

9. Consider the time it takes to drive from an outlying suburb to downtown. At which time would you expect the driving time to have the highest variation?
- at 3:00 in the morning
 - at 7:00 Sunday morning
 - during rush hour
10. The mayor of a town is considering a run for governor. She conducts a poll asking registered voters to rate their likelihood of voting for her on a scale of 1 to 5, where 1 means “definitely would not vote for her” and 5 means “definitely would vote for her.” The most encouraging result would be
- low median, high variation.
 - high median, low variation.
 - high median, high variation.

Exercises 6A

REVIEW QUESTIONS

- Define and distinguish among mean, median, and mode.
- What are outliers? Describe the effects of outliers on the mean, median, and mode.
- Briefly describe at least two possible sources of confusion about the “average.”
- Give simple examples of a single-peaked distribution and a double-peaked distribution.
- What do we mean when we say that a distribution is symmetric? Give simple examples of a symmetric distribution, a left-skewed distribution, and a right-skewed distribution.
- What do we mean by the variation of a distribution? Give simple examples of distributions with different amounts of variation.

DOES IT MAKE SENSE?

Decide whether each of the following statements makes sense (or is clearly true) or does not make sense (or is clearly false). Explain your reasoning.

- In my data set of 10 exam scores, the mean turned out to be the score of the person with the third highest grade. No two people got the same score.
- In my data set of 10 exam scores, the median turned out to be the score of the person with the third highest grade. No two people got the same score.
- I made a distribution of 15 apartment rents in my neighborhood. One apartment had a much higher rent than all of the others, and this outlier caused the mean rent to be higher than the median rent.
- If management and employees use the same data and do the calculations properly, they will always agree on the average wage.
- The distribution of grades was left-skewed, but the mean, median, and mode were all the same.
- There’s much more variation in the ages of the general population than in the ages of students in my college extension course, but both turn out to have the same mean.

BASIC SKILLS & CONCEPTS

13–18: Mean, Median, and Mode. Compute the mean, median, and mode of the following data sets.

13. Weights (in grams) of copper-nickel quarters made after 1965:
- 5.67 5.72 5.63 5.70 5.73 5.64

14. Body temperature (in degrees Fahrenheit) of randomly selected normal and healthy adults:

98.6 98.6 98.0 98.0 99.0
98.4 98.4 98.4 98.4 98.6

15. Total points scored in the games of an NBA (basketball) play-off series:

201 195 232 176 189 215 200

16. Golf scores from a recent WPGA tournament:

69 70 70 71 73 73 75 76 76 78
80 81 81 82 83 84 85 86 87 88

17. Rainfall amounts (in inches) for six consecutive months in a particular city:

2.5 0.8 1.3 1.2 0.4 0.9

18. Weights (in grams) of randomly selected M&M plain candies:

0.957 0.912 0.842 0.925 0.939 0.886
0.914 0.913 0.958 0.947 0.920

19. **Outlier Coke.** Cans of Coca-Cola vary slightly in weight. Here are the measured weights of seven cans, in pounds:

0.8161 0.8194 0.8165 0.8176
0.7901 0.8143 0.8126

Find the mean and median of these weights. Which, if any, of these weights would you consider to be an outlier? What are the mean and median weights if the outlier is excluded?

20. **Margin of Victory.** The data set below gives the margin of victory in the NFL Superbowl games for 2002–2009.

3 12 11 3 3 27 3 27

- Find the mean and median margin of victory.
- Identify the outliers in the set. If you eliminate the outliers on the high side, what are the new mean and median?

21–26: **Appropriate Average.** State, with an explanation, whether the mean, median, or mode gives the best description of the following averages.

- The average household income in Missouri
- The average age at first marriage for men in America
- The average number of times that people change jobs during their careers
- The average number of pieces of lost luggage per flight from an airline company’s perspective.
- The average weight of potatoes in a 10-pound bag

26. The average waiting time in the lines for a drive-up window at a bank

27–34: Describing Distributions. Consider the following distributions.

- a. How many peaks would you expect for the distribution? Explain.
 - b. Would you expect the distribution to be symmetric, left-skewed, or right-skewed? Explain.
 - c. Would you expect the variation of the distribution to be small, moderate, or large? Explain.
27. The exam scores for 100 students when 40 students got an F, 25 students got a D, and 20 students got a C
28. The weights of all people who use an ice rink that is open to figure skaters in the morning and to hockey players in the afternoon
29. The weights of all athletes on a college track team (men and women combined)
30. The numbers of people whose telephone numbers end in 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 (the data set has 10 values)
31. The monthly sales of snow shovels over a one-year period at a store in Buffalo, New York
32. The weights of cars at a dealership at which about half of the inventory consists of compact cars and half of the inventory consists of sport utility vehicles
33. The prices of 32-ounce containers of 20 different brands of laundry detergent
34. The ages of patrons who visit an amusement park

FURTHER APPLICATIONS

35–37: Smooth Distributions. Through each histogram, draw a smooth curve that captures its important features. Then classify the distribution according to its number of peaks, symmetry or skewness, and variation.

35. Times between 300 eruptions of Old Faithful geyser in Yellowstone National Park, shown in Figure 6.6

Times Between Eruptions of Old Faithful

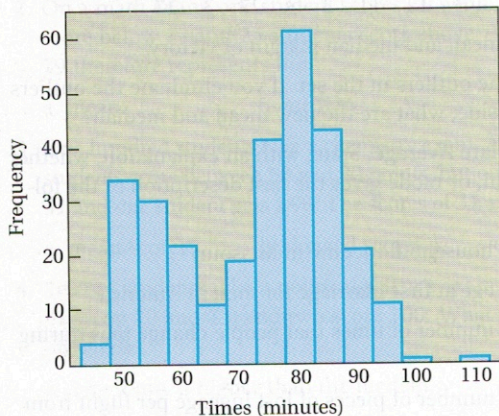


FIGURE 6.6 Source: Hand et al., *Handbook of Small Data Sets*, 1994.

36. Time until failure for a sample of 108 computer chips that failed, shown in Figure 6.7

Failure Time of Computer Chips

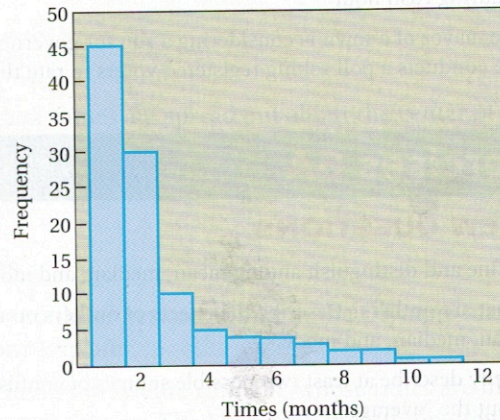


FIGURE 6.7 Source: Hand et al., *Handbook of Small Data Sets*, 1994.

37. Weights of a sample of 391 rugby players, shown in Figure 6.8

Weight of Rugby Players

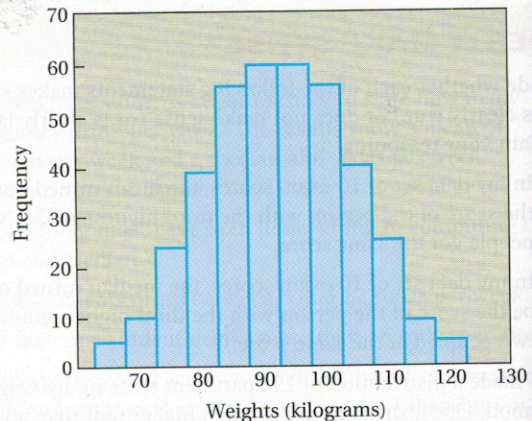


FIGURE 6.8 Source: Hand et al., *Handbook of Small Data Sets*, 1994.

38. **LOTTO Numbers.** Figure 6.9 shows the distribution of numbers (1 through 42) from 5964 drawings of balls in the Colorado LOTTO.

- a. Does it make sense to describe the symmetry of this distribution? Explain.
- b. Does it make sense to describe the number of peaks of this distribution? Explain.
- c. If you made the distribution of numbers for another 6000 drawings, would it look the same as Figure 6.9? Explain.
- d. If you made the distribution of numbers for 1,000,000 drawings, what would you expect the distribution to look like?