11. Earthquakes The Southern California Earthquake Data Center recorded magnitudes (Richter scale) of 10,594 earthquakes in a recent year. The mean is 1.240 and the standard deviation is 0.578. Consider the magnitudes that are unusual. What are the magnitudes that separate the unusual earthquakes from those that are usual?

12. Female Voice Based on data from Data Set 17 in Appendix B, the words spoken in a day by women have a mean of 16,215 words and a standard deviation of 7301 words. Consider the women with an unusual word count in a day. What are the numbers of words that separate the unusual word counts from those that are usual?

Comparing Values.   *In Exercises 13–16, use z scores to compare the given values.*

13. Tallest Man and Woman As of this writing, the tallest living man is Sultan Kosen, who has a height of 247 cm. The tallest living woman is De-Fen Yao, who is 236 cm tall. Heights of men have a mean of 175 cm and a standard deviation of 7 cm. Heights of women have a mean of 162 cm and a standard deviation of 6 cm. Relative to the population of the same gender, who is taller? Explain.

14. Oscars As of this writing, Sandra Bullock was the last woman to win an Oscar for Best Actress and Jeff Bridges was the last man to win for Best Actor. At the time of the awards ceremony, Sandra Bullock was 45 years of age and Jeff Bridges was 60 years of age. Based on Data Set 11 in Appendix B, the Best Actresses have a mean age of 35.9 years and a standard deviation of 11.1 years. The Best Actors have a mean age of 44.1 years and a standard deviation of 9.0 years. (All ages are determined at the time of the awards ceremony.) Relative to their genders, who was younger when winning the Oscar: Sandra Bullock or Jeff Bridges? Explain.

15. Comparing Test Scores Scores on the SAT test have a mean of 1518 and a standard deviation of 325. Scores on the ACT test have a mean of 21.1 and a standard deviation of 4.8. Which is relatively better: a score of 1490 on the SAT test or a score of 17.0 on the ACT test? Why?

16. Red Blood Cell Counts Based on Data Set 1 in Appendix B, males have red blood cell counts with a mean of 5.072 and a standard deviation of 0.395, while females have red blood cell counts with a mean of 4.577 and a standard deviation of 0.382. Who has the higher count relative to the sample from which it came: A male with a count of 4.91 or a female with a count of 4.32? Explain.

Percentiles.   *In Exercises 17–20, use the following duration times (seconds) of 24 eruptions of the Old Faithful geyser in Yellowstone National Park. The duration times are sorted from lowest to highest. Find the percentile corresponding to the given time.*

$$110 \quad 120 \quad 178 \quad 213 \quad 234 \quad 234 \quad 235 \quad 237 \quad 240 \quad 243 \quad 245 \quad 245$$
$$250 \quad 250 \quad 251 \quad 252 \quad 254 \quad 255 \quad 255 \quad 259 \quad 260 \quad 266 \quad 269 \quad 273$$

17. 213 sec   **18.** 240 sec   **19.** 250 sec   **20.** 260 sec

In Exercises 21–28, use the same list of 24 sorted Old Faithful eruption duration times given for Exercises 17–20. Find the indicated percentile or quartile.

21. P_{60} **22.** Q_1

23. Q_3 **24.** P_{40}

25. P_{50} **26.** P_{75}

27. P_{25} **28.** P_{85}