**In Exercises 1 and 2, use the information in the table to find the expected value.**

**1.**

| Outcome value, $x$ | $-2$ | 2 |
|---|---|---|
| Probability, $p$ | 0.32 | 0.68 |

**2.**

| Outcome value, $x$ | 15 | 45 | 30 |
|---|---|---|---|
| Probability, $p$ | $\frac{1}{2}$ | $\frac{1}{3}$ | $\frac{1}{6}$ |

**3. Coin Game** Consider a game in which two players each flip a coin. If both coins land heads up, then player A scores 3 points and player B loses 3 points. If one or both of the coins land tails up, then player B scores 1 point and player A loses 1 point. Find the expected value of the game for each player.

**4. Basketball** Amanda has injured her leg and may not be able to play in the next basketball game. If she can play, the coach estimates the team will score 68 points. If she is not able to play, the coach estimates the team will score 54 points. Her doctor states there is a 50% chance she will be able to play and a 50% chance she will not be able to play. Determine the expected number of points the team scores.

**5. Lawn Mowing** A landscaper mows 25 lawns per day on sunny days and 15 lawns per day on cloudy days. If the weather is sunny 65% of the time and cloudy 35% of the time, find the expected number of lawns the landscaper mows per day.

**6. Seminar Attendance** A hospital is holding a public seminar. Officials estimate that 24 people will attend if it does not rain and 16 people will attend if it rains. The weather forecast indicates there is a 30% chance it will rain on the day of the seminar. Find the expected number of people who will attend the seminar.

**7. Multiple Representations** In a proposed business venture, a company estimates that there is a 60% probability it will make $95,000, a 20% probability it will break even, and a 20% probability it will lose $65,000.

   **a. Making a Table** Make a table that shows each amount and its corresponding probability.

   **b. Using a Formula** Use the information in the table to find the expected value.

   **c. Applying Expected Value** How much can the company expect to gain or lose?

**8. Test Taking Strategy** You are taking an exam in which there are 5 possible choices for each question. The instructions indicate that you will gain 4 points for each correct answer, lose 3 points for each incorrect answer, and that no points will be lost or gained for answers left blank.

   **a.** If you do not know the correct answer to a particular question, is it to your advantage or disadvantage to guess the answer? *Explain.*

   **b.** Suppose you do not know the correct answer but you can eliminate one of the choices. Is it to your advantage or disadvantage to guess the answer? *Explain.*

**9. Raffle** Two thousand raffle tickets are sold for $1 each. One prize worth $400 is to be awarded. What is your expected value if you purchase one ticket?

UNIT 6

**In Exercises 1 and 2, use the information in the table to find the
expected value.**

1.

| Outcome value, $x$ | 8000 | −8000 | 4000 |
|---|---|---|---|
| Probability, $p$ | 0.39 | 0.43 | 0.18 |

2.

| Outcome value, $x$ | 12 | 19 | 36 | −3 |
|---|---|---|---|---|
| Probability, $p$ | $\frac{1}{2}$ | $\frac{1}{4}$ | $\frac{1}{6}$ | $\frac{1}{12}$ |

3. **Integer Game** Consider a game in which two players each choose an integer from 1 to 5. If the product of the two integers is even, then player A scores 5 points and player B loses 2 points. If the product of the two integers is odd, then player B scores 5 points and player A loses 2 points. Find the expected value of the game for each player.

4. **Airline Profit** An airline is considering adding a route to the city of Shreveport, Louisiana. Market research predicts that if the airline serves Shreveport, there is a 42% probability of making a $700,000 profit, a 22% probability of breaking even, and a 36% probability of losing $1,000,000. What is the expected value of adding a route to Shreveport?

5. **Number Cube Game** You are playing a number cube game in which you need to score 80 points to win. On each turn, you roll two six-sided number cubes. Your score for the turn is 0 if the number cubes do not show the same number. Your score for the turn is the product of the numbers if they do show the same number. What is the expected value for each turn? How many turns will it take on average to score 80 points?

6. **Sales** During a one-year selling period (225 days), a sales representative made between 0 and 8 sales per day, as shown in the table.

| Number of sales per day, $x$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| Frequency, $f$ (in days) | 35 | 43 | 54 | 44 | 23 | 12 | 9 | 4 | 1 |

   a. Identify the possible outcomes and find the probability of each number of sales per day.

   b. If this pattern continues, what is the expected value for the number of sales per day for the sales representative?

7. **Contest** A national restaurant chain is having a contest with five prizes. No purchase is necessary to enter. What is the expected value of one contest entry?

| Prize | Value | Probability of winning |
|---|---|---|
| Gift certificate | $10 | 0.0002 |
| Wide-screen TV | $3000 | 0.0000004 |
| Vacation getaway | $12,000 | 0.00000008 |
| Car | $60,000 | 0.000000003 |
| Cash | $1,000,000 | 0.000000002 |