7. The weights of babies born at Belmont Hospital are normally distributed with a mean of 6.8 pounds and a standard deviation of 7 pounds.

8. On yesterday's mathematics exam, the standard score was 75.

9. My professor graded the final on a curve, and she gave a grade of A to anyone who had a standard score of 2 or more.

10. Jack is in the 50th percentile for height, so he is of median height.

BASIC SKILLS & CONCEPTS

11–12: Normal Shape. Consider the following sets of three distributions, all of which are drawn to the same scale. Identify the two distributions that are normal. Of the two normal distributions, which one has the larger variation?

11.

      (a)   (b)   (c)

12.

      (a)   (b)   (c)
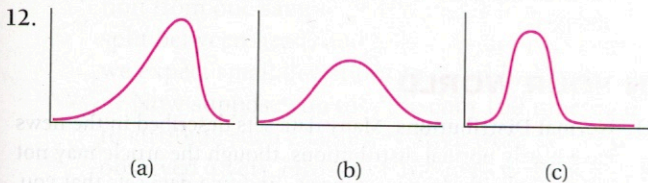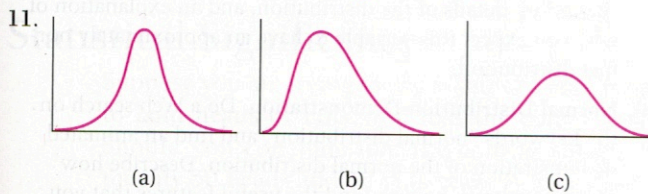
13–18: Normal Distributions. State, with an explanation, whether you would expect the following data sets to be normally distributed.

13. The delay in departure of trains from a station (note that trains, buses, and airplanes cannot leave early)

14. The weights of lawn fertilizer bags labeled "40 pounds"

15. The distances between the bull's-eye of a target and 100 darts thrown by an expert

16. The distances of tee shots hit with the same club by a professional golfer during a four-day tournament

17. Scores on an easy statistics exam

18. The times of runners at the Olympic marathon

19. **The 68-95-99.7 Rule.** A set of test scores is normally distributed with a mean of 100 and a standard deviation of 20. Use the 68-95-99.7 rule to find the percentage of scores in each of the following categories.

  a. less than 100   b. less than 120

  c. less than 140   d. less than 60

  e. greater than 60   f. greater than 160

  g. greater than 80   h. between 60 and 140

20. **The 68-95-99.7 Rule.** The resting heart rates for a sample of individuals are normally distributed with a mean of 70 and a standard deviation of 15. Use the 68-95-99.7 rule to find the percentage of heart rates in each of the following categories.

  a. less than 55   b. less than 40

  c. less than 85   d. less than 100

  e. greater than 85   f. greater than 55

  g. greater than 40   h. between 55 and 85

21–28: Standard Scores. The scores on a psychology exam were normally distributed with a mean of 67 and a standard deviation of 8.

21. About what percentage of scores were above 59?

22. About what percentage of scores were below 83?

23. A failing grade on the exam was anything 2 or more standard deviations below the mean. What was the cutoff for a failing score? Approximately what percentage of the students failed?

24. If 500 students took the exam, approximately how many students scored below 75?

25. What is the standard score for an exam score of 67?

26. What is the standard score for an exam score of 59?

27. What is the standard score for an exam score of 55?

28. What is the standard score for an exam score of 88?

29–30: Standard Scores and Percentiles. Use Table 6.3 to find the standard score and percentile of the following data values.

29. a. A data value 1 standard deviation above the mean

    b. A data value 0.5 standard deviation above the mean

    c. A data value 1.5 standard deviations below the mean

30. a. A data value 0.5 standard deviation below the mean

    b. A data value 2 standard deviations below the mean

    c. A data value 1.2 standard deviations above the mean

31–32: Percentiles. Use Table 6.3 to find the approximate standard score of the following data values. Then state the approximate number of standard deviations that the value lies above or below the mean.

31. a. A data value in the 20th percentile

    b. A data value in the 80th percentile

    c. A data value in the 63rd percentile

32. a. A data value in the 10th percentile

    b. A data value in the 35th percentile

    c. A data value in the 88th percentile

FURTHER APPLICATIONS

33–36: Pregnancy Length. Actual lengths of pregnancy terms are nearly normally distributed about a mean pregnancy length (of about 38 to 39 weeks) with a standard deviation of 15 days.

33. About what percentage of births would be expected to occur within 15 days of the mean pregnancy length?

34. About what percentage of births would be expected to occur within 1 month of the mean pregnancy length?

35. About what percentage of births would be expected to occur more than 15 days after the mean pregnancy length?