800 but less than 3850	12	3.64%
3850 but less than 3900	1	0.30%

2.90 cont. (c)





(d) 0.54% of the "Boston" shingles pallets are underweight while 0.27% are overweight. 1.21% of the "Vermont" shingles pallets are underweight while 3.94% are overweight.

2.91 (a),(c) **Two-star:**

bin	Frequency	Percentage	Cumulative Pctage.	Midpts.
15 but less than 25	1	2.38%	2.38%	20
25 but less than 35	5	11.90%	14.29%	30
35 but less than 45	2	4.76%	19.05%	40
45 but less than 55	5	11.90%	30.95%	50
55 but less than 65	9	21.43%	52.38%	60
65 but less than 75	12	28.57%	80.95%	70
75 but less than 85	5	11.90%	92.86%	80
85 but less than 95	1	2.38%	95.24%	90
95 but less than 105	1	2.38%	97.62%	100
105 but less than 115	1	2.38%	100.00%	110

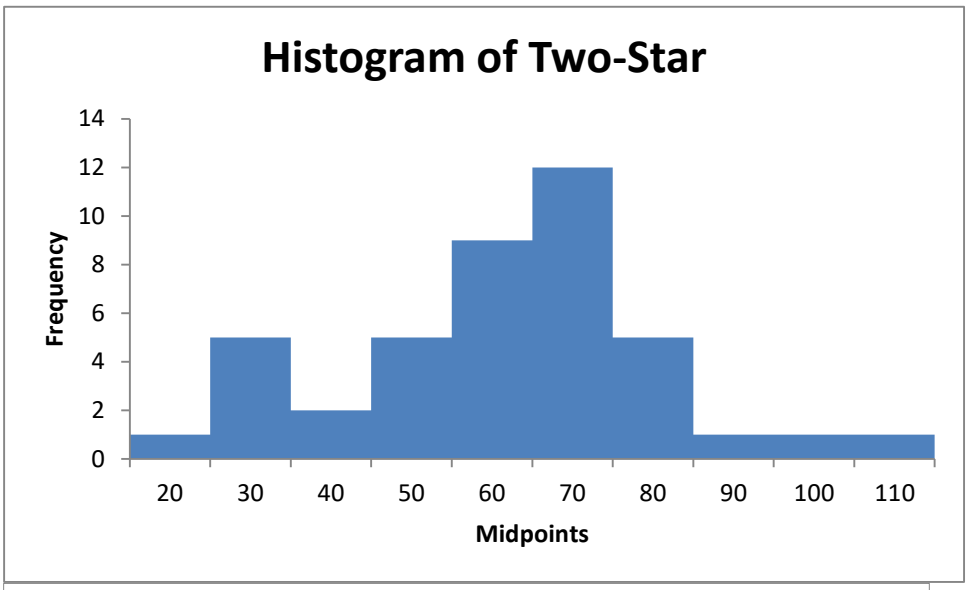
Three-star:

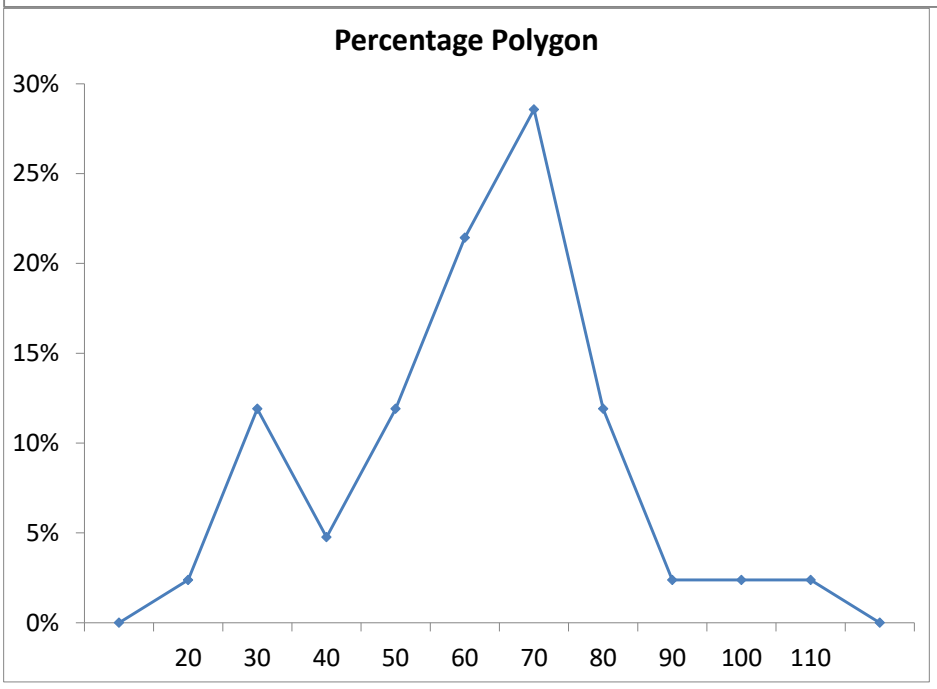
bin	Frequency	Percentage	Cumulative Pctage.	Midpts.
20 but less than 35	1	2.38%	2.38%	27.5
35 but less than 50	3	7.14%	9.52%	42.5
50 but less than 65	7	16.67%	26.19%	57.5
65 but less than 80	5	11.90%	38.10%	72.5
80 but less than 95	16	38.10%	76.19%	87.5
95 but less than 110	6	14.29%	90.48%	102.5
110 but less than 125	1	2.38%	92.86%	117.5
125 but less than 140	2	4.76%	97.62%	132.5
140 but less than 155	1	2.38%	100.00%	147.5

Four-star:

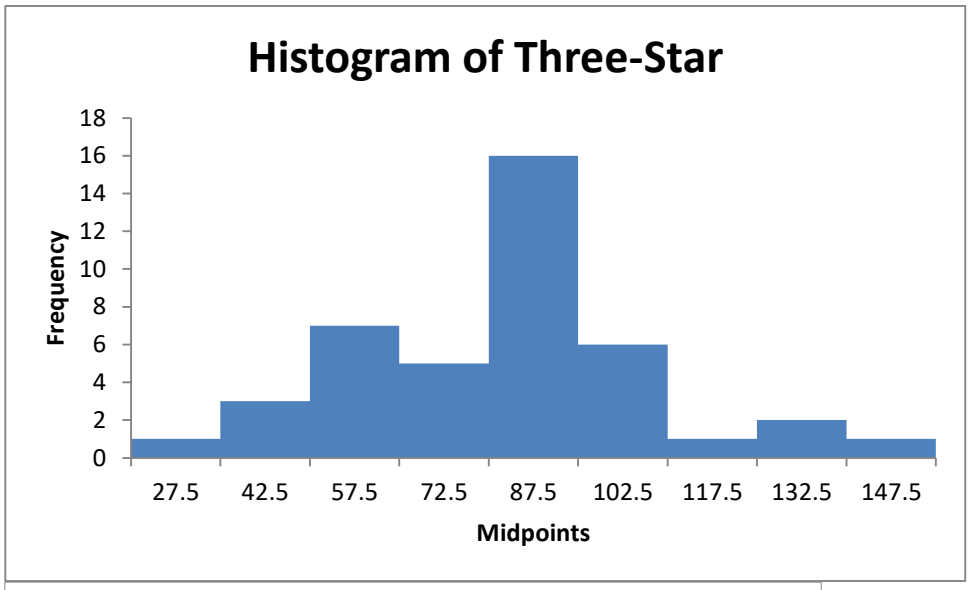
bin	Frequency	Percentage	Cumulative Pctage.	Midpts.
55 but less than 70	3	7.14%	7.14%	62.5
70 but less than 85	5	11.90%	19.05%	77.5
85 but less than 100	5	11.90%	30.95%	92.5
100 but less than 115	7	16.67%	47.62%	107.5
115 but less than 130	10	23.81%	71.43%	122.5
130 but less than 145	6	14.29%	85.71%	137.5
145 but less than 160	2	4.76%	90.48%	152.5
160 but less than 175	2	4.76%	95.24%	167.5
175 but less than 190	0	0.00%	95.24%	182.5
190 but less than 205	2	4.76%	100.00%	197.5
205 but less than 220	0	0.00%	100.00%	212.5

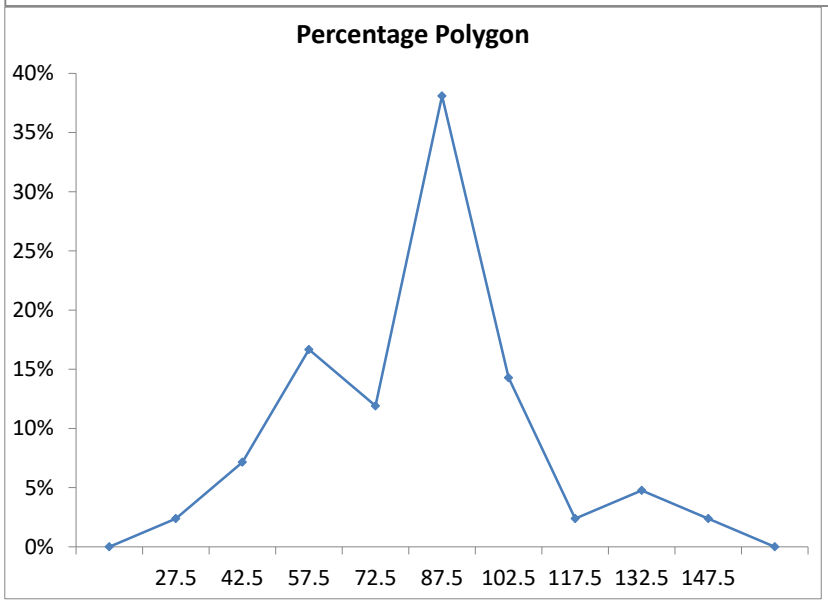
2.91 cont. (b) **Two-star:**



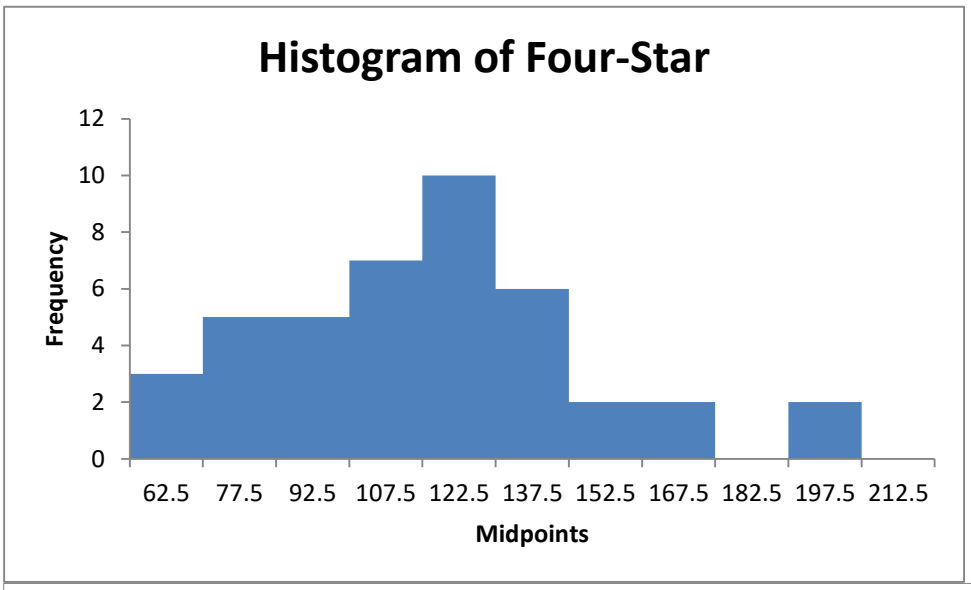


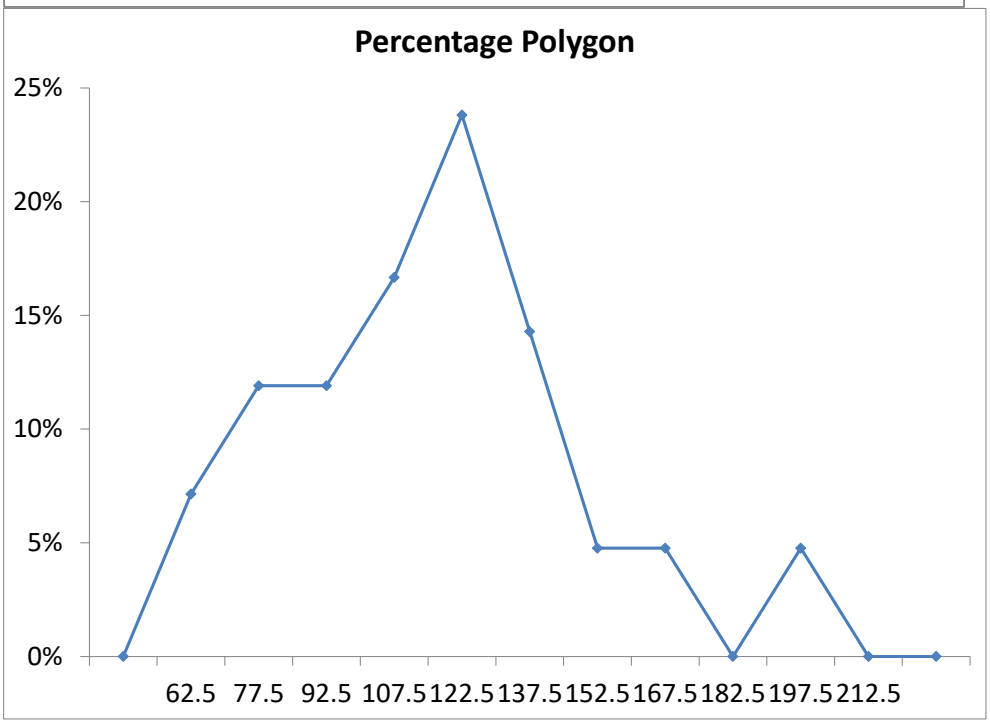
2.91 cont. (b) **Three-star:**



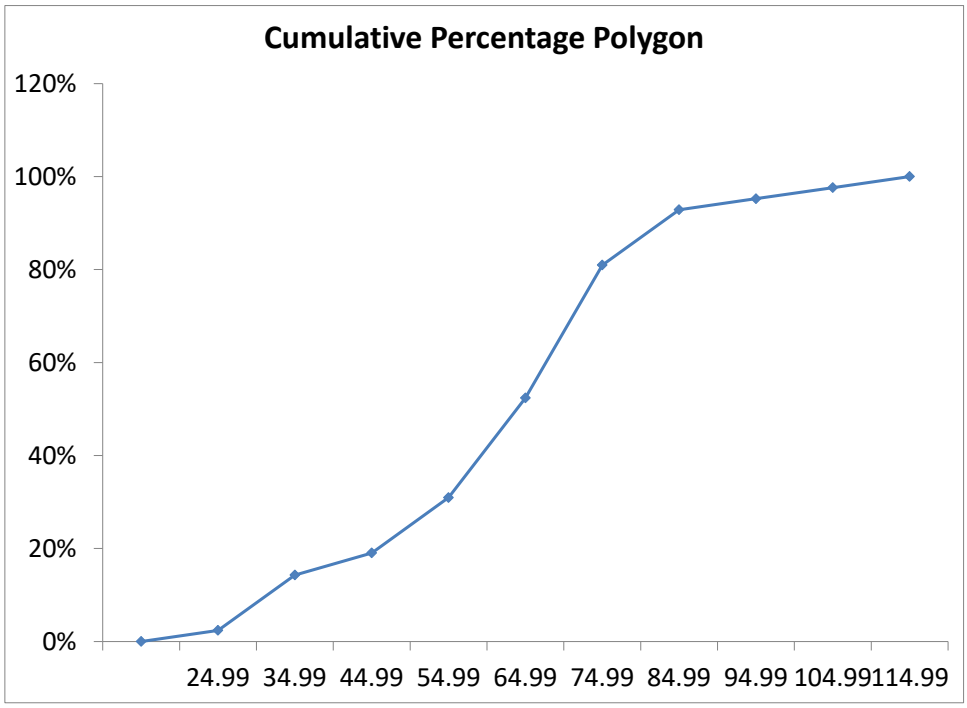


2.91 cont. (b) **Four-star:**

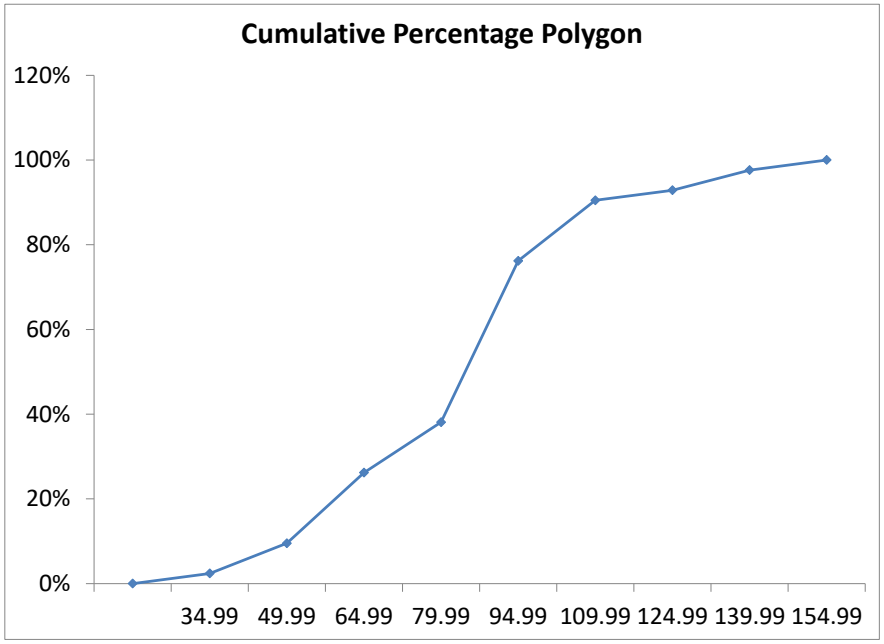




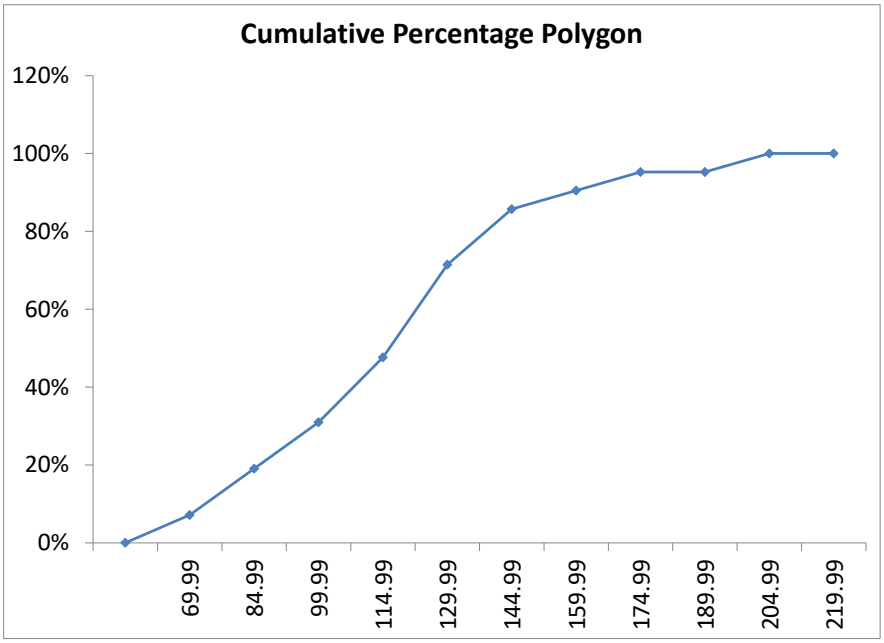
2.91 cont. (c) **Two-star:**



Three-star:

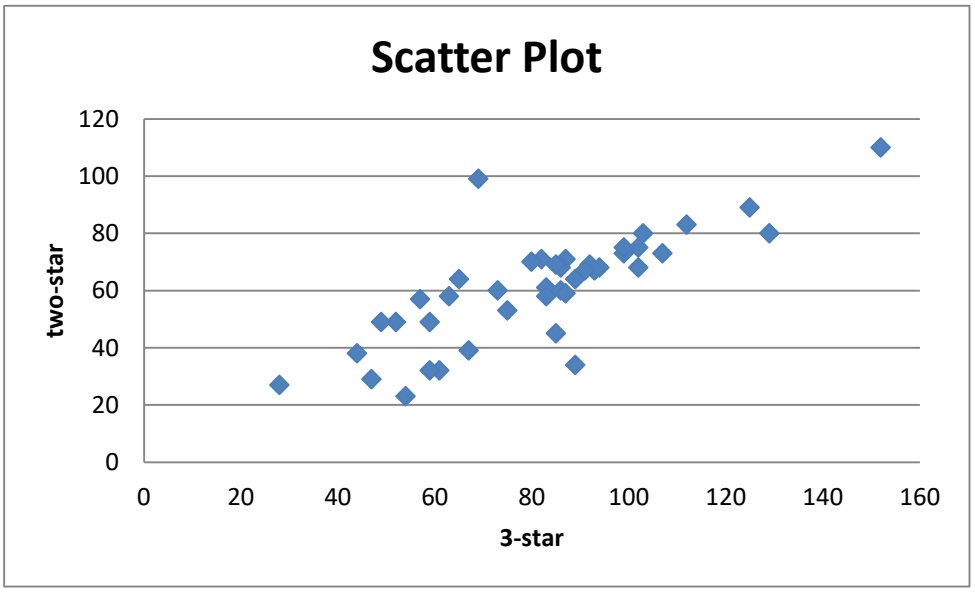


2.91 cont. (c) **Four-star:**

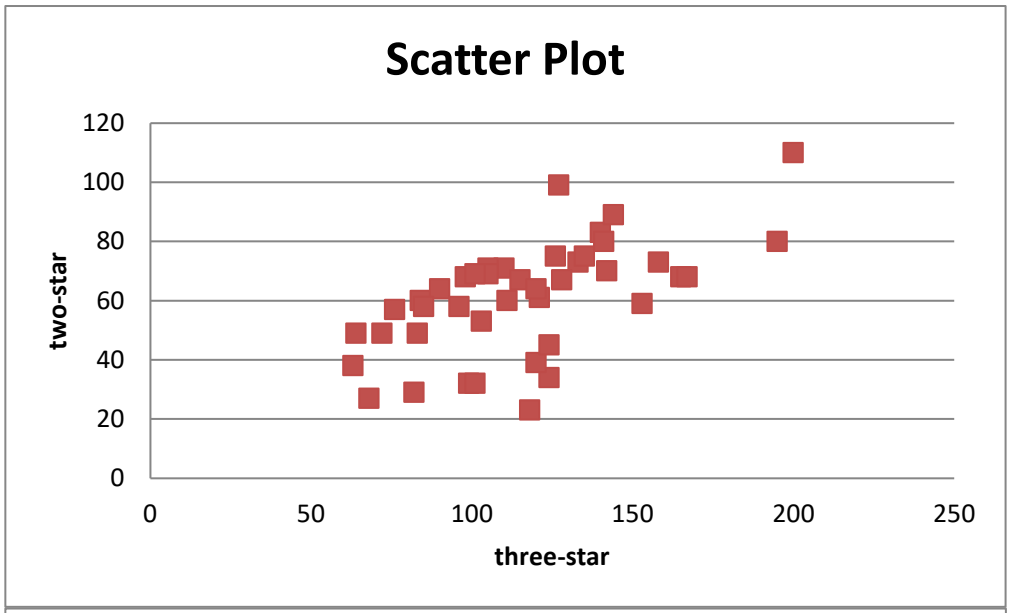


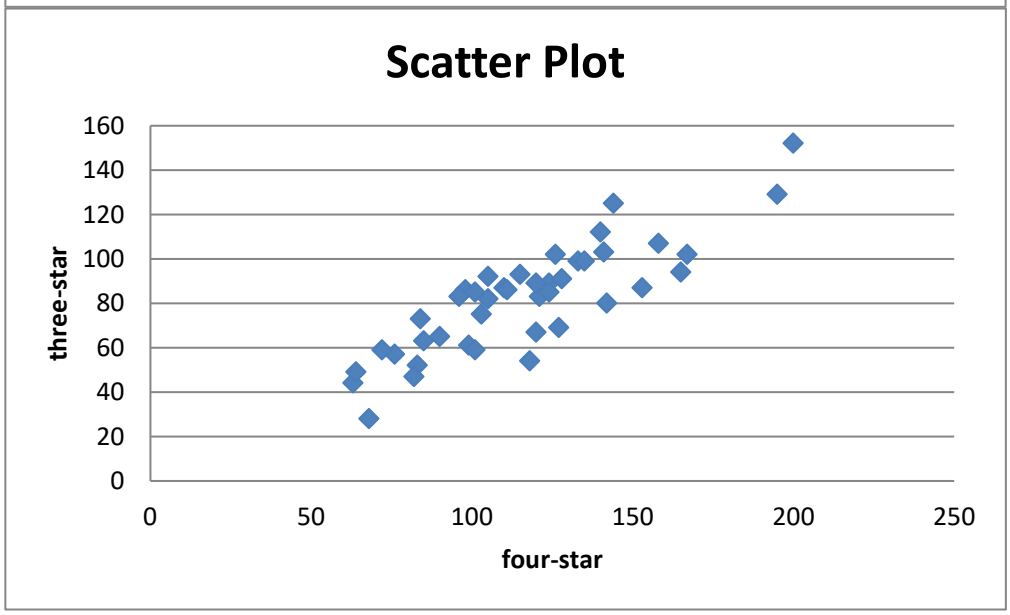
(d) The price of two-star, three-star and four-star hotels are all right-skewed. The median price of two-star , three-star and four-star hotels is around 64, 86, and 120 English pounds, respectively.

(e)



2.91 cont. (e)

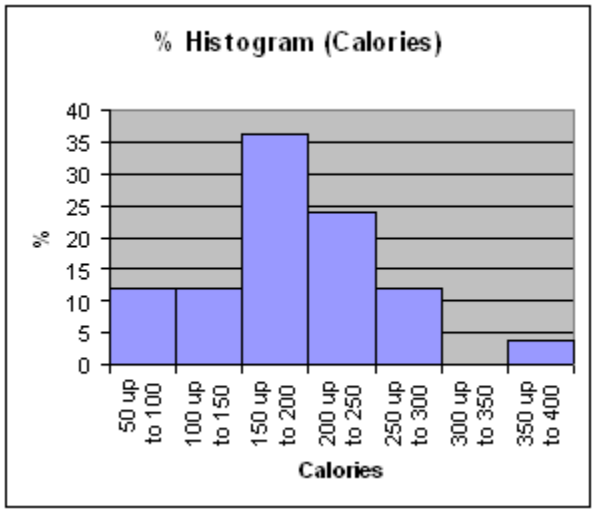




(f) The relationship of the price between two-star and three-star, three-star and four-star, and two-star and four-star hotels are all positve.

2.92 (a)

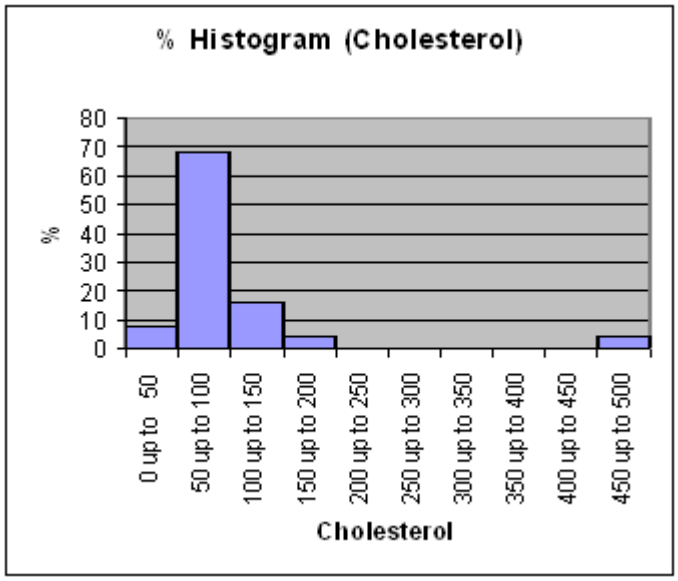
Calories	Frequency	Percentage	Percentage Less Than
50 up to 100	3	12%	12%
100 up to 150	3	12	24
150 up to 200	9	36	60
200 up to 250	6	24	84
250 up to 300	3	12	96
300 up to 350	0	0	96
350 up to 400	1	4	100



(b)

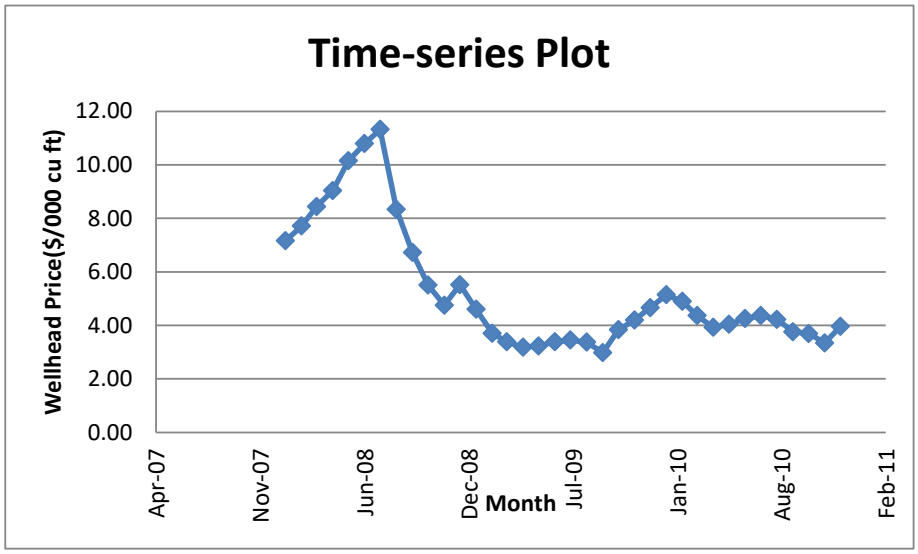
Cholesterol	Frequency	Percentage	Percentage Less Than
0 up to 50	2	8	8%
50 up to 100	17	68	76
100 up to 150	4	16	92
150 up to 200	1	4	96
200 up to 250	0	0	96
250 up to 300	0	0	96
300 up to 350	0	0	96
350 up to 400	0	0	96
400 up to 450	0	0	96
450 up to 500	1	4	100

2.92 (b)
cont.

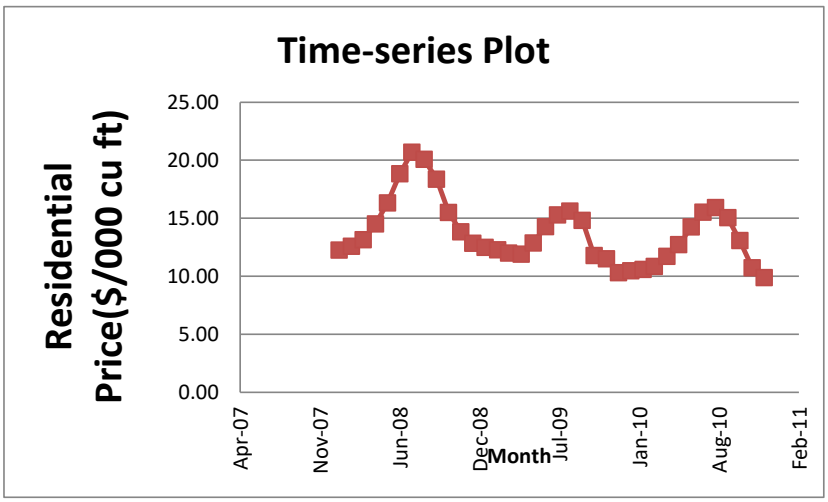


(c) The sampled fresh red meats, poultry, and fish vary from 98 to 397 calories per serving, with the highest concentration between 150 to 200 calories. One protein source, spareribs, with 397 calories, is more than 100 calories above the next highest caloric food. The protein content of the sampled foods varies from 16 to 33 grams, with 68% of the data values falling between 24 and 32 grams. Spareribs and fried liver are both very different from other foods sampled—the former on calories and the latter on cholesterol content.

2.93 (a)

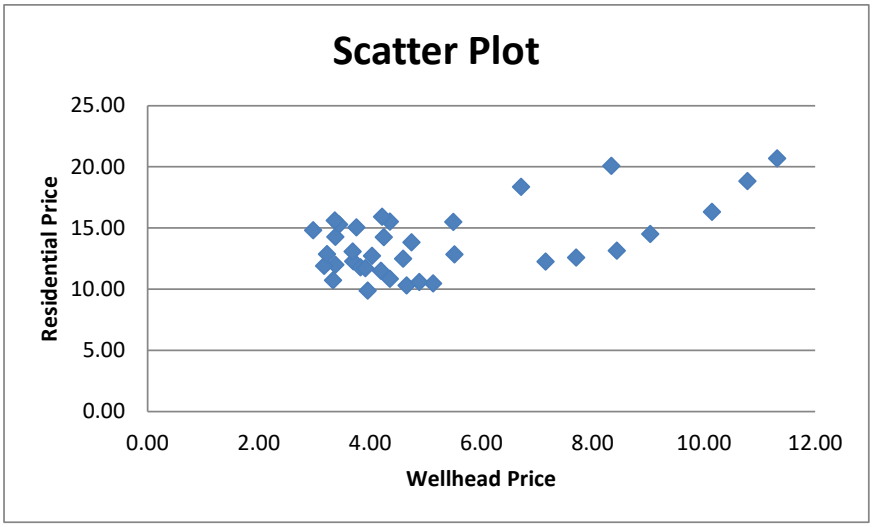


2.93 cont. (a)



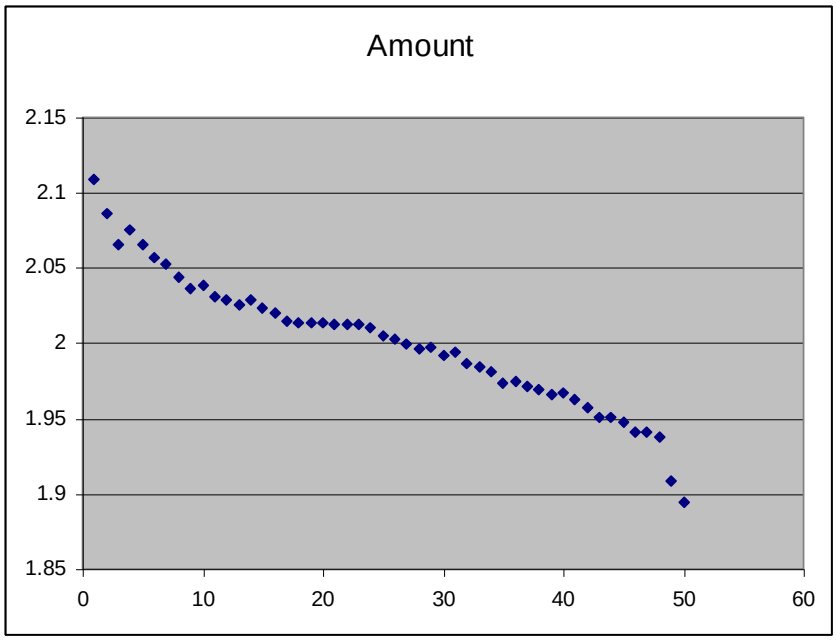
(b) The wellhead average price was highest in the summer of 2008 and has since declined. The residential average price of gasoline in the United States is higher in the summer in general and seems to peak in June.

(c)



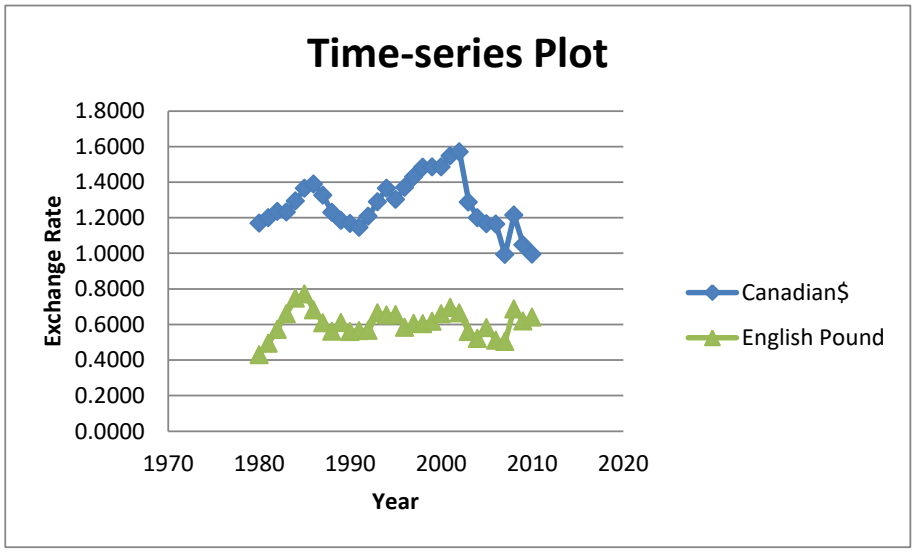
(d) There appears to be a slight positive relationship between the wellhead price and residential price.

2.94 (a)

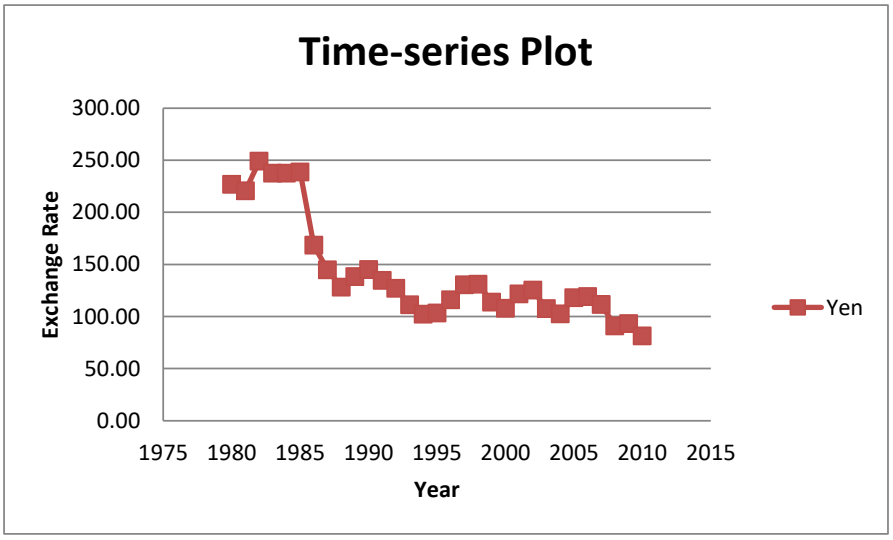


(b) There is a downward trend in the amount filled.
(c) The amount filled in the next bottle will most likely be below 1.894 liter.
(d) The scatter plot of the amount of soft drink filled against time reveals the trend of the data, whereas a histogram only provides information on the distribution of the data.

2.95 (a)



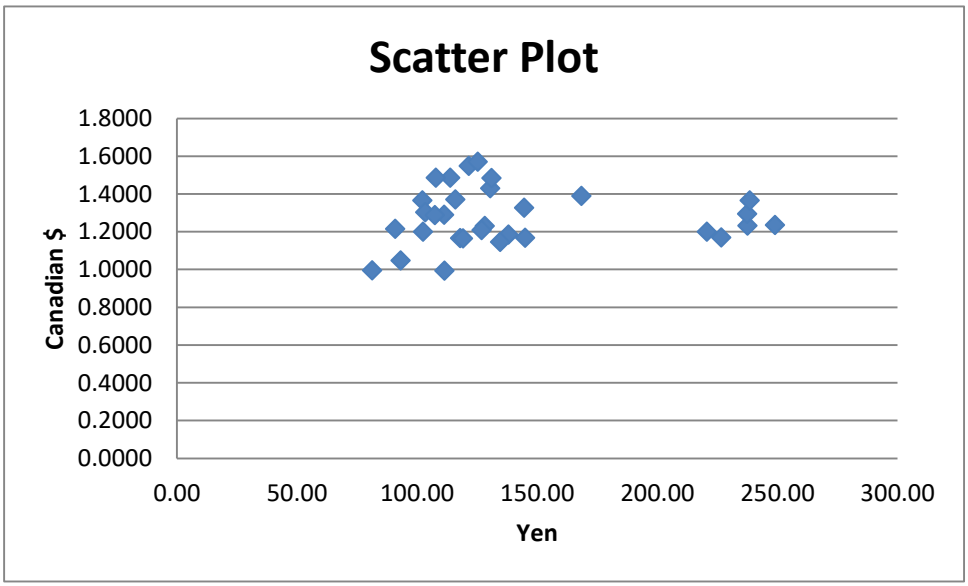
2.95 cont. (a)



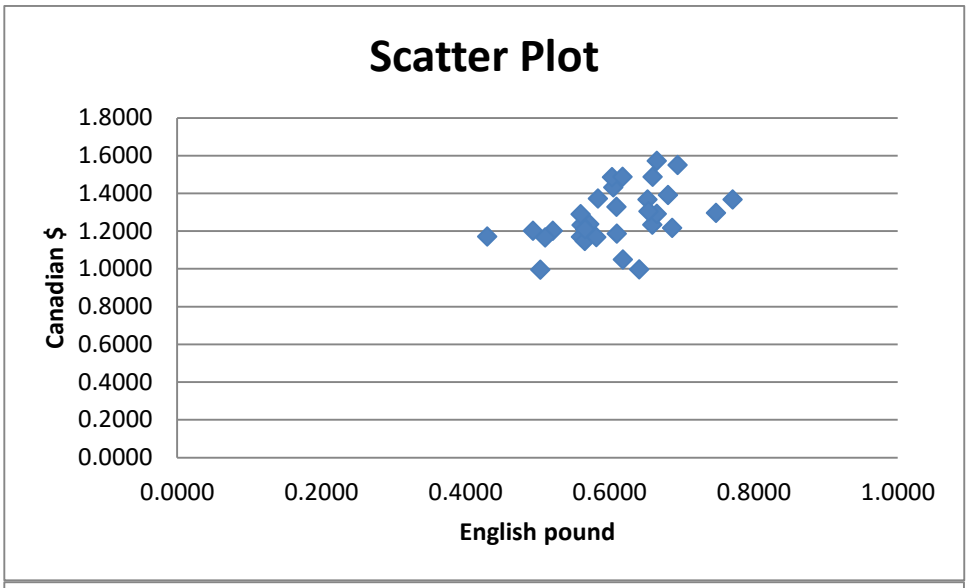
(b) The Japanese yen had depreciated against the U.S. dollar since 1982 while the Canadian dollar appreciated gradually from 1980 to 1987 and from 1991 to 2002 and then started to depreciate since. The English pound to U.S. dollar's exchange rate has been quite stable since 1983.

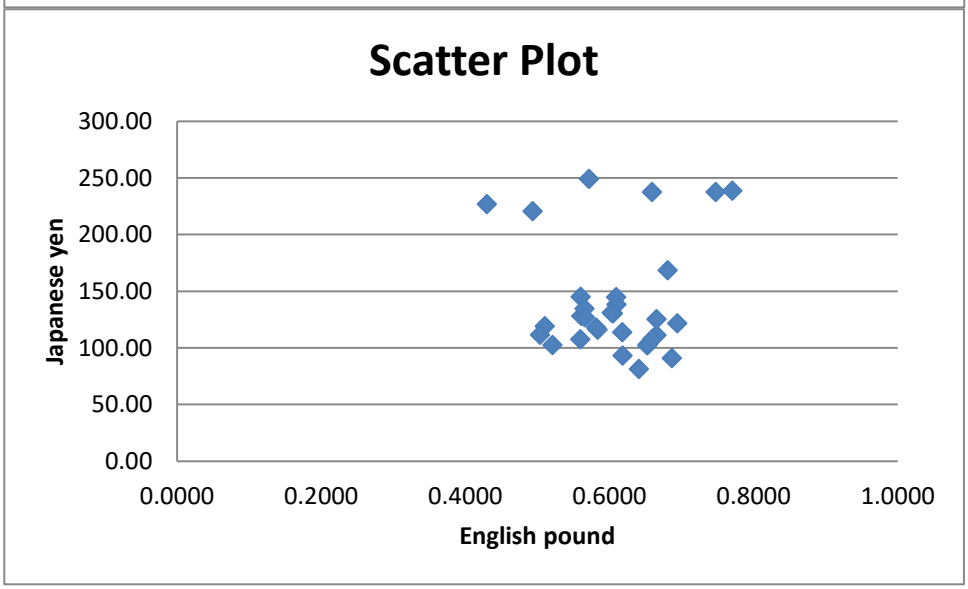
(c) The U.S. dollar has appreciated against the Japanese yen since 1980 and appreciated against the Canadian dollar since 2001 in general while the exchange rate against the English bound has been stable in general.

(d)



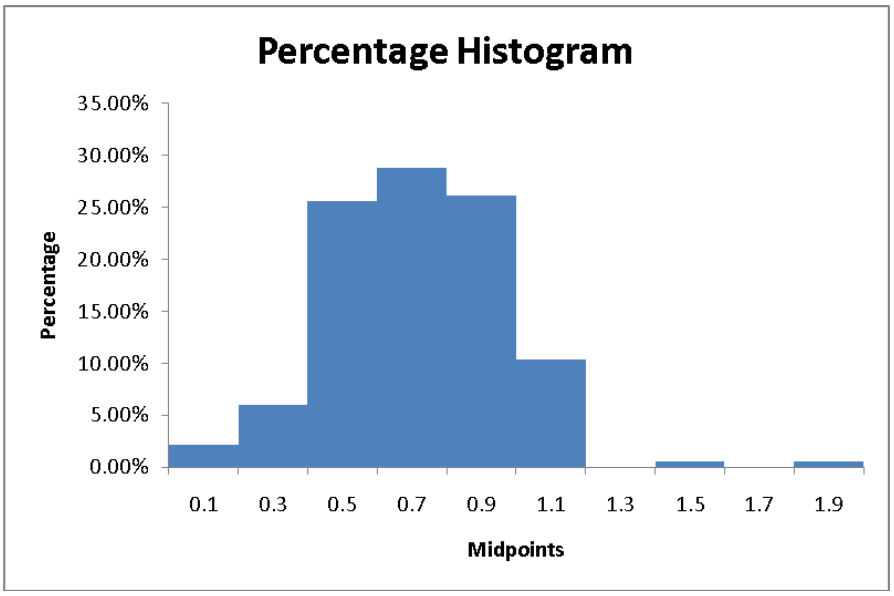
2.95 cont. (d)



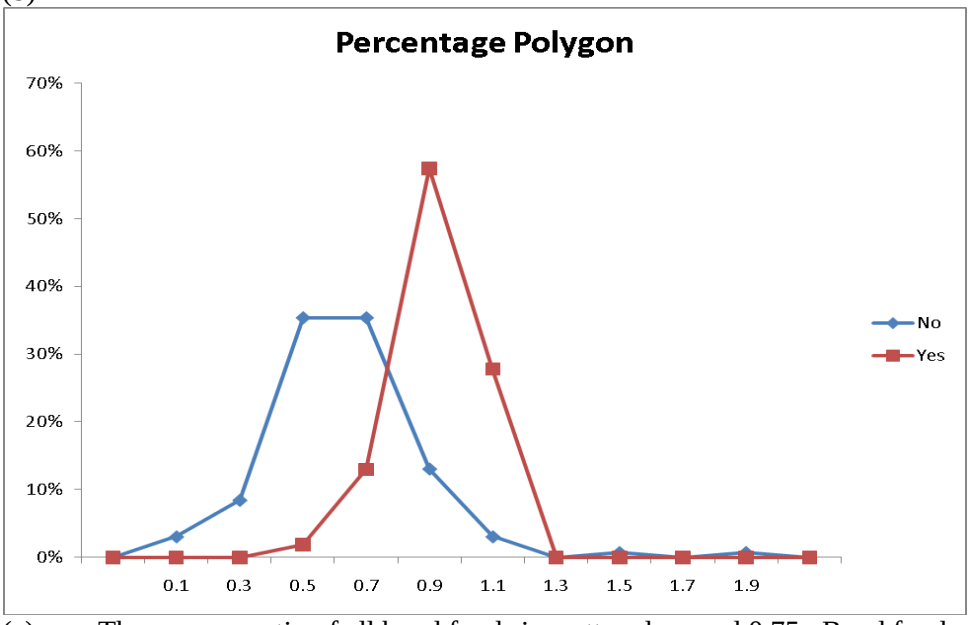


(e) There is not any obvious relationship between the Canadian dollar and Japanese yen in terms of the U.S. dollar nor any relationship between the Japanese yen and English pound. There is a slightly positive relationship between the Canadian dollar and English pound which reflects the fact that when the Canadian dollar appreciated against the U.S. dollar, so did the English pound.

2.100 (a) **Expense Ratio**

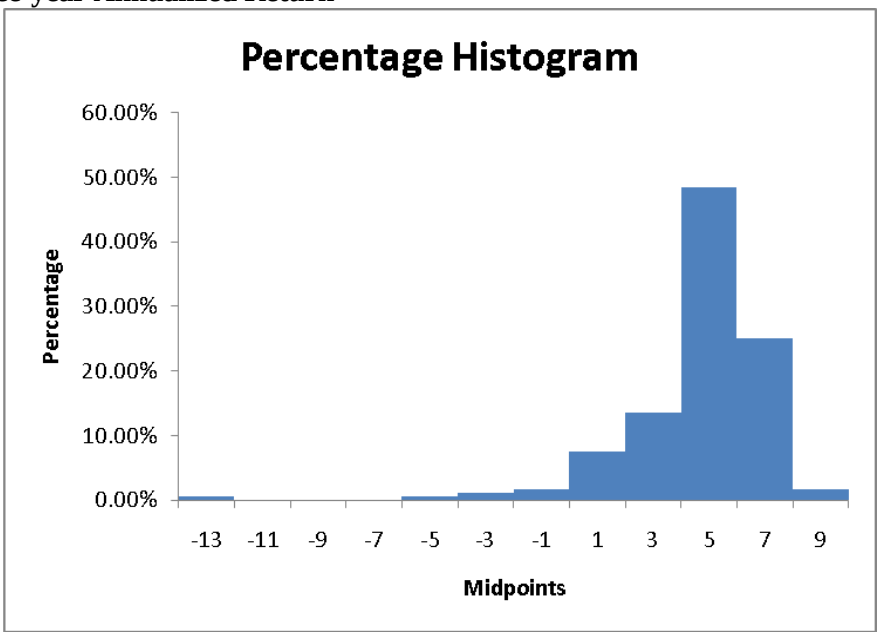


(b)

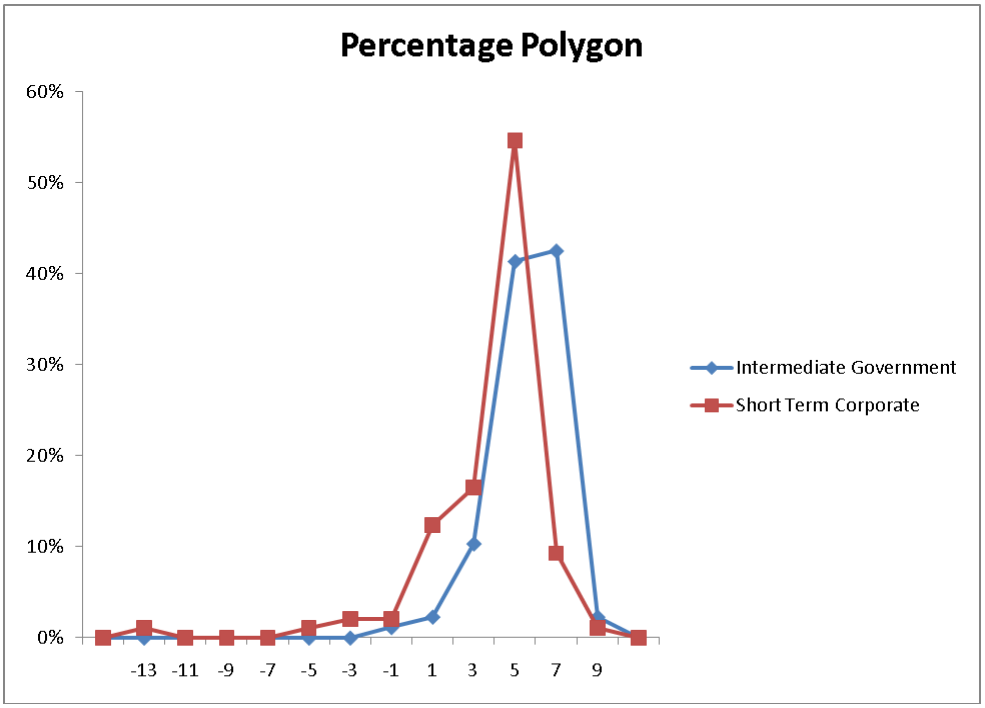


(c) The expense ratio of all bond funds is scattered around 0.75. Bond funds with fees have expense ratios scattered around 0.9 while bond funds without fees have expense ratios scattered around 0.6.

2.101 (a) **Three-year Annualized Return**

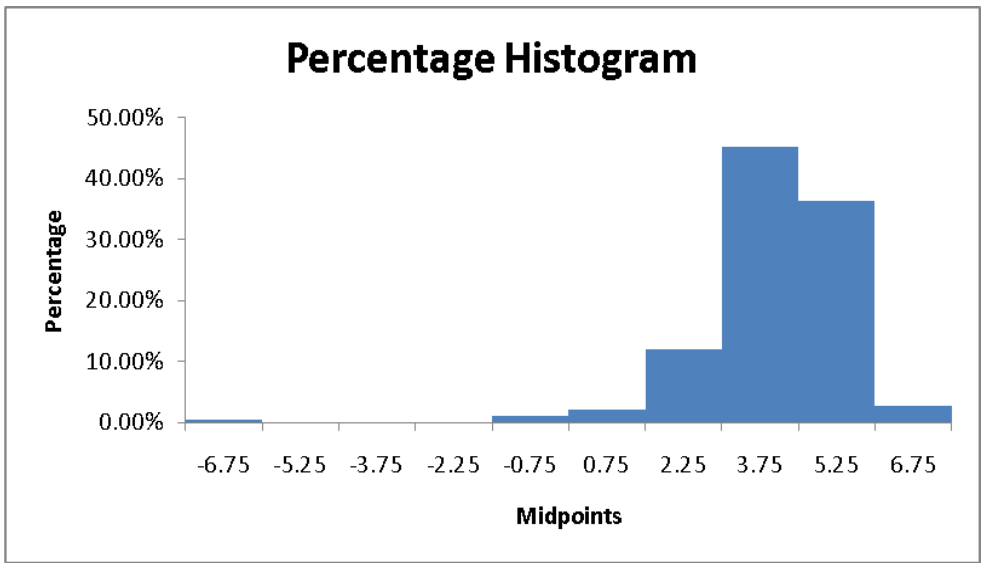


(b)

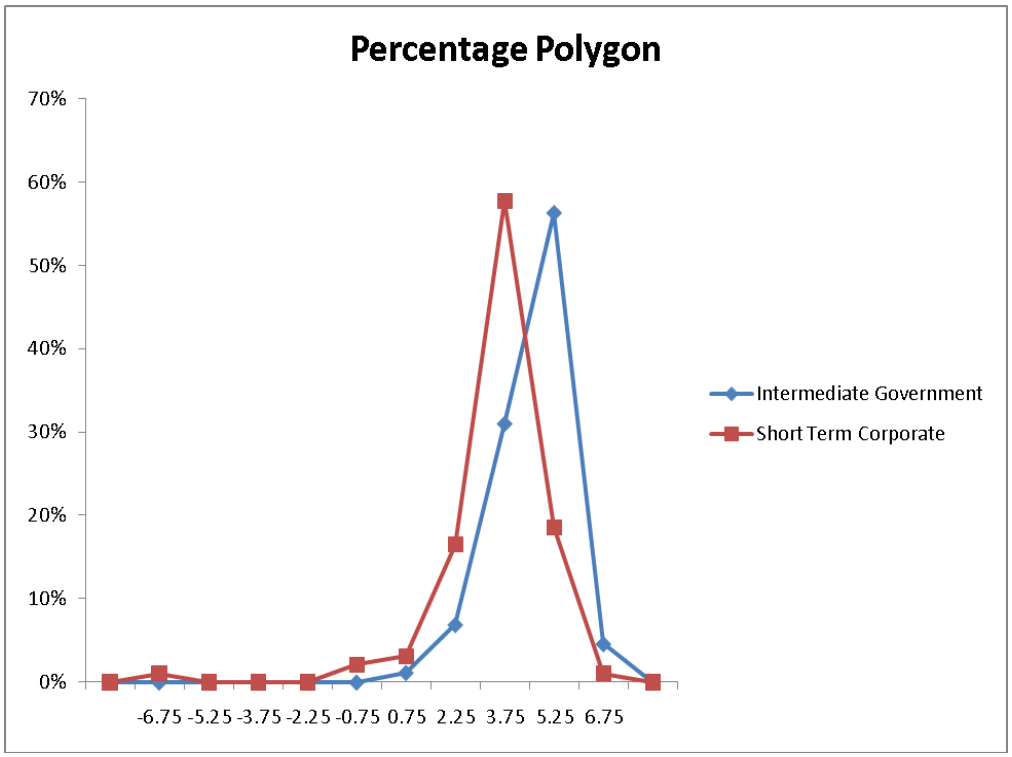


(c) The three-year annualized return of all the bond funds is left-skewed with majority of them (about 87%) scattered between 2% and 8%. About 3.8% of the bond funds have a negative three-year annualized return while about 1.6% of them have a return higher than 8%. In general, the intermediate government funds have higher three-year annualized returns than short term corporate funds. Both types of bond funds have three-year annualized returns skewed to the left.

2.102 (a) **Five-year Annualized Return**



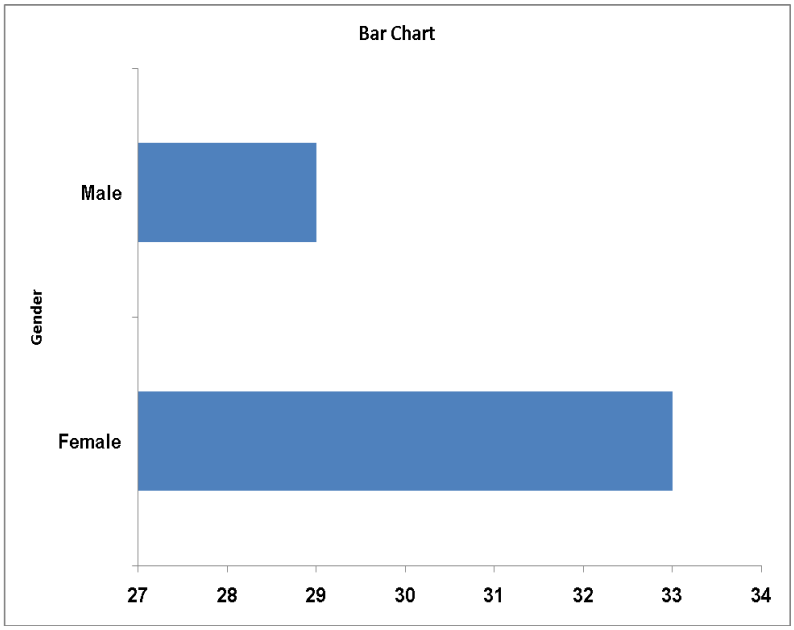
(b)

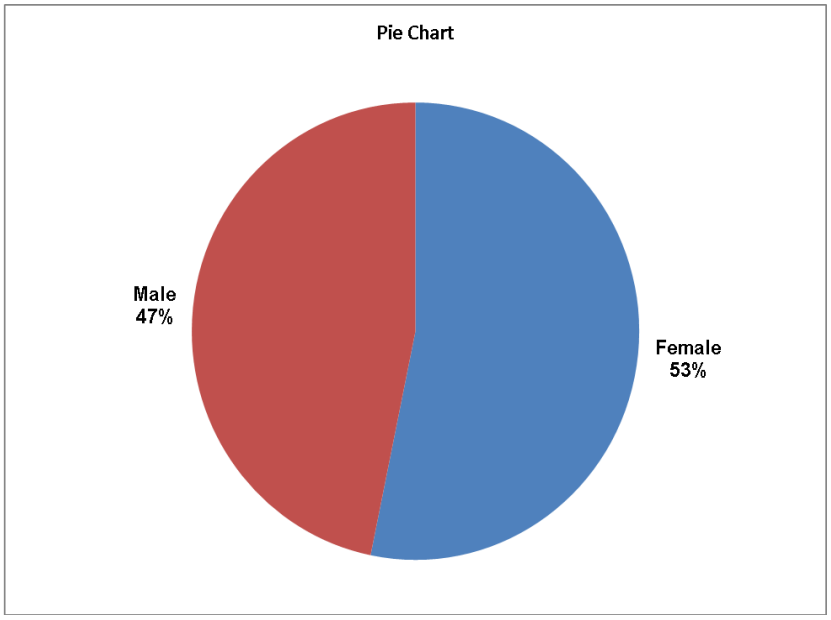


(c) The five-year annualized return of all the bond funds is left-skewed with majority of them (about 93%) scattered between 1.5% and 6%. About 1.6% of the bond funds have a negative five-year annualized return while about 2.7% of them have a return higher than 6%. In general, the intermediate government funds have higher five-year annualized returns than short term corporate funds. Both types of mutual funds have five-year annualized returns skewed to the left.

2.103

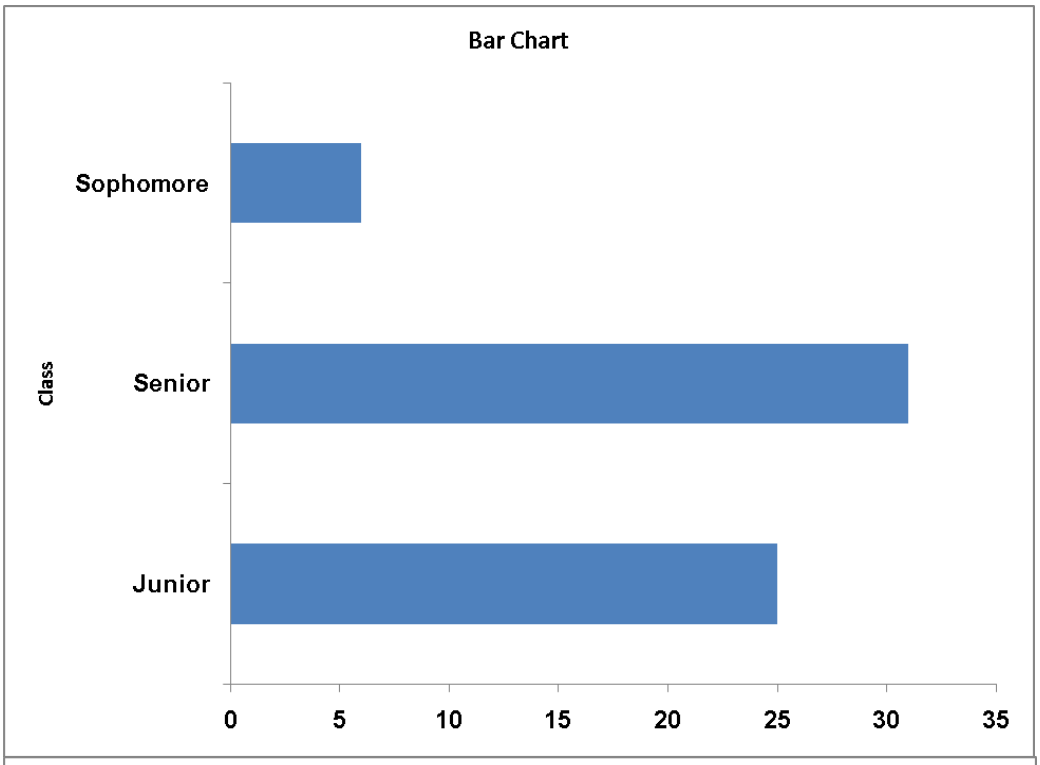
Gender:

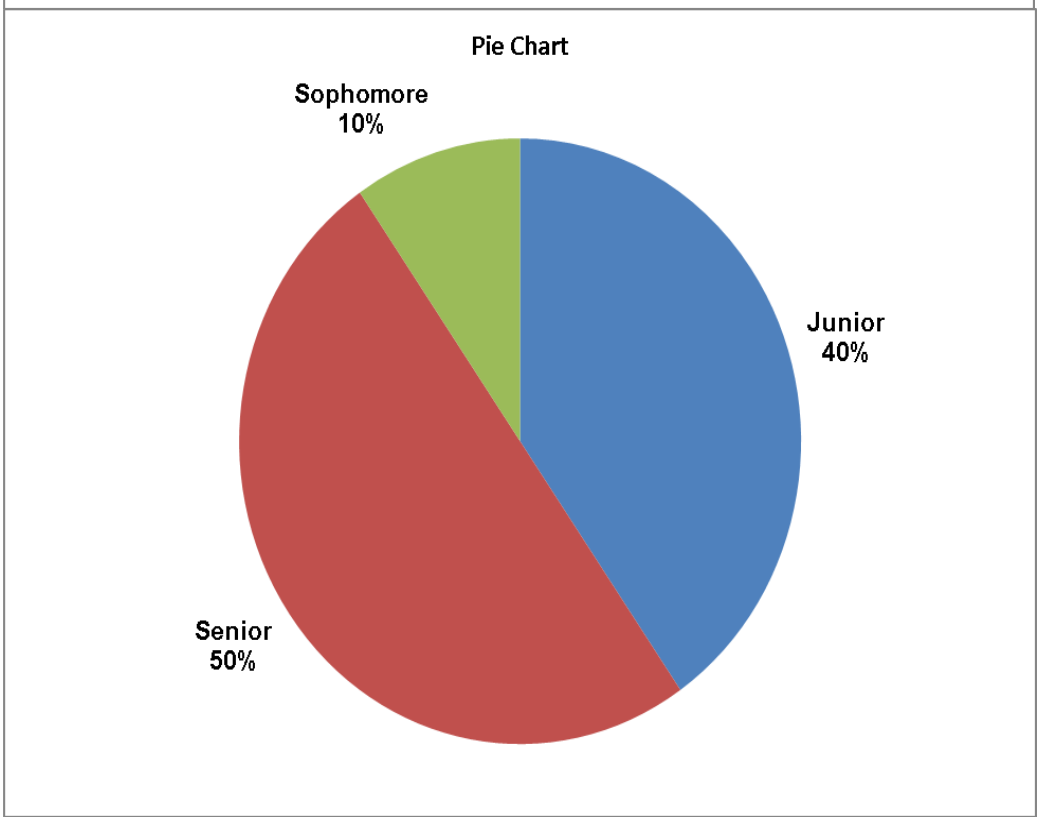




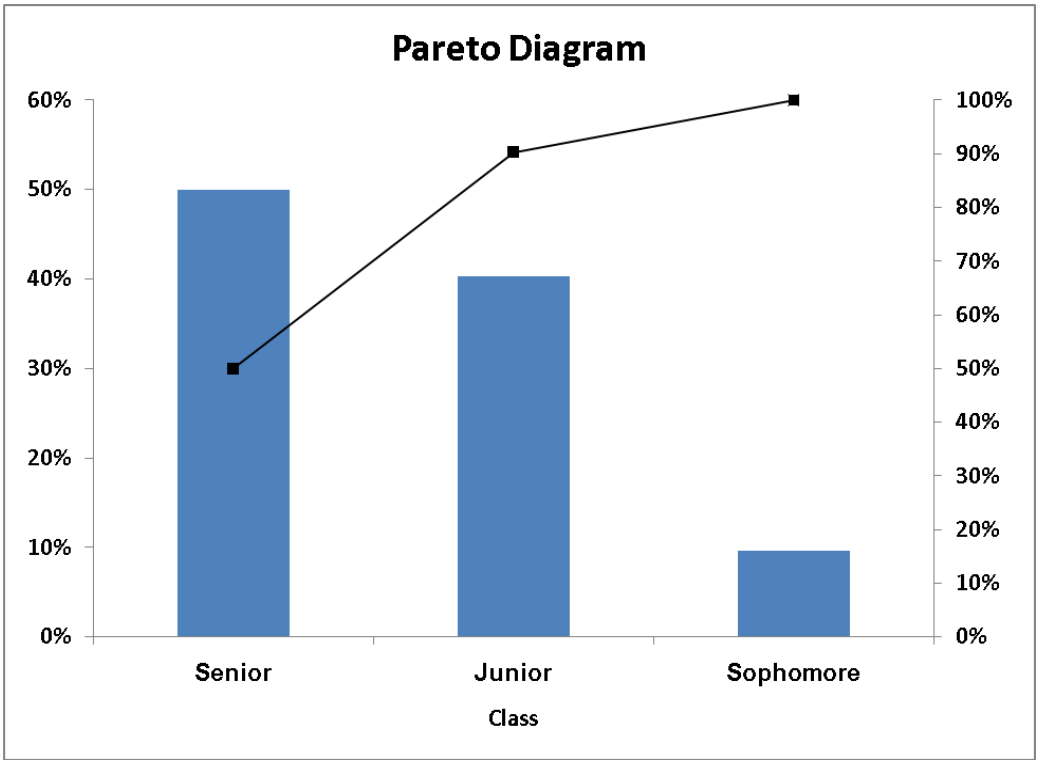
There are more females than males in the survey.

2.103 **Class:**
cont.



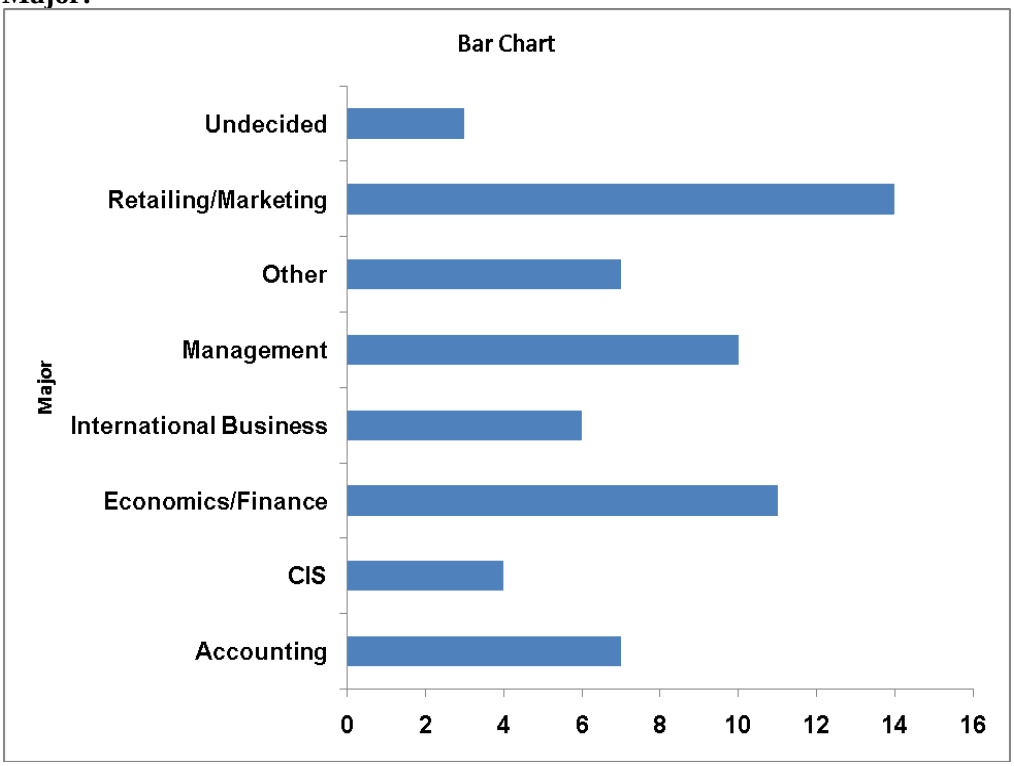


2.103
cont.

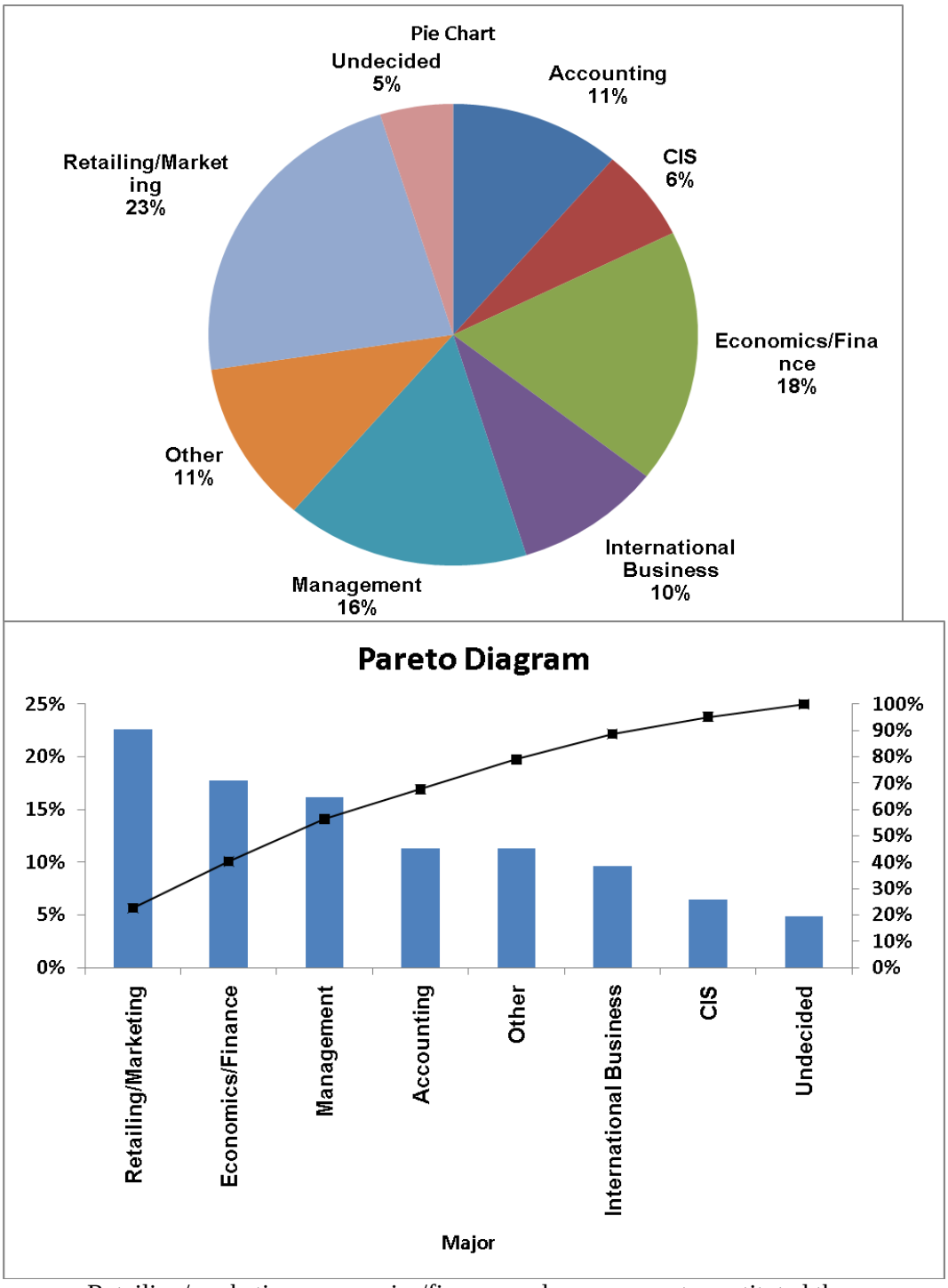


There are more senior and junior students than sophomore.

Major:

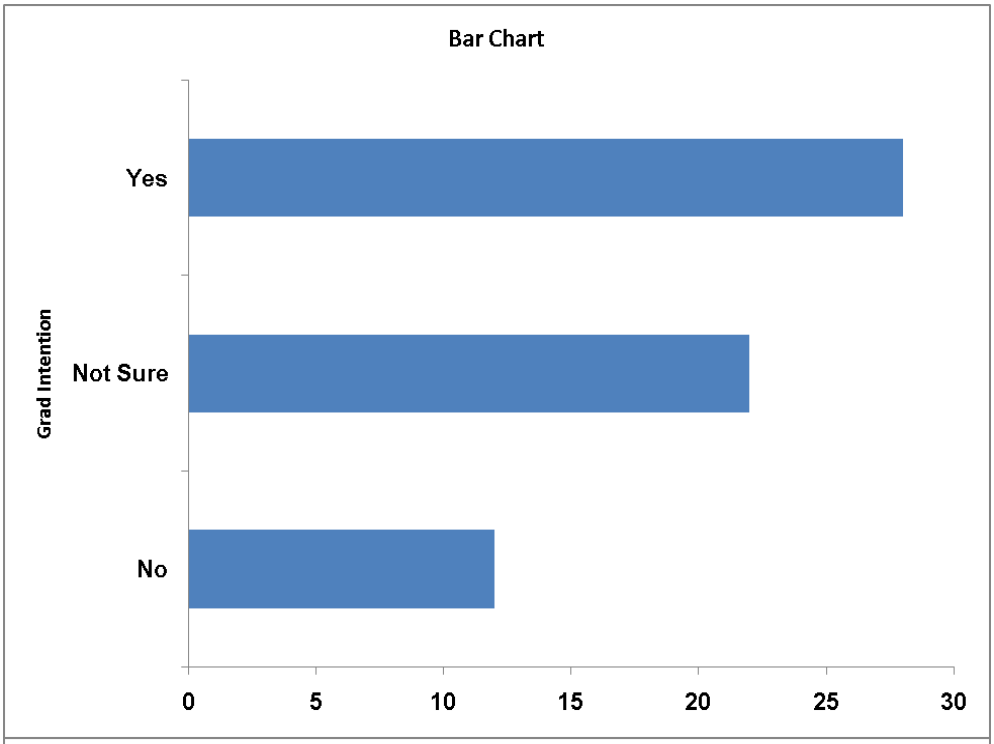


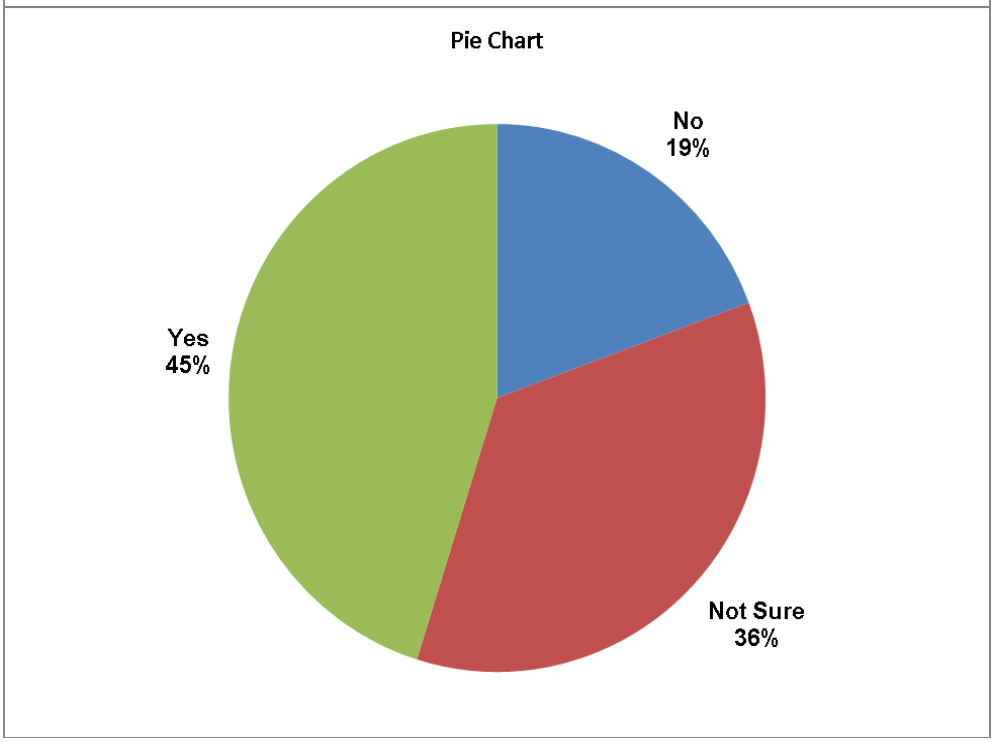
2.103
cont.



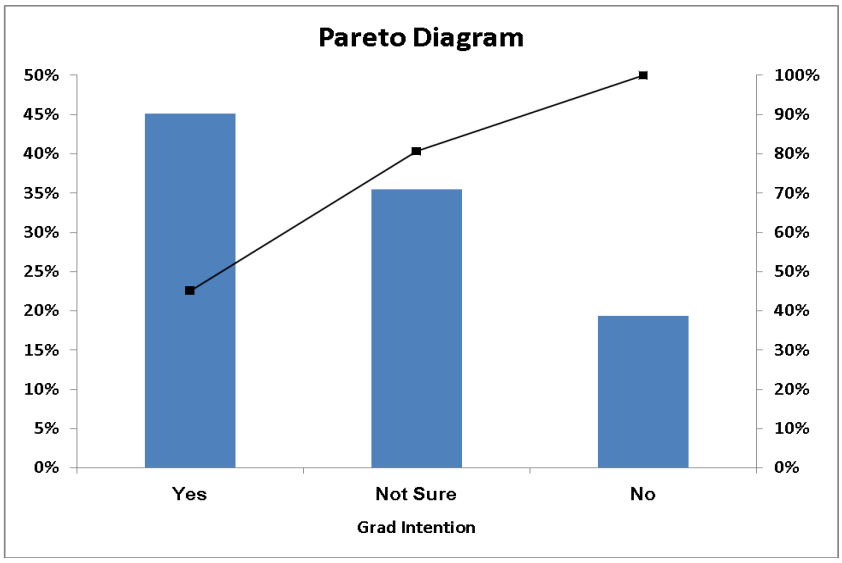
Retailing/marketing, economics/finance and management constituted the "vital few" while the rest of the majors make up the "trivial many".

2.103
cont. **Grad Intention:**



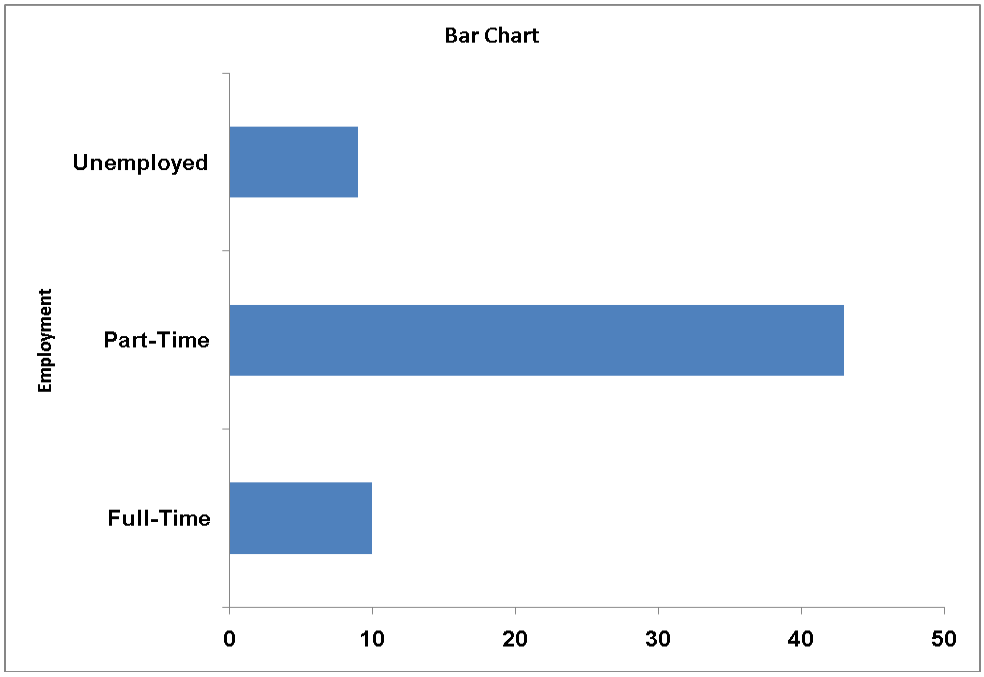


2.103
cont.

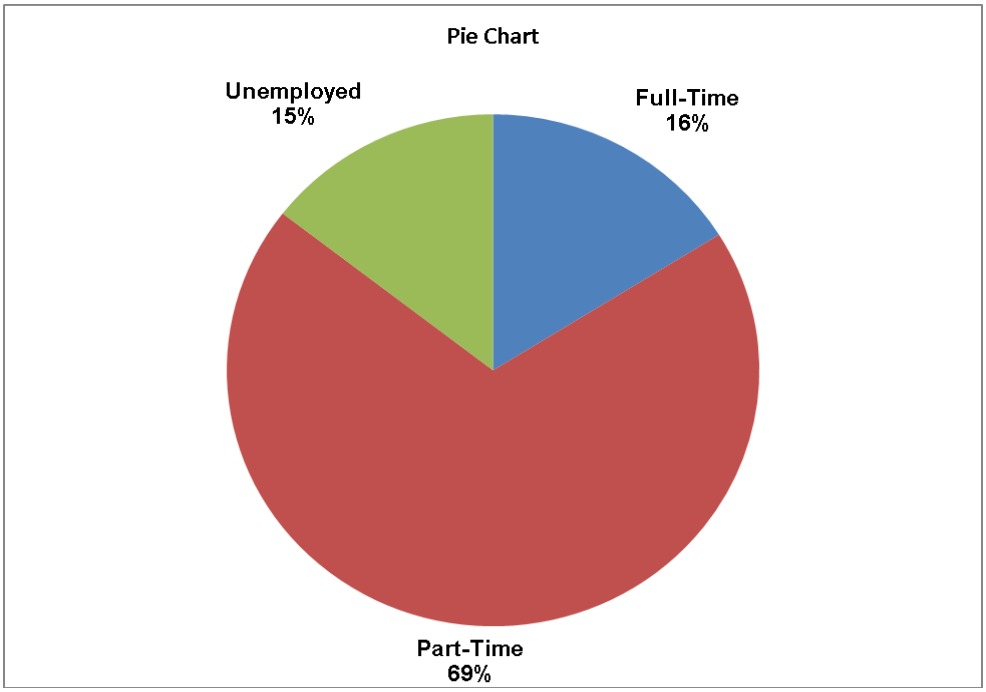


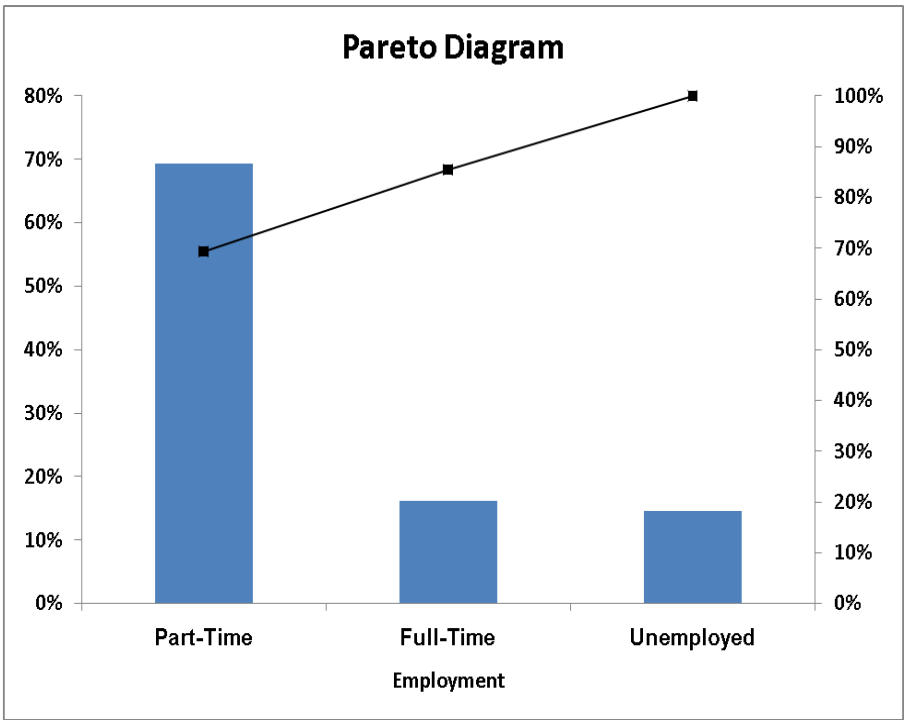
There are more students with a grad intention than either of the other categories.

Employment:



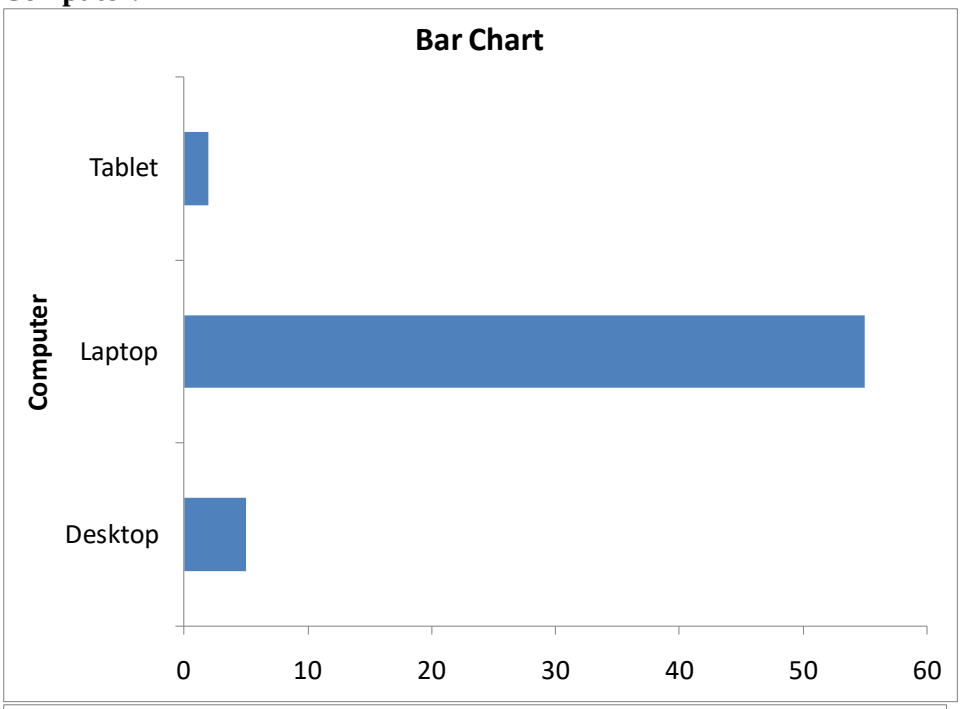
2.103
cont.

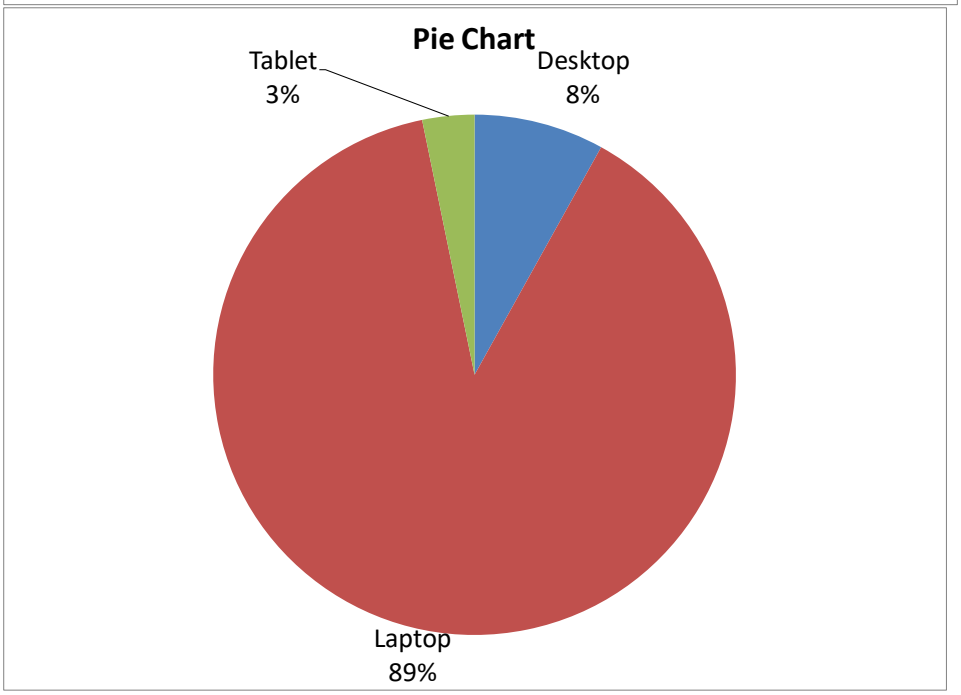




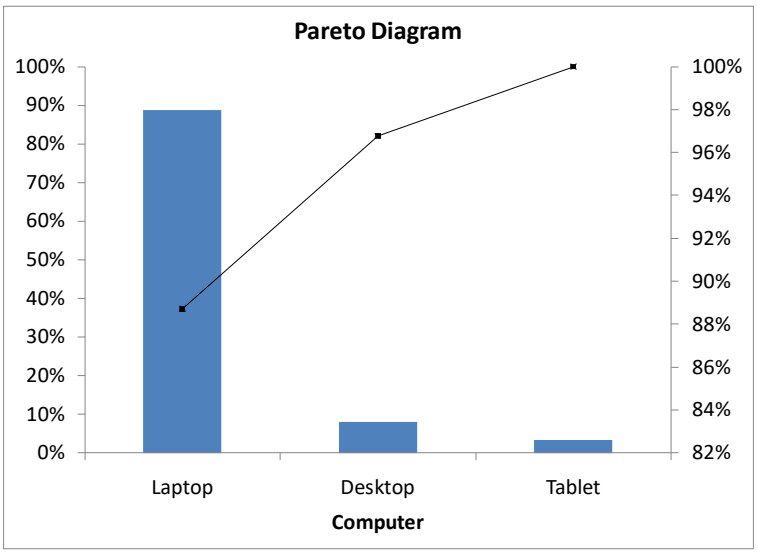
Most of the students have part-time employment.

2.103
cont. **Computer:**





2.103
cont.



Nearly 90% of the students use laptops.

Age:

Stem-and-Leaf Display	
Stem unit	1
18	0
19	00000
20	00000000000000
21	000000000000000000000
22	00000000000
23	00000
24	000
25	
26	0

Majority of the students surveyed are between 20 and 22 year old.

Social Networking:

Stem-and-Leaf Display	
Stem unit	1
0	000
1	00000000000000000000000000000000000
2	00000000000000000000
3	00000
4	00

Majority of the students are registered at between 1 and 2 social networking sites.

2.103
cont.

Satisfaction:

Stem-and-Leaf Display	
Stem unit	1
1	00000
2	00
3	000000000000000
4	00000000000000000000000000
5	0000000000
6	0000

Majority of the satisfaction ratings fall between 3.0 and 5.0.

Text Messages:

Stem-and-Leaf Display	
Stem unit	100
0	01344555555567
1	00000000114555558
2	00000055
3	000000000055
4	00
5	000
6	00
7	005
8	0
9	0

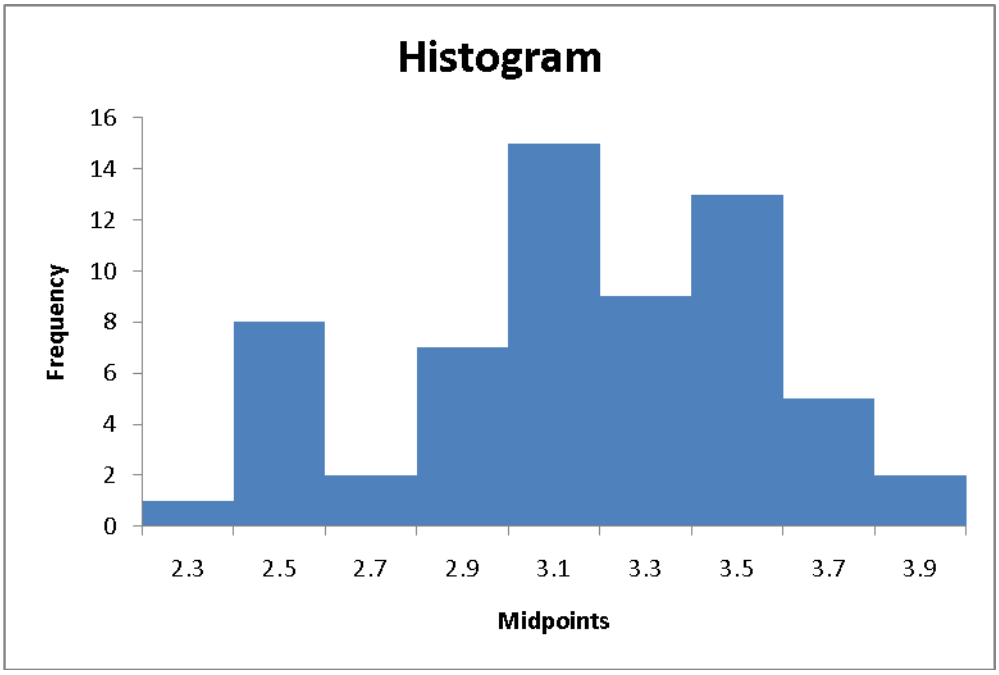
Majority of the students sent less than 400 messages in a typical week.

2.103 cont. **Spending:**

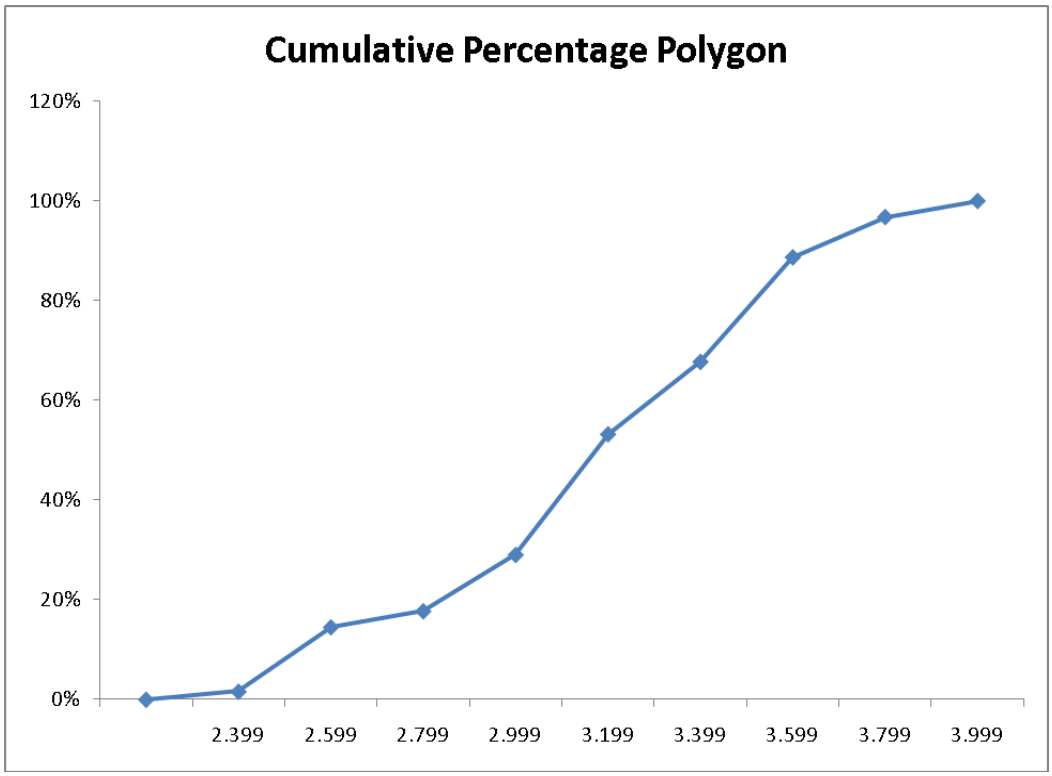
Stem-and-Leaf Display	
Stem unit	100
1	0
2	0000255
3	0000000055568
4	00000559
5	000000000000002
6	0000000005589
7	0
8	
9	0
10	0
11	0
12	
13	
14	0

Majority of the students spend between $200 and $700 for textbooks and supplies.

GPA:

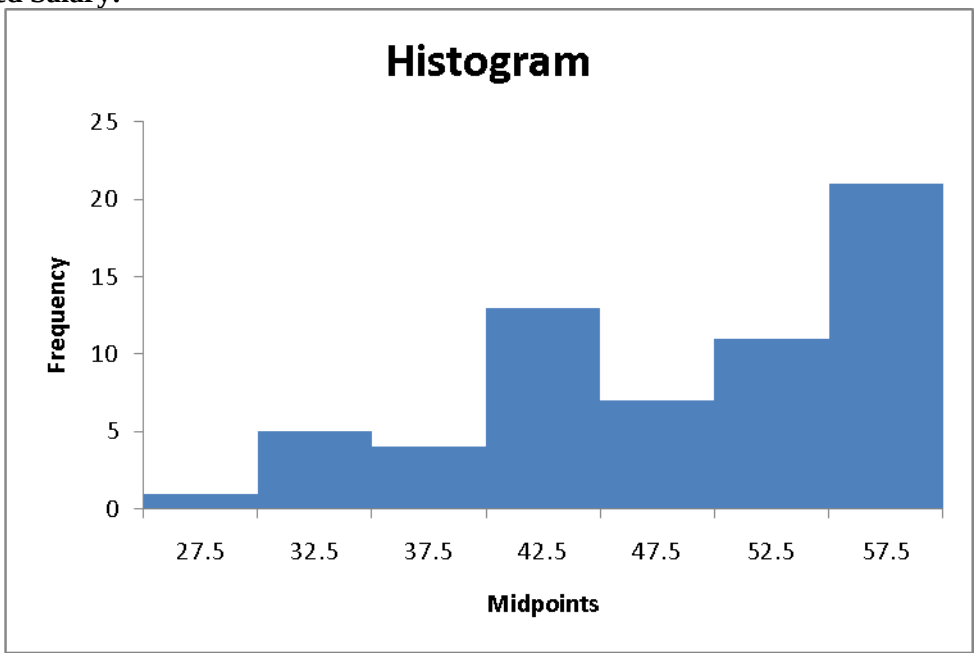


2.103
cont.

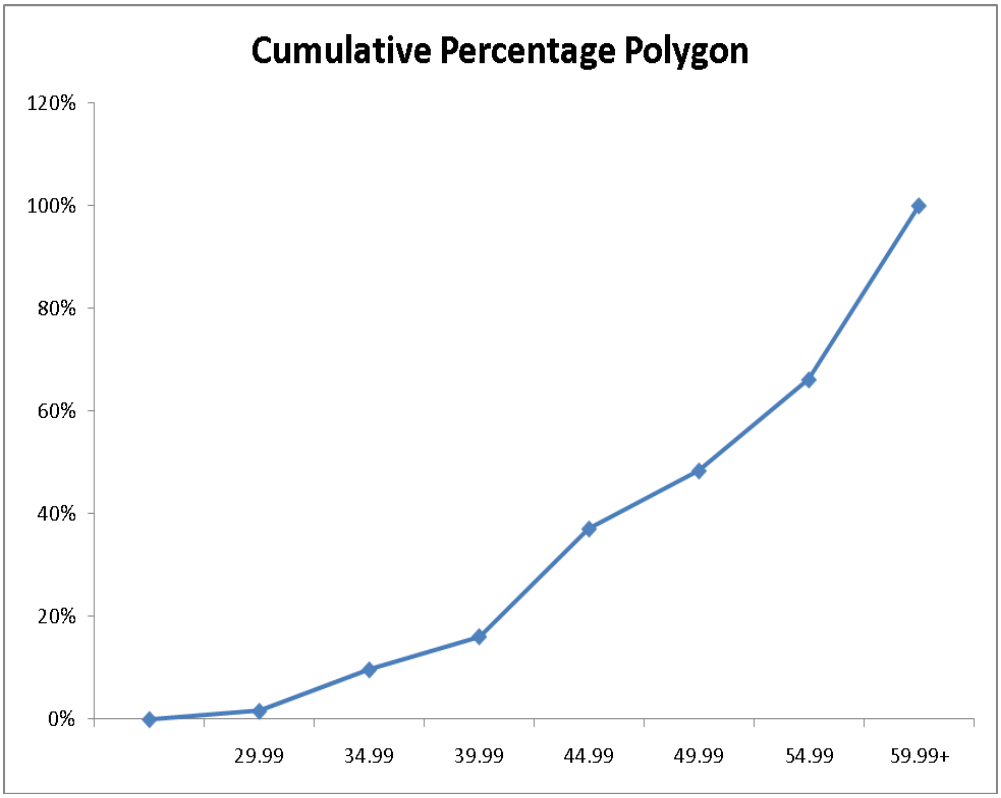


GPA is slightly left-skewed.

Expected Salary:

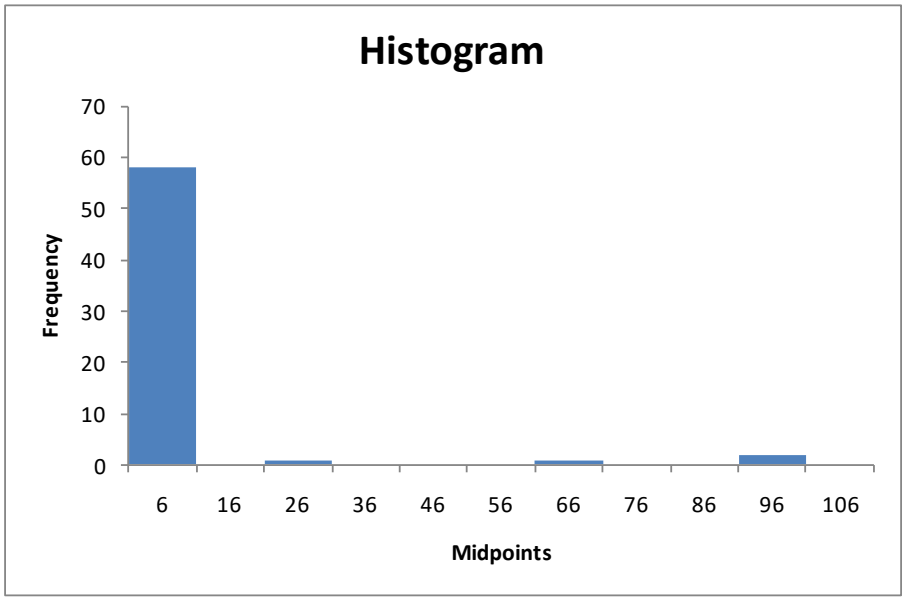


2.103
cont.

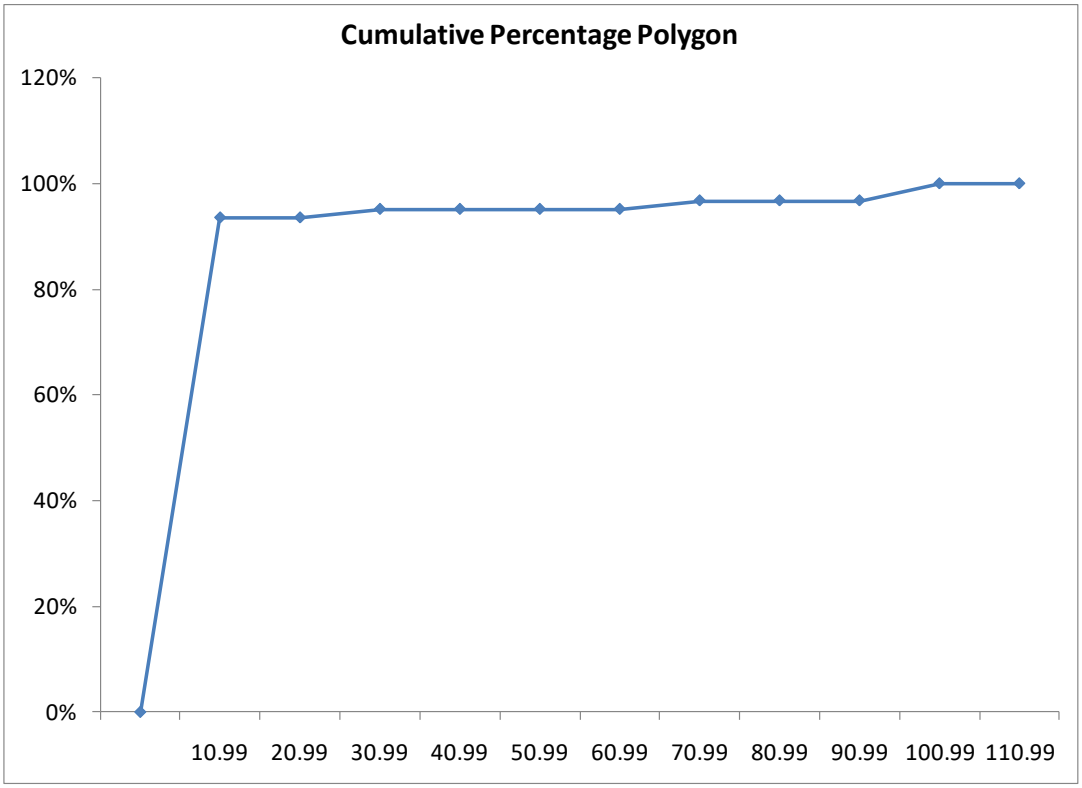


Expected salary is left-skewed.

Wealth:



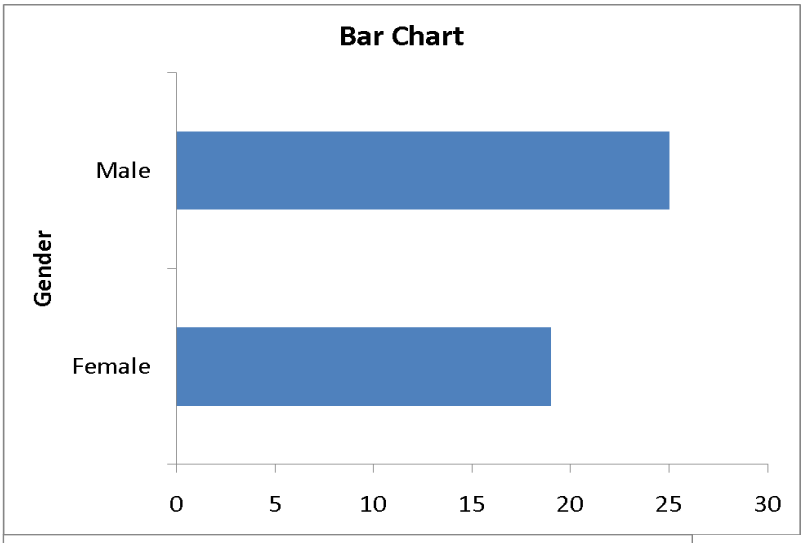
2.103
cont.

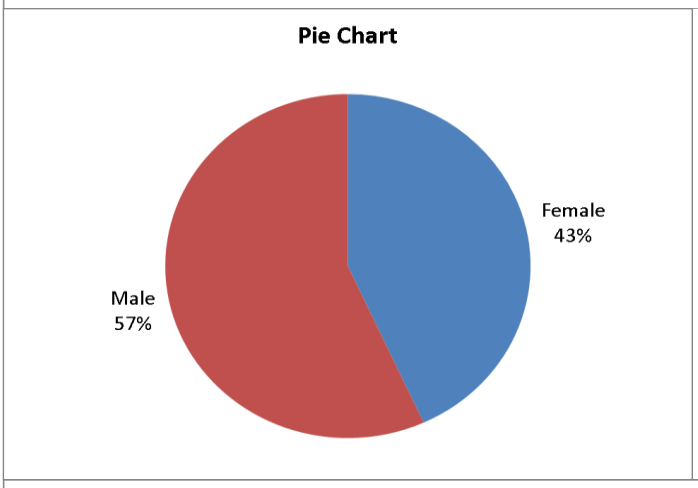


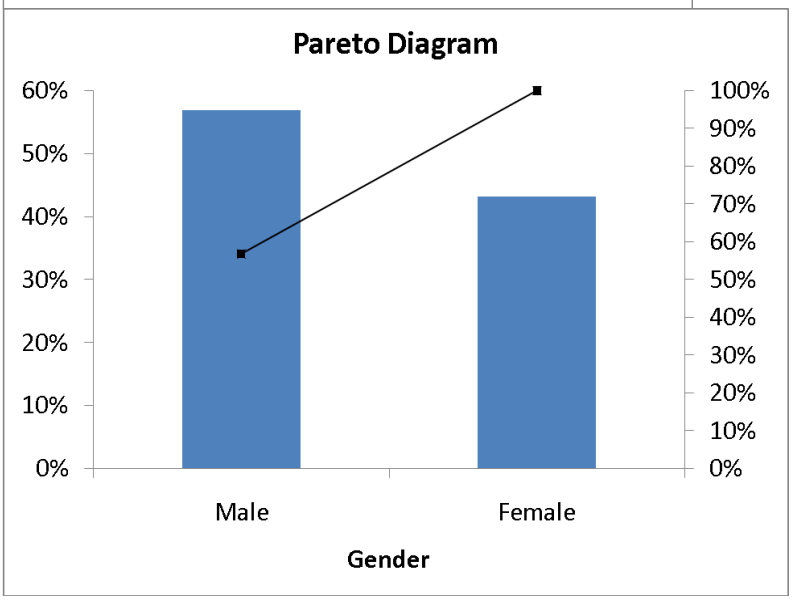
Wealth is right-skewed.

2.105

Gender:



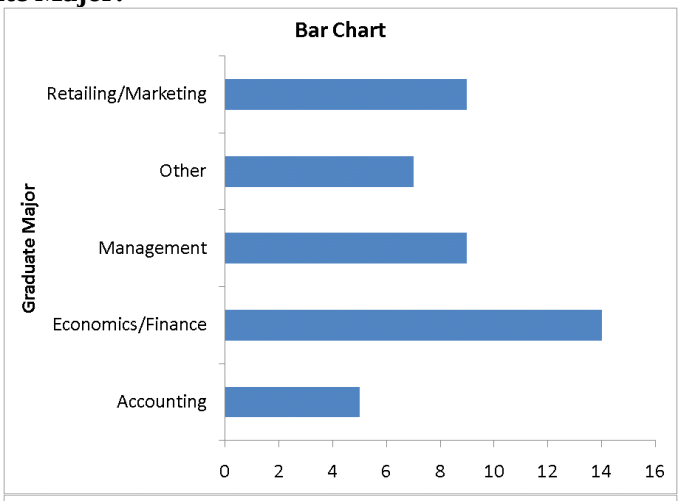


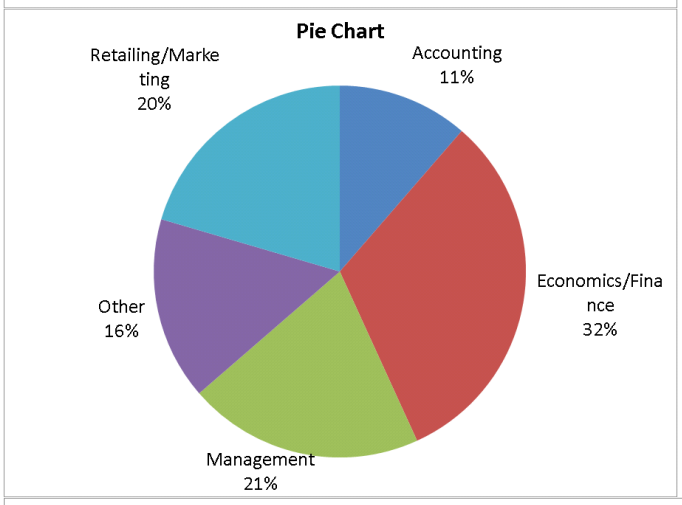


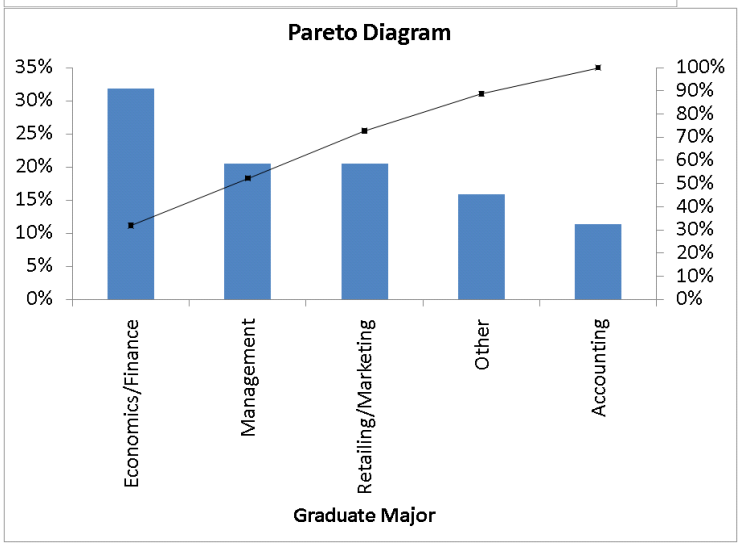
There are more males than females in the survey.

2.105
cont.

Graduate Major:

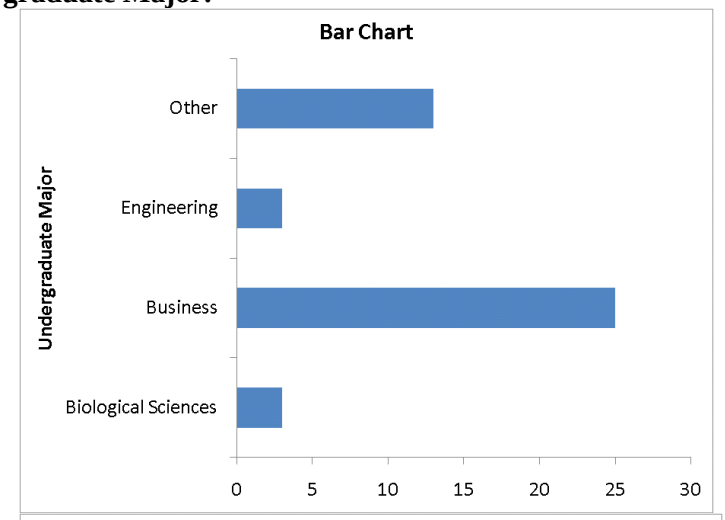


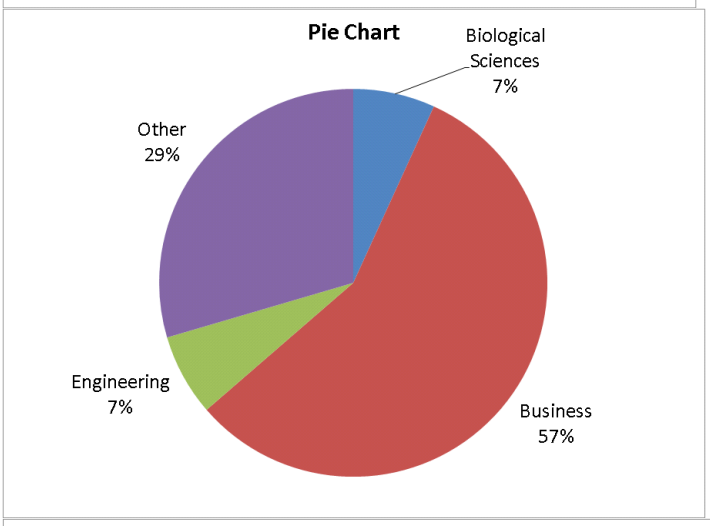


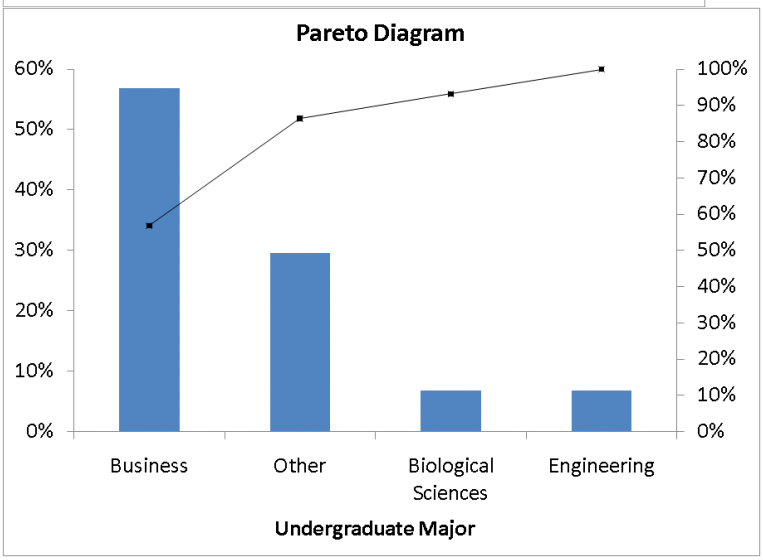


The "vital few" of economics/finance, management, and marketing/retailing account for more than 70% of the graduate majors.

2. 105
cont. **Undergraduate Major:**

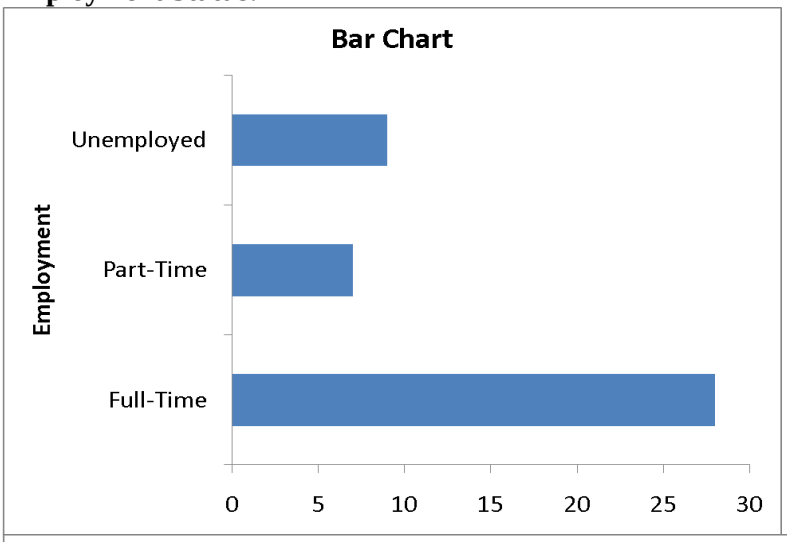


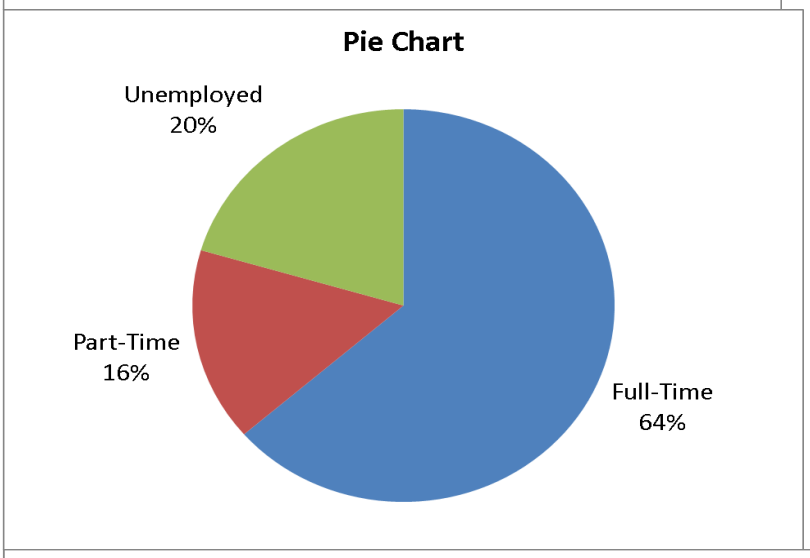


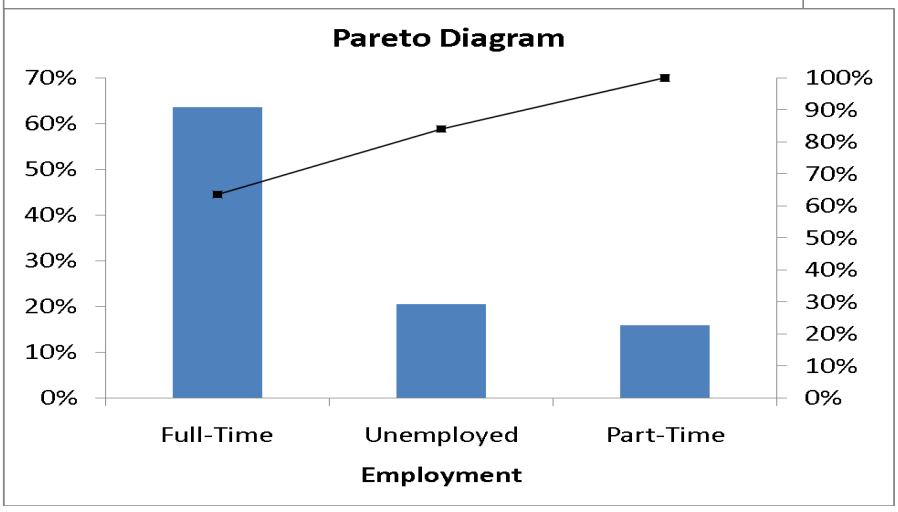


The "vital few" of business administration and other account for more than 80% of the undergraduate majors.

2.105
cont. **Employment Status:**



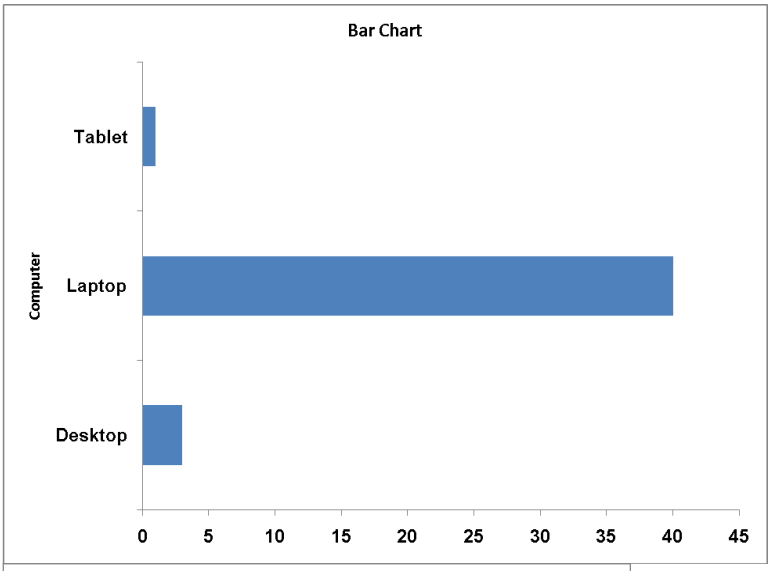


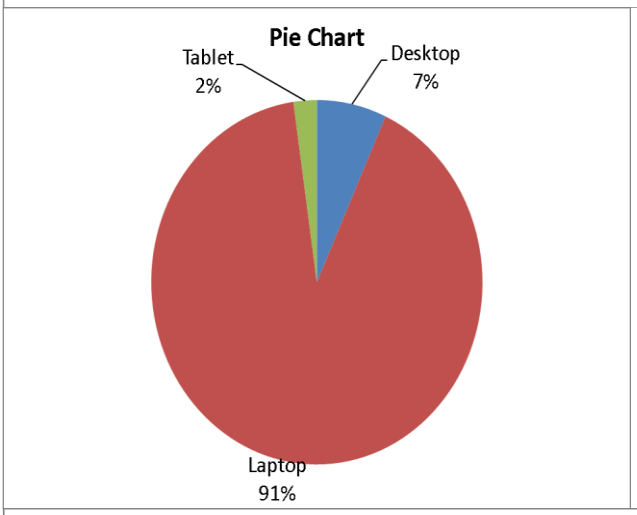


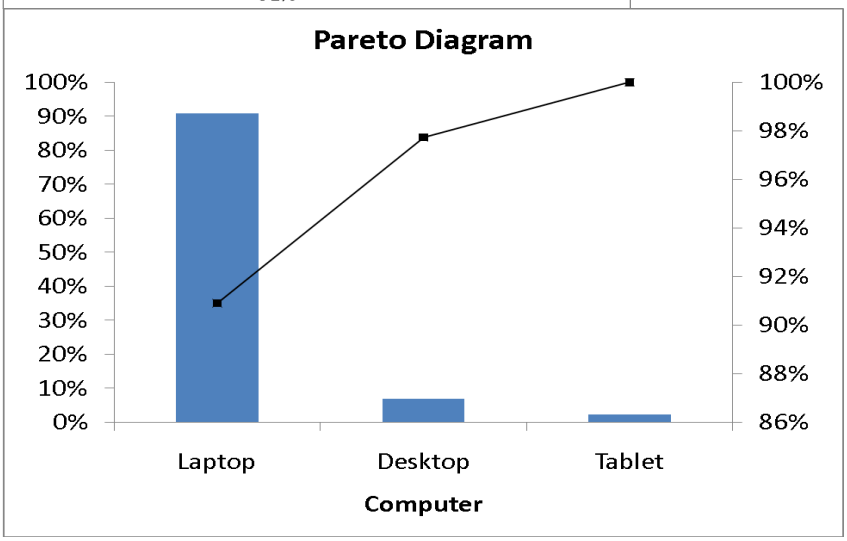
"Full-time" employment status accounts for more than 60% of the students.

2.105 cont.

. **Computers:**







More than 90% of the students use laptop computer for their studies.

2.105
cont.

Age:

Stem-and-Leaf Display	
Stem unit	1
21	0 0
22	0 0 0 0 0 0
23	0 0 0
24	0 0 0 0 0 0 0
25	0 0 0 0
26	0 0 0 0 0 0 0 0
27	0 0 0 0 0
28	
29	0 0 0
30	0
31	0
32	0
33	
34	
35	
36	
37	
38	
39	
40	
41	0
42	0
43	
44	
45	
46	
47	0

Majority of the students are between 22 and 27 years of age and the distribution of age is right-skewed.

2.105
cont.

Full-time Jobs:

Stem-and-Leaf Display	
Stem unit	1
0	0 0 0 0
1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
3	0 0 0 0 0
4	0 0 0

Majority of the students have held between 1 and 2 jobs in the past 10 years.

Spending:

Stem-and-Leaf Display	
Stem unit	100
0	7 8
1	4 5 5 5 7 8 9
2	0 0 0 2 3 5 5 5 5
3	0 0 0 0 0 0 0 0 0 0 0 5 5 6
4	0 0 0 0 0
5	0 6
6	0 8
7	
8	
9	
10	
11	
12	
13	
14	
15	0
16	
17	
18	
19	
20	
21	
22	0

Majority of the students spend between $100 and $500 on textbooks and supplies.

2.105
cont.

Advisory Rating:

Stem-and-Leaf Display	
Stem unit	1
2	0
3	0 0 0
4	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
6	0 0 0 0 0 0
7	0

Majority of the advisory service ratings is between 4 and 5.

Text Message:

Stem-and-Leaf Display	
Stem unit	100
0	0 0 0 0 0 0 1 1 1 1 2 3 5 5 6 6 6 8 8
1	0 0 0 0 0
2	0 0 0 1 1 5
3	0 5
4	0 0 0
5	0 0 3
6	0 5
7	
8	
9	
10	0 0
11	
12	5

Majority of the students sent less than 300 text message in a typical week.

2.105
cont.

Graduate GPA:

Stem-and-Leaf Display	
Stem unit	0.1
30	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
31	0
32	0 0
33	0
34	0
35	0
36	0
37	0 0 0 0
38	0 0
39	0 0
40	0 0 0 0 0 0

Majority of the students have a graduate GPA of 3.0.

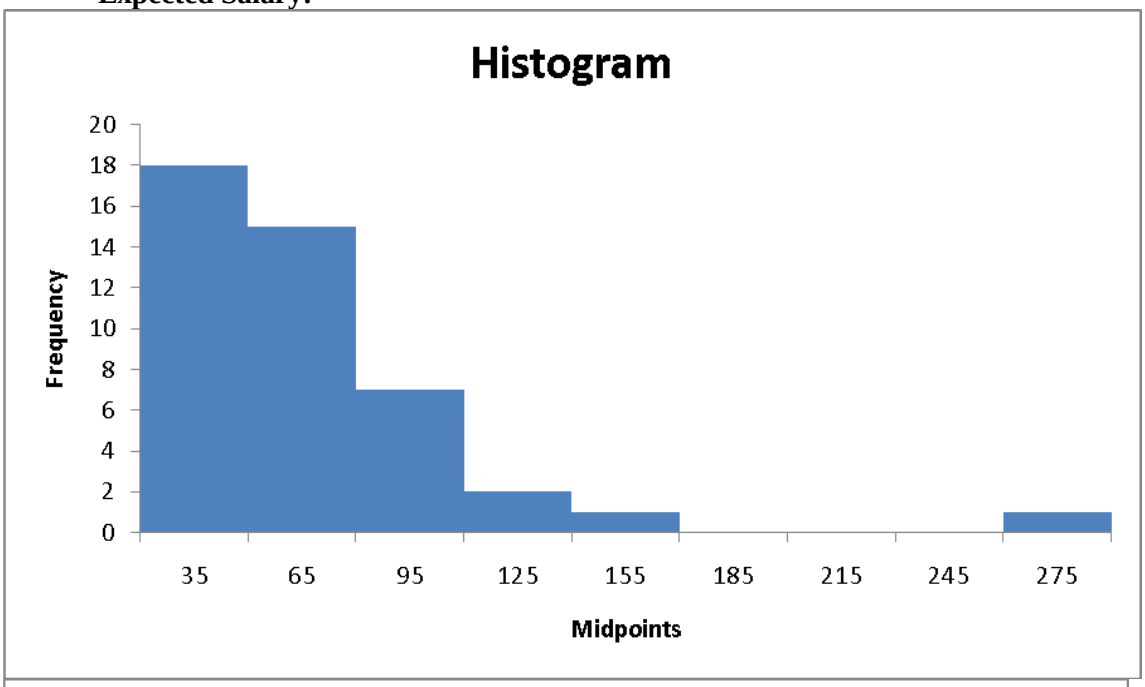
Undergraduate GPA:

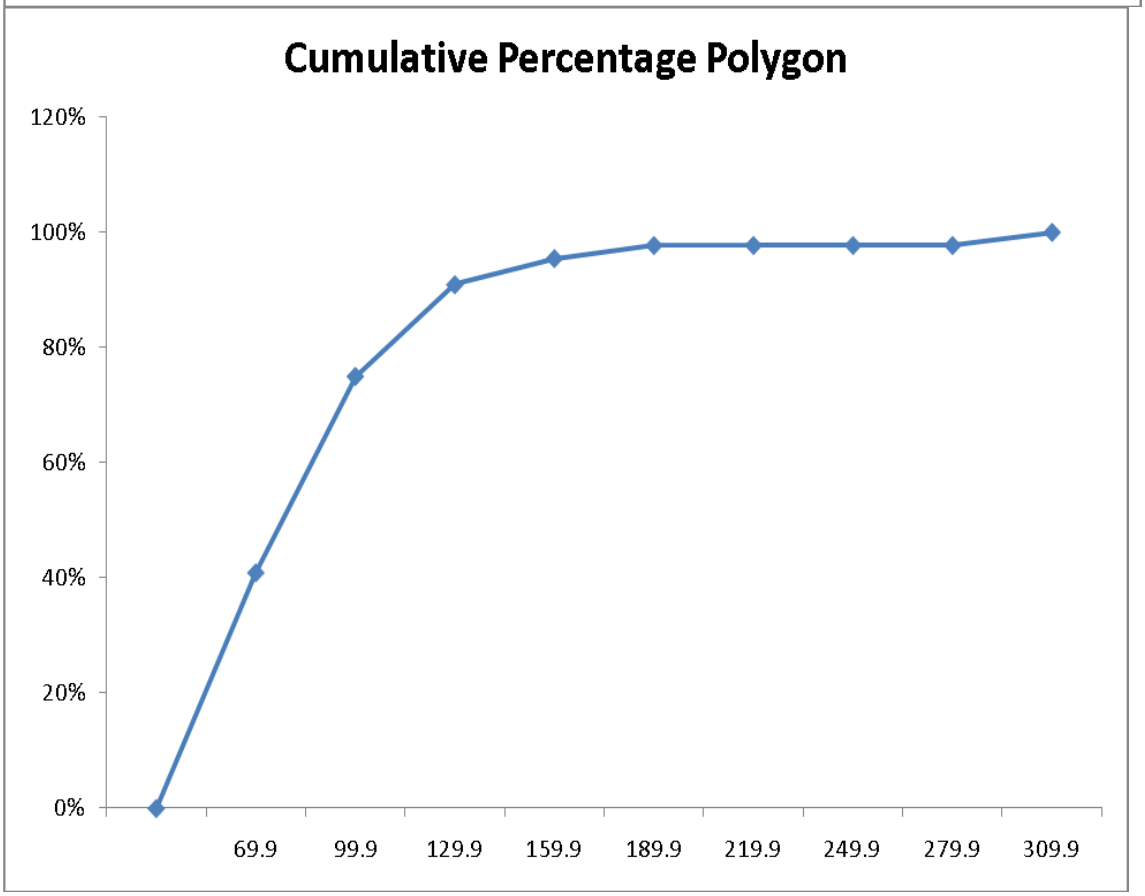
Stem-and-Leaf Displa	
Stem unit	0.1
28	0
29	0 0 0 0 0
30	0 0 0 0 0
31	0 0
32	0 0 0
33	0 0 0 0
34	0 0 0 0 0
35	0 0
36	0 0 0 0 0 0
37	0 0 0 0 0 0
38	0 0 0 0
39	0

The distribution of undergraduate GPA is quite symmetrical around 3.35.

2.105
cont.

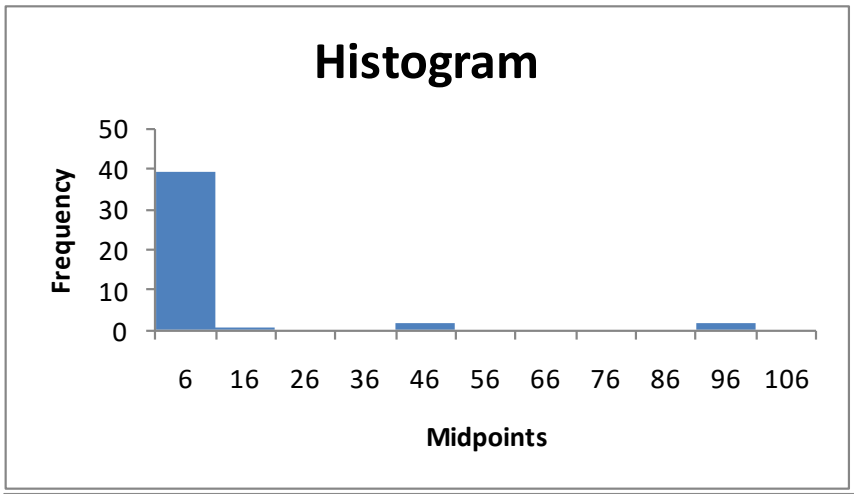
Expected Salary:

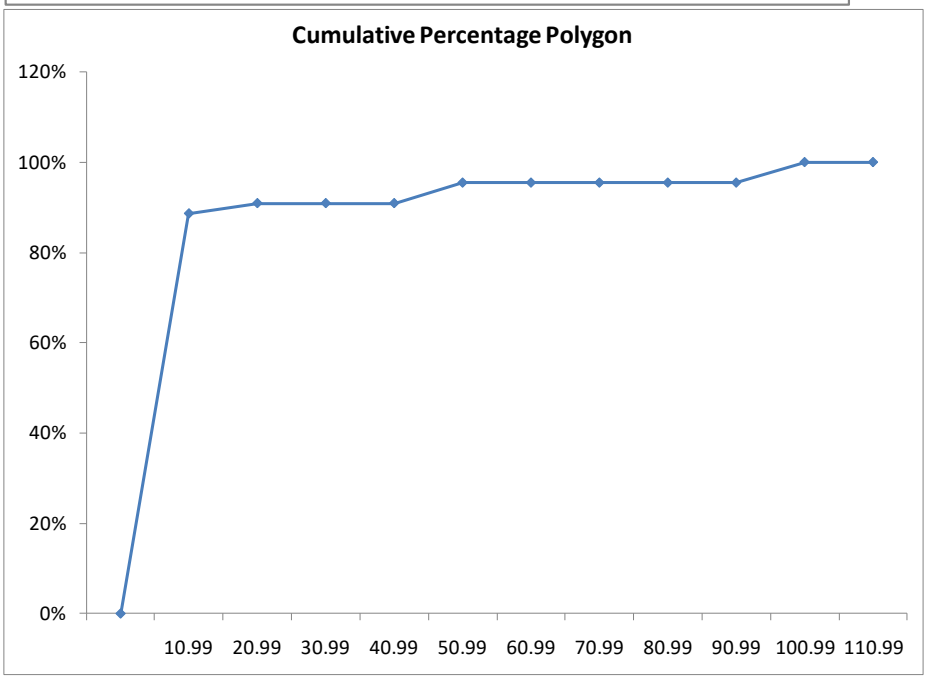




Expected salary is right-skewed.

2.105
cont. **Wealth:**





Wealth is right-skewed.