

1. Consider a lottery game in which a person can win \$0, \$1, \$2, or \$1,000. The probability of winning nothing when one plays the game is 0.99, the probability of winning \$1 is 0.009, and the probability of winning \$2 is 0.0009.

- A. What is the variable?
- B. What are the values of the variable?
- C. What is the probability distribution of the variable in table form?
- D. What is the probability distribution of the variable in graph form?
- E. What is the expected value of the lottery winning?
- F. What is the standard deviation of the lottery winning?
- G. What is the probability that the player will win either \$1 or \$2?
- H. If the game cost \$1 to play what is the probability that a person will at least win their money back in the game?
- I. What is the interval of values that are within one standard deviation of the mean?
- J. What is the probability that the lottery winnings will be within one standard deviation of the mean?

2. Suppose a person is shooting at a very small target. Assume that the person hits the target 1.5 percent of time. If the person hits the target, then the person wins \$25,000. If the target is missed the loss is \$500. Consider the amount of money to be won in this contest.

- A. What is the variable?
- B. What are the values of the variable?
- C. What is the probability distribution?
- D. What is the expected amount of money to be won?
- E. What is the probability that the person does not lose money?

3. Assume that a discrete random variable has five possible values, 10, 20, 30, 40, and 50 with the probability on each of the first two values, 10 and 20, equal to 0.05 and the remaining probability divided equally for the other three values of the variable, 30, 40, and 50.

- A. What is the probability distribution of the variable?
- B. What is the expected value of the random variable?
- C. What is the standard deviation of the random variable?
- D. What is the probability that the variable is at the most 20?
- E. What is the probability that the variable has values between and including 20 and 40?
- F. What is the probability that the variable has values between 15 and 35?
- G. What is the interval of values that are within one standard deviation of the mean?
- H. What is the probability that this random variable has values that are within one standard deviation of the mean?

4. Assume that a discrete random variable has the values of 5, 10, 15, 20, 25, and 30. Furthermore, assume that the value 30 has probability of 0.50 associated with it, but each of the other values is equally likely.

- A. What is the probability distribution?
- B. What is the expected value of this variable?
- C. What is the standard deviation of this variable?
- D. What is the probability that this variable is 20 or more?
- E. What is the probability that this variable is more than 20?
- F. What is the probability that such a random variable has the value of 20 or less?
- G. What is the probability that the variable has values between 18 and 28?
- H. What is the interval of values that are within one standard deviation of the mean?
- I. What is the probability that this variable has values within one standard deviation of the mean?

5. A small daycare center for young children has only 3, 4, 5, 6, or 7 children in attendance on any one day. On half of the days there are three children in attendance and on a quarter of the days there are 4 children in attendance. The probability on 5 and on 6 children in attendance is 0.10 each, with the remainder of the probability on the event that 7 children will attend.

- A. What is the variable?
- B. What are the values of the variable?
- C. What is the probability distribution of the variable?
- D. What is the expected number of children who will attend the small daycare center?
- E. If an adult must be present for every 3 children, what is the probability that the daycare center will need 3 adults?
- F. If an adult must be present for every 3 children, what is the probability that the daycare center will need 2 adults?
- G. If an adult must be present for every 3 children, what is the probability that at least 2 adults are needed?
- H. In an adult must be present for every 3 children, what is the probability that only one adult is needed?