1. The average stock price for companies making up the S&P 500 is $30, and the standard deviation is $8.20 (BusinessWeek, Special Annual Issue, Spring 2003). Assume the stock prices are normally distributed.
    a. What is the probability a company will have a stock price of at least $40?
    b. What is the probability a company will have a stock price no higher than $20?
    c. How high does a stock price have to be to put a company in the top 10%?

2. In an article about the cost of health care, Money magazine reported that a visit to a hospital emergency room for something as simple as a sore throat has a mean cost of $328 (Money, January 2009). Assume that the cost for this type of hospital emergency room visit is normally distributed with a standard deviation of $92. Answer the following questions about the cost of a hospital emergency room visit for this medical service.
    a. What is the probability that the cost will be more than $500?
    b. What is the probability that the cost will be less than $250?
    c. What is the probability that the cost will be between $300 and $400?
    d. If the cost to a patient is in the lower 8% of charges for this medical service, what was the cost of this patient's emergency room visit?

3. In January 2003, the American worker spent an average of 77 hours logged on to the Internet while at work (CNBC, March 15, 2003). Assume the population mean is 77 hours, the times are normally distributed, and that the standard deviation is 20 hours.
    a. What is the probability that in January 2003 a randomly selected worker spent fewer than 50 hours logged on to the Internet?
    b. What percentage of workers spent more than 100 hours in January 2003 logged on to the Internet?
    c. A person is classified as a heavy user if he or she is in the upper 20% of usage. In January 2003, how many hours did a worker have to be logged on to the Internet to be considered a heavy user?

4. A person must score in the upper 2% of the population on an IQ test to qualify for membership in Mensa, the international high-IQ society (U.S. Airways Attaché, September 2000). If IQ scores are normally distributed with a mean of 100 and a standard deviation of 15, what score must a person have to qualify for Mensa?

5. The mean hourly pay rate for financial managers in the East North Central region is $32.62, and the standard deviation is $2.32 (Bureau of Labor Statistics, September 2005). Assume that pay rates are normally distributed.
    a. What is the probability a financial manager earns between $30 and $35 per hour?
    b. How high must the hourly rate be to put a financial manager in the top 10% with respect to pay?
    c. For a randomly selected financial manager, what is the probability the manager earned less than $28 per hour?

6. The time needed to complete a final examination in a particular college course is normally distributed with a mean of 80 minutes and a standard deviation of 10 minutes. Answer the following questions.
    a. What is the probability of completing the exam in one hour or less?
    b. What is the probability that a student will complete the exam in more than 60 minutes but less than 75 minutes?
    c. Assume that the class has 60 students and that the examination period is 90 minutes in length. How many students do you expect will be unable to complete the exam in the allotted time?

7. Trading volume on the New York Stock Exchange is heaviest during the first half hour (early morning) and last half hour (late afternoon) of the trading day. The early morning trading volumes (millions of shares) for 13 days in January and February are shown here (Barron's, January 23, 2006; February 13, 2006; and February 27, 2006).
   214, 163, 265, 194, 180, 202, 198, 212, 201, 174, 171, 211, 211

   The probability distribution of trading volume is approximately normal.
    a. Compute the mean and standard deviation to use as estimates of the population mean and standard deviation.
    b. What is the probability that, on a randomly selected day, the early morning trading volume will be less than 180 million shares?
    c. What is the probability that, on a randomly selected day, the early morning trading volume will exceed 230 million shares?
    d. How many shares would have to be traded for the early morning trading volume on a particular day to be among the busiest 5% of days?

8. According to the Sleep Foundation, the average night's sleep is 6.8 hours (Fortune, March 20, 2006). Assume the standard deviation is .6 hours and that the probability distribution is normal.
    a. What is the probability that a randomly selected person sleeps more than 8 hours?
    b. What is the probability that a randomly selected person sleeps 6 hours or less?
    c. Doctors suggest getting between 7 and 9 hours of sleep each night. What percentage of the population gets this much sleep?