## Chapter 2

## Describing Data: Frequency Distributions and Graphic Presentation

1. Maxwell Heating \& Air Conditioning far exceeds the other corporations in sales. Mancell Electric \& Plumbing and Mizelle Roofing \& Sheet Metal are the two corporations with the least amount of fourth quarter sales.


Maxwell has the highest sales, and Mizelle the lowest. (LO2-2)
2. Three classes are needed, one for each player. (LO2-1)
3. There are four classes: winter, spring, summer, and fall.

The relative frequencies are $0.1,0.3,0.4$, and 0.2 , respectively. (LO2-1)
4. a.

(LO2-2)
b.

| Aboriginal Identity | Number | Relative Frequency | Percent |  |
| :--- | ---: | ---: | ---: | ---: |
| First Nations | 851560 | 0.608 | 60.8 |  |
| Métis | 451795 | 0.323 |  | 32.3 |
| Inuit | 59445 | 0.042 |  | 4.2 |
| Other | 26475 | 0.019 |  | 1.9 |
| Multiple identities | 11415 | 0.008 |  | 0.8 |
| Aboriginal Identity |  |  | Number | Percent |
| First Nations |  | 851560 | 60.8 |  |
| Métis |  | 451795 | 32.3 |  |
| Inuit |  | 59445 | 4.2 |  |
| Other |  | 26475 | 1.9 |  |
| Multiple identities |  |  | 11415 | 0.8 |

(LO2-1)
c.

5. a.

b.

| Type | Number | Relative Frequencies |
| ---: | :---: | :---: |
| Bright white | 130 | 0.10 |
| Metallic black | 104 | 0.08 |
| Magnetic lime | 325 | 0.25 |
| Tangerine orange | 455 | 0.35 |
| Fusion red | 286 | 0.22 |
| Total | 1300 | $1.00($ LO2-1) |


(LO2-3)
6. Student loan amounts for 2014. Susan Chan's loan is the largest.

(LO2-2)
7. $2^{5}=32,2^{6}=64$; therefore 6 classes (LO2-4)
8. $2^{5}=32,2^{6}=64$ suggests 6 classes. $i \geq \frac{\$ 29-\$ 0}{6}=4.47$ Use interval of 5. (LO2-4)
9. $\quad 2^{7}=128,2^{8}=256$ suggests 8 classes $i \geq \frac{567-235}{8}=41.5$ Use interval of 42 or 45. (LO2-4)
10. a. $2^{5}=32,2^{6}=64$ suggests 6 classes.
b. $\quad i \geq \frac{129-42}{6}=14 \quad$ Use interval of 15 and start first class at 40. (LO2-4)
11. a. $2^{4}=16$ suggests 5 classes
b. $\quad(31-25) / 5=6 / 5=1.2$ Use interval of 1.5
c. 24
d. Units

24 to under 25.5
25.5 to under 27

27 to under28.5
28.5 to under 30

30 to under 31.5
Total
16
e. The largest concentration is in the 27 up to 28.5 class (8). (LO2-4\&5)
$f \quad$ Relative frequency
20.125

4
0.250
$8 \quad 0.500$
$0 \quad 0.000$

$\underline{0.125}$
1.000
12. a. $2^{4}=16,2^{5}=32$, suggest 5 classes
b. $\quad 47 / 5=9.4$ Use interval of 10 .
c. $\quad 50$
d. $\quad f \quad$ Relative frequency

| 50 to under 60 | 4 | 0.20 |
| :--- | :--- | :--- |
| 60 to under 70 | 5 | 0.25 |
| 70 to under 80 | 6 | 0.30 |
| 80 to under 90 | 2 | 0.10 |
| 90 to under 1003 | $\underline{3}$ | $\underline{0.15}$ |
| Total | 20 | $\underline{1.00}$ |

e. The fewest number is about 50 , the highest about 100 . The greatest concentration is in classes 60 up to 70 and 70 up to 80 . (LO2-4\&5)

Shoppers $\quad f$
13. a. 0 to under 3

3 to under $6 \quad 21$
6 to under $9 \quad 13$
9 to under 124
12 to under 153
15 to under $18 \quad \underline{1}$
Total 51
b. The largest group of shopper's (21) shop at BiLo Supermarket 3, 4 or 5 times during a month and one customer visits the store as many as 15 times in a month.
c. Number of Percent of Relative Frequency

Shoppers Total

| 0 to under 3 | 17.65 | 0.1765 |
| :--- | ---: | ---: |
| 3 to under 6 | 41.18 | 0.4118 |
| 6 to under 9 | 25.49 | 0.2549 |
| 9 to under 12 | 7.84 | 0.0784 |
| 12 to under 15 | 5.88 | 0.0588 |
| 15 to under 18 | $\underline{1.96}$ | $\underline{0.0196}$ |
| Total | 100.00 | 1.0000 | (LO2-4\&5)

14. a. An interval of 10 is more convenient to work with. The distribution using 10 is:
$\begin{array}{lr} & f \\ 15 \text { to under } 25 & 1 \\ 25 \text { to under 35 } & 2 \\ 35 \text { to under } 45 & 5 \\ 45 \text { to under } 55 & 10 \\ 55 \text { to under } 65 & 15 \\ 65 \text { to under } 75 & 4 \\ 75 \text { to under } 85 & 3\end{array}$

Total 40
b. Data tends to cluster in classes 45 up to 55 and 55 up to 65 .
c. Based on the distribution, the least spent is $\$ 15$ (actually $\$ 18$ from the raw data). The most spent was less than $\$ 85$. The largest concentration of spending is between $\$ 45$ up to $\$ 65$.
d. $\quad \$$ Spent Percent of Relative Frequency

|  | Total |  |  |
| :--- | ---: | ---: | ---: |
| 15 to under 25 | 2.5 | 0.025 |  |
| 25 to under 35 | 5.0 | 0.050 |  |
| 35 to under 45 | 12.5 | 0.125 |  |
| 45 to under 55 | 25.0 | 0.250 |  |
| 55 to under 65 | 37.5 | 0.375 |  |
| 65 to under 75 | 10.0 | 0.100 |  |
| 75 to under 85 | 7.5 | $\underline{0.075}$ |  |
| Total | 100.0 | 1.000 | (LO2-4\&5) |

15. a. Histogram
b. 100
c. 5
d. $\quad 28$
e. $\quad 0.28$
f. $\quad 12.5$
g. $\quad 13$
(LO2-5\&6)
16. a. 3
b. approximately 27
c. 84
d. $\quad 2$
e. frequency polygon (LO2-6)
17. a. 50
b. $\quad 1.5$ thousands or 1500 miles
c. Using lower limits on the X -axis

d. $\quad 1.5,5$
e.

f. Most between 6000-9000, even spread on both sides
(LO2-6)
18. a. 40
b. $\quad 2.5$
c. $2.5,6$ (always draw a frequency polygon using the midpoints)
d.

e.

f. Most orders take around 10-15 days.
(LO26)
19. a. 40
b. 5
c. $\quad 11$ or 12
d. about $\$ 18$ per hour
e. about $\$ 9$ per hour
f. about $75 \%$
(LO2-7)
20. a. 200
b. 50 or $\$ 50,000$
c. approximately $\$ 175,000$
d. about $\$ 240,000$
e. about 60 homes
f. about 130 homes

## (LO2-7)

21. a. 5
b. Miles

0 to under 3
3 to under $6 \quad 12$

## Cumulative Frequency

Less than
5
17
6 to under 923
40
9 to under 128
48
12 to under $15 \quad 2 \quad 50$
c.

d. about 8500 miles (LO2-7)
22.

| a. | $f$ | More than |
| :--- | ---: | ---: |
| 0 to under 3 | 5 | 50 |
| 3 to under 6 | 12 | 45 |
| 6 to under 9 | 23 | 33 |
| 9 to under 12 | 8 | 10 |
| 12 to under 15 | 2 | 2 |

b.

c. about 7500 miles (LO2-7)
23. a. 13,25
b. Lead Time $f$ 0 to under $5 \quad 6$
5 to under $10 \quad 7$
10 to under 1512
15 to under 208
Cumulative Frequency
Less than
6
13
25

20 to under 257
33
40
c.

d. About 14 days
e. $27 ; 15$
(LO2-7)
24.
a. Lead Time $f$

0 to under $5 \quad 6$
5 to under $10 \quad 7$
10 to under 1512
15 to under 208
More than
40
34
27
15
20 to under 257 7
b.

c. About 18 days (LO2-7)
25. a. 621 to 629
b. 5
c. $621,623,623,627,629 \quad(\mathbf{L O 2}-8)$
26. a. 210-219
b. 6
c. $\quad 210,211,213,215,217,219$
(LO2-8)
27. a. 25
b. $\quad 1$
c. 38,106
d. $\quad 60,61,63,63,65,65,69$
e. No values
f. $\quad 9$

| g. | 9 |
| :--- | :--- |
| h. | 76 |

i. $\quad 16$
(LO2-8)
28. a. 50
b. one
c. 126,270
d. $155,158,159$
e. No values
f. 13
g. $\quad 12$
h. 193.5
i. 19
(LO2-8)
29. Stem Leaves
$0 \quad 5$
128
2
30024789
412366
$5 \quad 2$
There were a total of 16 calls studied. The number of calls ranged from 5 to 52 received.
Typical was 30-39 calls, smallest was 5, largest was 52
(LO2-8)
30. Stem Leaves

36
4
$5 \quad 22499$
60113458
7035678
80344447
9055
The daily usage ranged from 36 to 95 . In a typical day the ATM is typically used between 52-87 times, smallest was 36 , largest was 95 ; clustered between $52-87$ times (LO2-8)
31. a. Qualitative variables are ordinarily nominal level of measurement, but some are ordinal. Quantitative variables are commonly of interval or ratio level of measurement.
b. Yes, both types depict samples and populations. (LO2-1)
32. a.

b.

c. Both are readable, but the pie chart may be easier to comprehend.
33. $2^{6}=64$ and $2^{7}=128$ suggest 7 classes (LO2-4)
34. $2^{7}=128,2^{8}=256$ suggests 8 classes. $i \geq \frac{490-56}{8}=54.25$ Use interval of 55. (LO2-4)
35. a. 5 because $2^{4}=16<25$ and $2^{5}=32>25$
b. $\quad i \geq \frac{48-16}{5}=6.4$ use interval of 7 .
c. $\quad 15$
d. Class Frequency

15 to under 223
22 to under $29 \quad 8$
29 to under $36 \quad 7$
36 to under $43 \quad 5$
43 to under $50 \quad \underline{2}$
25
d. The values are clustered between 22 and 36 . (LO2-4)
36. a. 6 because $2^{5}=32<45$ and $2^{6}=64>45$
b. $\quad 90$, found by $\frac{570-41}{6}=88.17$
c. $\quad 40$
d. Class Frequency

40 to under $130 \quad 6$
130 to under $220 \quad 10$
220 to under $310 \quad 17$
310 to under $400 \quad 8$
400 to under $490 \quad 3$
490 to under $580 \quad \frac{1}{5}$
(LO2-4)
37.
a. $\quad 70$
b. 1
c. $\quad 0,145$
d. $30,30,32,39$
e. 24
f. 21
g. $\quad 77.5$
h. 25
(LO2-8)
38. a. 55
b. two
c. $\quad 91,237$
d. $141,143,145$
e. 8
f. $\quad 12$
g. three
h. 180
(LO2-8)
39. a. 56
b. $\quad 10$ (found by $60-50$ )
c. 55
d. $\quad 17$
(LO2-6)
40. a. less-than frequency diagram or ogive
b. $\quad 250$
c. $\quad 50$ (found by $100-50$ )
d. approx $\$ 240,000$
e. approx $\$ 230,000$ (LO2-7)
41. a. $\$ 36.60$, (found by $265-82$ )/5
b. approx $\$ 40$
c. $\quad \$ 80$ to under $\$ 120 \quad 8$

120 to under $160 \quad 19$
160 to under $200 \quad 10$
200 to under $240 \quad 6$
$\begin{array}{lr}240 \text { to under } 280 \quad \frac{1}{4} \\ \text { Total } & \end{array}$
d. The purchases ranged from a low of about $\$ 80$ to a high of about $\$ 280$. The concentration is in the $\$ 120$ to under $\$ 160$ class.
(LO2-4)
42. a. Student Chequing Accounts End of Month Balances

| Balance | $f$ | $C F$ |
| :--- | :--- | ---: |
| 0 to under 100 | 9 | 9 |
| 100 to under 200 | 6 | 15 |
| 200 to under 300 | 6 | 21 |
| 300 to under 400 | 6 | 27 |
| 400 to under 500 | 5 | 32 |
| 500 to under 600 | 2 | 34 |
| 600 to under 700 | 1 | 35 |
| 700 to under 800 | 3 | 38 |
| 800 to under 900 | 1 | 39 |
| 900 to under $1000 \underline{1}$ | 40 |  |
| Total | 40 |  |

Probably a class interval of $\$ 200$ would be better.
b.

c. About $67 \%$ have less than a $\$ 400$ balance. Therefore, about $33 \%$ would be considered "preferred."
d. Approx $\$ 50$ would be a convenient cutoff point.
(LO2-4 \& 2-6)
43.


A pie chart is also acceptable. From the graph we can see that insurance and license fees are the highest expense at close to $\$ 1500$ per year.
(LO2-2)
44. a. Since $2^{2}=32,2^{6}=64$, and $60<64,6$ classes are recommended. The interval should be at least $(10.1-0.4) / 6=1.6$. So we will use 2 as a convenient value.

|  | Personal Computer Usage (Hours) |  |  |  |  |  | cumula |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| lower |  | upper | midpoint | width | frequency | percent | Frequency | percent |
| 0 | $<$ | 2 | 1 | 2 | 7 | 11.7 | 7 | 11.7 |
| 2 | $<$ | 4 | 3 | 2 | 11 | 18.3 | 18 | 30.0 |
| 4 | $<$ | 6 | 5 | 2 | 19 | 31.7 | 37 | 61.7 |
| 6 | $<$ | 8 | 7 | 2 | 12 | 20.0 | 49 | 81.7 |
| 8 | $<$ | 10 | 9 | 2 | 10 | 16.7 | 59 | 98.3 |
| 10 | $<$ | 12 | 11 | 2 | 1 | 1.7 | 60 | 100.0 |

$60 \quad 100.0$
b.


Interpretations will vary. The "typical" person used the computer about 5 hours per week and nearly everyone is within about five hours. (LO2-4\&2-6)
45. a. Since $2^{6}=64<70<128=2^{7}, 7$ classes are recommended. The interval should be at least $(1002.2-3.3) / 7=142.7$; use 150 as a convenient value.

$70 \quad 100.0$
b.


There will be many answers for the interpretation. (LO2-4\&2-6)
46.

(LO2-2)
47.


Professional development is the largest expense. (LO2-3)
48.

49.

50. Canada won the most medals in 2010 at 26 , but 2014 is a very close second with 25 medals won.

(LO 2-3)
Note: a bar chart is also acceptable.
51. There are 50 observations so the recommended number of classes is 6 .


Twenty-three of the 50 days, or $46 \%$, have fewer than 35 calls waiting. There are two days that have more than 105 calls waiting.
(LO2-4,6\&7)
52. There will be many answers. The following pie chart shows the breakdown of the six colours. About $77 \%$ of the candies are either brown, yellow or red. Each of these colours represents about $25 \%$ of the total. The percent of orange and blue is less than $10 \%$ each. About $4 \%$ of the candies are green.
(LO2-3)

53. a. $2^{\wedge} 5=32<36<64=2^{\wedge} 6$. Thus 6 classes are recommended.
b. The interval width should be at least 2 , found by (15-3)/6. Use 2.2 for convenience and to ensure there are only 6 classes
c. $\quad 2.2$
d.

| Class | Frequency |
| :---: | :---: |
| 2.2 to under 4.4 | 2 |
| 4.4 to under 6.6 | 7 |
| 6.6 to under 8.8 | 11 |
| 8.8 to under 11 | 7 |
| 11 to under 13.2 | 7 |
| 13.2 to under 15.4 | 2 |


e. The distribution is slightly right-skewed with the largest concentration in the class of 6.6 up to 8.8. (LO2-4)
54. a. ordinal and qualitative.
b.

| Performance | Relative Frequency |
| :---: | :---: |
| Early | .22 |
| On-time | .67 |
| Late | .09 |
| Lost | .02 |

c.
d.


e. $89 \%$ of the packages are either early or on-time and $2 \%$ of the packages are lost. So they are missing both of their objectives. They must eliminate all lost packages and reduce the late percentage to below $1 \%$. (LO2-2, 2-3 \& 2-5)
55. a. $\quad 2^{\wedge} 5=32<45<64=2^{\wedge} 6$. Thus 6 classes are recommended.
b. The interval width should be at least 1.5 , found by (10-1)/6. Use 2 for simplicity.
c. 0
d.

| Class | Frequency |
| :---: | :---: |
| 0 to under 2 | 1 |
| 2 to under 4 | 5 |
| 4 to under 6 | 12 |
| 6 to under 8 | 17 |
| 8 to under 10 | 8 |
| 10 to under 12 | 2 |

The distribution is fairly symmetric or "bell-shaped" with a large peak in the middle two classes of 4 up to 8 .
e.

| Class | Frequency |
| :---: | :---: |
| Less than 0 | 0 |
| Less than 2 | 1 |
| Less than 4 | 6 |
| Less than 6 | 18 |


| Less than 8 | 35 |
| :---: | :--- |
| Less than 10 | 43 |
| Less than 12 | 45 |

f.

g. About 28
h.

| Class | Frequency |
| :---: | :---: |
| More than 0 | 45 |
| More than 2 | 44 |
| More than 4 | 39 |
| More than 6 | 27 |
| More than 8 | 10 |
| More than 10 | 2 |
| More than 12 | 0 |

i.

i. About 32
(LO 2-4 \& 2-7)
56.

| Class | Frequency |
| :---: | :---: |
| 0 to under 200 | 19 |
| 200 to under 400 | 1 |
| 400 to under 600 | 4 |
| 600 to under 800 | 1 |
| 800 to under 1000 | 2 |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

This distribution is skewed with a large number of observations in the first class. Notice that the top 19 tunes account for 1323 plays out of a total of 5387 or about $73 \%$ of all plays. (LO2-4)
57. a. $2^{5}=32<33<64=2^{6}$. Thus 6 classes are recommended.
b. The interval width should be at least 1253 , found by (7829-312) /6. Use 1500 for simplicity.
c. $\quad 0$
d.

| Class | Frequency |
| :---: | :---: |
| 0 to under 1500 | 1 |
| 1500 to under 3000 | 2 |
| 3000 to under 4500 | 0 |


| 4500 to under 6000 | 7 |
| :---: | :---: |
| 6000 to under 7500 | 20 |
| 7500to under <br> 9000 | 3 |

e. This distribution is skewed with a few very small values which likely correspond to the "start up" phase of this publication. Most observations fall in the 6000 up to 7500 class which contains 20 of the 33 ( $60.6 \%$ ) months. (LO 2-4)
58.


By far the largest part of sales revenue goes towards operating expenses. (LO2-3)
59.


The largest group had grades between 70 and 79 (38.1\%). Three students (7.1\%) had grades at 90 or more and 3 students had grades less than 60. (LO 2-3)
60. a.

| Class | Cumulative Frequency |
| :---: | :---: |
| Less than 0 | 0 |
| Less than 15 | 1 |
| Less than 30 | 6 |
| Less than 45 | 15 |
| Less than 60 | 26 |
| Less than 75 | 30 |

## b.


c. $\quad 6$ days saw fewer than 30 .
d. The highest $80 \%$ of the days had at least 30 families.
e.

| Class | Cumulative Frequency |
| :---: | :---: |
| More than 0 | 30 |
| More than 15 | 29 |
| More than 30 | 24 |
| More than 45 | 15 |
| More than 60 | 4 |
| More than 75 | 0 |

f.

g. About 27; about 12
(LO 2-7)
61.

| City | Frequency | Relative Frequency |
| :--- | ---: | ---: |
| Vancouver | 100 | 0.05 |
| Calgary | 450 | 0.225 |
| Edmonton | 1300 | 0.65 |
| Saskatoon | 150 | 0.075 |
|  | 2000 |  |

The preference among frequent business travelers is definitely Edmonton (65\%). The least preferred is Vancouver (5\%). (LO 2-5)
62. a. approximately 180
b. 400
c. $23 / 180=.128$
d. $(32+19) / 180=.283=28.3 \%$
e. 2000,45 (LO2-2, 2-4, 2-5 \& 2-6)
63. a.

| frequency | cumulative <br> frequency |  |
| ---: | ---: | ---: |
| Less than 0 | 0 | 0 |
| Less than 5 | 4 | 4 |
| Less than 10 | 15 | 19 |
| Less than 15 | 27 | 46 |
| Less than 20 | 18 | 64 |
| Less than 25 | 6 | 70 |

b.

c. About 30; about 60
d.

|  | frequency | cumulative frequency |
| :--- | ---: | ---: |
| More than 0 | 0 | 70 |
| More than 5 | 4 | 66 |


| More than 10 | 15 | 51 |
| :--- | ---: | ---: |
| More than 15 | 27 | 24 |
| More than 20 | 18 | 6 |
| More than 25 | 6 | 0 |

e.

64. Answers will vary depending on how the data is organized. One possible frequency distribution created using MegaStat is:
a.
$\mathrm{n}=172$ use 8 classes

$$
\begin{aligned}
& \text { interval }=(1338000-3300) / 8= \\
& 163125
\end{aligned}
$$

Frequency Distribution - Quantitative

| List Price |  |  |  |  |  |  | cumulative |  |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | :---: |
| Lower | upper | midpoint | width | frequency | percent | frequency | percent |  |
| 0 | $<$ | 200,000 | 100,000 | 200,000 | 19 | 11.0 | 19 |  |
| 11.0 |  |  |  |  |  |  |  |  |
| 200,000 | $<$ | 400,000 | 300,000 | 200,000 | 126 | 73.3 | 145 |  |
| 800.3 |  |  |  |  |  |  |  |  |
| 400,000 | $<$ | 600,000 | 500,000 | 200,000 | 18 | 10.5 | 163 |  |
| 600,000 | $<$ | 800,000 | 700,000 | 200,000 | 7 | 4.1 | 170 |  |
| 98.8 |  |  |  |  |  |  |  |  |
| 800,000 | $<$ | $1,000,000$ | 900,000 | 200,000 | 0 | 0.0 | 170 |  |
| 98.8 |  |  |  |  |  |  |  |  |
| $1,000,000$ | $<$ | $1,200,000$ | $1,100,000$ | 200,000 | 0 | 0.0 | 170 |  |
| $1,200,000$ | $<$ | $1,400,000$ | $1,300,000$ | 200,000 | 2 | 1.2 | 172 |  |
| 100.8 |  |  |  |  |  |  |  |  |

b.


1. the list prices are clustered in the 2nd class between $\$ 200000$ to under $\$ 400000$.
2. the list prices range from $\$ 0$ to under $\$ 1400000$
c.

3. about 55 homes
4. about $88 \%$.
d.

For the stem-and-leaf output, please see the data set exercise answers for this question.

1. list prices are clustered between $\$ 200000$ and $\$ 390000$.
2. the smallest value is $\$ 40000$; the largest is $\$ 1300000$.
(LO2-4, 2-6, 2-7 \& 2-8)
3. (LO 2-4)
a.

$$
\begin{array}{rrr}
\min = & 500 & \\
\max = & 5200 & \text { interval }=(5200-500) / 7=671
\end{array}
$$

use 750 as the interval

## Total Square Feet

lower upper frequency

| 0 | $<$ | 750 | 11 |
| ---: | ---: | ---: | ---: |
| 750 | $<$ | 1,500 | 48 |
| 1,500 | $<$ | 2,250 | 18 |
| 2,250 | $<$ | 3,000 | 8 |
| 3,000 | $<$ | 3,750 | 6 |
| 3,750 | $<$ | 4,500 | 2 |
| 4,500 | $<$ | 5,250 | 5 |

1. A typical size is from 750 to 1500 . The range of the data is from about 0 to under 5250 .
2. There are 7 values between 3750 and 5250 square feet. These values are much larger than the typical number of square feet.
b.

|  | Total Square Feet |  |  |  |  |
| ---: | ---: | ---: | ---: | ---: | ---: |
|  |  |  |  |  |  |
| Lower |  | upper | frequency | less-than | more-than |
| 0 | $<$ | 1,500 | 11 | 11 | 98 |
| 750 | $<$ | 2,250 | 48 | 59 | 87 |
| 1,500 | $<$ | 3,000 | 8 | 77 | 39 |
| 2,250 | $<$ | 3,750 | 6 | 85 | 21 |
| 3,000 | $<$ | 4,500 | 2 | 91 | 13 |
| 3,750 | $<$ | 5,250 | 5 | 93 | 7 |
| 4,500 |  |  | 98 | 5 |  |





1. less than 1500 sq ft
2. about 75
3. about $75 \%$
c.

Stem and
Leaf plot for List Price
stem unit $=1000000$
leaf unit $=100000$
Frequency Stem Leaf
$88 \quad 0 \quad 11111112222222222222222222223333333333334444$ $0 \quad 44444444444444444444555555566666777777899999$
$\underline{9} \quad 1 \quad 133345558$
$4 \quad 2 \quad 4$
98

1. The values are clustered between $\$ 100000$ and $\$ 900000$.
2. smallest value $=164900$; largest value $=2490000$
3. Answers will vary but should contain the above information.
d.

Stem and
Leaf plot
for Total Square Feet
stem unit $=1000$
leaf unit $=100$

| Frequency | Stem | Leaf |
| ---: | ---: | :--- |
| 19 | 0 | 5555667777777888899 |
| 53 | 1 | 0000000000011111111122222 |
| 13 | 1 | 3333333333333445566666667899 |
| 6 | 2 | 1111122234458 |
| 4 | 3 | 022356 |
| $\underline{3}$ | 4 | 0378 |
| 98 | 5 | 022 |

1. The values are clustered between 1100 and 1900.
2. smallest $=500$; largest $=5200$
3. Answers will vary but should contain the above information.
b.
d.

## CASE (LO2-4 \& 2-6)

Answers may vary.

| Price |  |  |  |  |  | cumulative |  |  |
| :---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| lower |  | upper | Midpoint | width | frequency | percent | frequency | percent |
| 15,000 | $<$ | 18,000 | 16,500 | 3,000 | 8 | 10.0 | 8 | 10.0 |
| 18,000 | $<$ | 21,000 | 19,500 | 3,000 | 23 | 28.8 | 31 | 38.8 |
| 21,000 | $<$ | 24,000 | 22,500 | 3,000 | 17 | 21.3 | 48 | 60.0 |
| 24,000 | 27,000 | 25,500 | 3,000 | 18 | 22.5 | 66 | 82.5 |  |
| 27,000 | $<$ | 30,000 | 28,500 | 3,000 | 8 | 10.0 | 74 | 92.5 |
| 30,000 | $<$ | 33,000 | 31,500 | 3,000 | 4 | 5.0 | 78 | 97.5 |
| 33,000 | $<$ | 36,000 | 34,500 | 3,000 | 2 | 2.5 | 80 | 100.0 |

$80 \quad 100.0$


The selling prices range from about $\$ 15000$ to about $\$ 36000$. The selling prices are concentrated between $\$ 18000$ and $\$ 27000$. A total of 58 , or $72,5 \%$, of the vehicles sold within this range. The highest frequency is in the $\$ 18000$ to under $\$ 21000$ class. So we say that a typical selling price is $\$ 19$ 500. Six vehicles sold for less than $\$ 18000$, and two sold for more than $\$ 33000$.

