

Text Exercise Set 4

NAME:

- 4-1** On boxes of chocolates produced by the Sweetuthe Company is a statement that the box contains 4 pounds of chocolate. The company produces the boxes of chocolate at two locations, one on the east coast and one on the west coast. For several boxes, the weight of chocolate in the box, measured in pounds, and the location where the box was produced are recorded with following results:

East Coast	4.14	3.99	4.06	4.15	4.18	4.26	4.03	4.12	4.19	3.98	4.09	4.24	3.96	4.01
West Coast	4.13	3.94	3.93	4.00	3.90	4.40	4.07	3.97	4.35	3.95	3.91			

- (a) Find the mean and median for the east coast weights; then find the mean and median for the west coast weights.

- (b) Do the means and medians found in part (a) suggest that the distribution of weights is centered at a different value for the two locations? If yes, for which location does the center of the distribution appear to be greater?

- (c) Do the means and medians found in part (a) suggest that the distribution of weights has a different shape for the two locations? If yes, how does the shape appear to differ between the two locations?

- (d) Find the range and interquartile range for the east coast weights; then find the range and interquartile range for the west coast weights.

- (e) Do the ranges and interquartile ranges found in part (d) suggest that the distribution of weights shows a different amount of dispersion for the two locations? If yes, for which location does the amount of dispersion appear to be greater?

4-3 The number of phone calls to a certain office is recorded each day for 100 days, and the results are organized into the frequency table displayed as Table 4-4.

<u>Number of Calls</u>	<u>Raw Frequency</u>
5	10
6	11
7	13
8	24
9	21
10	14
11	0
12	4
13	3

(a) Find the mean number of phone calls per day and the median number of phone calls per day.

(b) What does the difference between the mean and median say about the shape of the distribution?

(c) Find the range and the interquartile range for the number of phone calls per day.

4-4 The number of sales during the last week by each salesperson in an office is recorded, and the results are organized into the frequency table displayed as Table 4-5.

<u>Number of Sales</u>	<u>Raw Frequency</u>
3	2
4	5
5	7
6	10
7	19
8	15
9	8
10	5
11	4

(a) Find the mean number of sales per person and the median number of sales per person.

(b) What does the difference between the mean and median say about the shape of the distribution?

(c) Find the range and the interquartile range for the number of sales per person.

4-5 The number of seconds each student in several sections of a gym class could hold his/her breath underwater is recorded, and the results are organized into the frequency table displayed as Table 4-6.

<u>Time in Seconds</u>	<u>Raw Frequency</u>
Above 0 to 10	15
Above 10 to 20	20
Above 20 to 30	29
Above 30 to 40	25
Above 40 to 50	22
Above 50 to 60	14

- (a) Why was it necessary to define classes in the construction of the frequency distribution for this data?
- (b) What does the shape of the distribution suggest about the difference between the mean and median time for holding breath underwater?
- (c) In which class does the median time lie?
- (d) Why is it not correct to obtain the mean time by dividing $15+20+29+25+22+14$ by 6?
- (e) For the recorded times used to create Table 4-6, in which class does Q_1 lie, and in which class does Q_3 lie?
- (f) Explain why it is not possible for the mean of the recorded times used to create Table 4-6 to be equal to 61.

4-6 The gas mileage in miles per gallon (mpg) for each of several vehicles owned by a rental agency is recorded, and the results are organized into the frequency table displayed as Table 4-7.

<u>Miles Per Gallon</u>	<u>Raw Frequency</u>
Above 10 to 15	2
Above 15 to 20	4
Above 20 to 25	7
Above 25 to 30	10
Above 30 to 35	11
Above 35 to 40	14
Above 40 to 45	15
Above 45 to 50	12

- (a) Why was it necessary to define classes in the construction of the frequency distribution for this data?
- (b) What does the shape of the distribution suggest about the difference between the mean and median gas mileage?
- (c) In which class does the median gas mileage lie?
- (d) Why is it not correct to obtain the mean gas mileage by dividing $2+4+7+10+11+14+15+12$ by 8?
- (e) For the recorded gas mileages used to create Table 4-7, in which class does Q_1 lie, and in which class does Q_3 lie?
- (f) Explain why it is not possible for the mean of the recorded gas mileages used to create Table 4-7 to be equal to 9.

- 4-7** Indicate the shape of the distribution you might expect to observe for each of the data sets described, if a histogram were constructed, and give a reason to justify your answer. (Please note that you are not required to actually collect any data; you are only being asked to make educated guesses about what is likely to occur if data were collected.)
- (a) Several hundred 20-year-old males are arbitrarily selected, and each male's height is recorded.
 - (b) Several hundred 20-year-old individuals (about half male and half female) are arbitrarily selected, and each individual's height is recorded.
 - (c) Several hundred one-dollar bills are arbitrarily selected from those passed by patrons of a restaurant, and the age of each dollar bill is recorded.
 - (d) Several hundred one-dollar bills are arbitrarily selected from those passed by patrons of a restaurant, and the calendar year that each dollar bill was printed is recorded.
 - (e) Several hundred names are arbitrarily selected from a phone book, and the last digit of each person's phone number is recorded.
- 4-8** Indicate the shape of the distribution you might expect to observe for each of the data sets described, if a histogram were constructed, and give a reason to justify your answer. (Please note that you are not required to actually collect any data; you are only being asked to make educated guesses about what is likely to occur if data were collected.)
- (a) Ten pennies are flipped simultaneously, and the number of pennies displaying heads is recorded. This is repeated several hundred times.
 - (b) A fair, six-sided die has one dot painted on one side, two dots painted on a second side, three dots painted on a third side, four dots painted on a fourth side, five dots painted on a fifth side, and six dots painted on a sixth side. The die is rolled several hundred times, and the number of dots displayed upward each time is recorded.

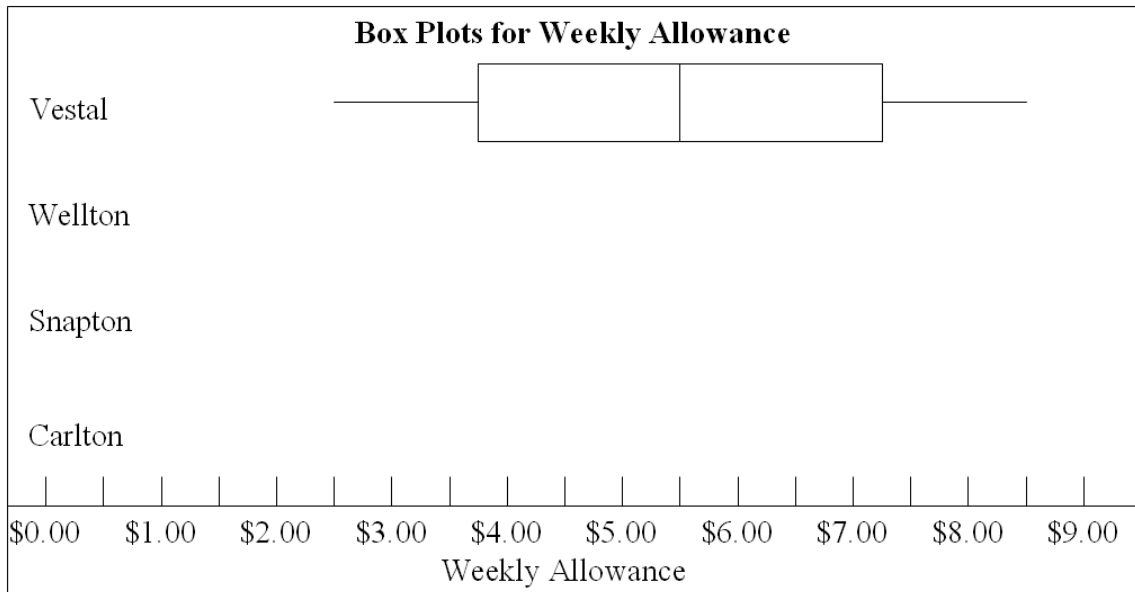
4-8 - continued

- (c) A fair, twelve-sided die has one dot painted on three of its sides, two dots painted on two of its sides, three dots painted on one of its sides, four dots painted on one of its sides, five dots painted on two of its sides, and six dots painted on three of its sides. The die is rolled several hundred times, and the number of dots displayed upward each time is recorded.

- (d) Several hundred automobiles are arbitrarily selected on a busy city street, and the age of each automobile in years is recorded.

- (e) Several hundred automobiles are arbitrarily selected on a busy city street, and the calendar year that each automobile was made is recorded.

4-9 The figure titled "Box Plots for Weekly Allowance" displays the distribution of weekly allowances for the sixth graders attending Vestal Middle School.

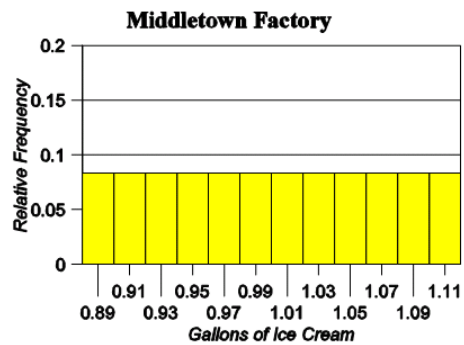


- (a) Suppose the distribution of weekly allowances for the sixth graders attending Wellton Middle School has the same mean, the same median, and the same interquartile range as the distribution for Vestal Middle School, but there is less dispersion at Wellton Middle School than at Vestal Middle School. In the figure titled "Box Plots for Weekly Allowance", construct a possible box plot for Wellton Middle School.

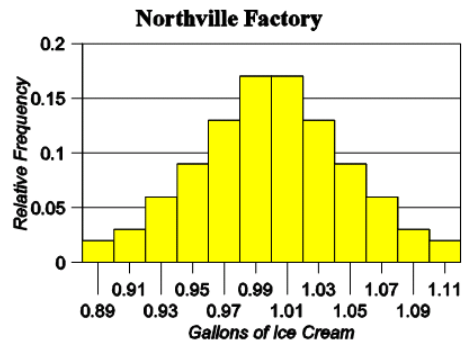
4-9 - continued

- (b) Suppose the distribution of weekly allowances for the sixth graders attending Snapton Middle School has the same mean, the same median, and the same range as the distribution for Vestal Middle School, but there is less dispersion at Snapton Middle School than at Vestal Middle School. In the figure titled "Box Plots for Weekly Allowance", construct a possible box plot for Snapton Middle School.
- (c) Suppose the distribution of weekly allowances for the sixth graders attending Carlton Middle School has the same median as the distribution for Vestal Middle School, but the mean is larger at Carlton Middle School than at Vestal Middle School. In the figure titled "Box Plots for Weekly Allowance", construct a possible box plot for Carlton Middle School.

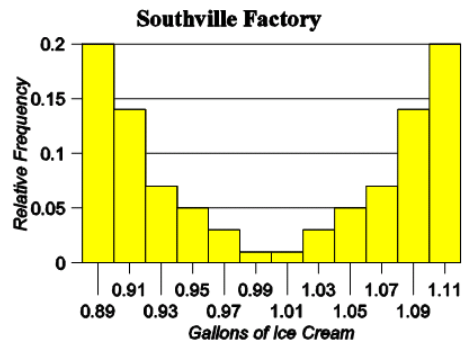
4-10 Three factories, one in Northville, one in Middletown, and one in Southville, each produce gallon containers of ice cream. For each factory, the actual amount of ice cream in each of several selected containers is recorded, and the three histograms on the right display the resulting data.



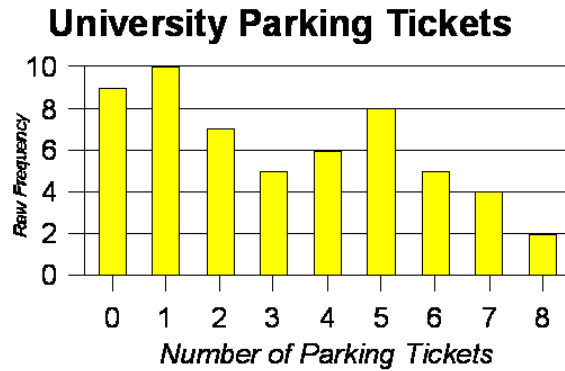
- (a) How does the mean amount of ice cream per container compare for the three factories?
- (b) How does the dispersion in amount of ice cream per container compare for the three factories?



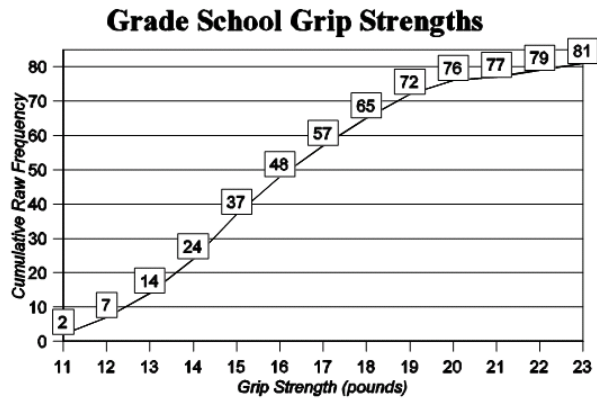
- (c) What is a possible explanation for the type of distribution observed at the Southville factory?



4-11 Figure 3-3 was used in Exercise 3-8 to display data on how many parking tickets graduating college seniors received during an academic year (and is redisplayed here on the right). Find the five-number summary for the data.



4-12 Figure 3-4 was used in Exercise 3-9 to display data on the grip strength measured in pounds of force for several grade school children (and is redisplayed here on the right). Without doing any calculations, indicate whether or not you think the median will be above 25, and state the reason for your answer.



[This page is intentionally left blank]