Name Date

Enrichment and Extension

10.7

Should I Keep Playing?

The **expected value** of an event is equal to the average of its outcomes—as long as all of the outcomes have an equal probability of occurring.

**Example:** John is playing a game where he rolls number cubes one at a time and adds the values to obtain a sum. The person scoring closest to 8 without going over wins the round. Each player can decide to continue his or her turn after two rolls. John's sum after two rolls is 5. Use the expected value of a number cube to determine if John should roll again.

 The average of the outcomes is the expected value.

The expected value of a number cube is 3.5, so John should not roll again because  The sum 8.5 would put John over the limit of 8.

Use expected value to help each person decide what to do in the situation described.

1. Daulton is playing a game where he draws a random card from a deck   
with no face cards (Jack, Queen, King, Ace, or Joker). He receives points equal to the value of the card. If Daulton gets more than 4 points on his next turn he loses the game. Should Daulton draw a card or pass?

2. Ally is playing a card game with a friend. Each player draws a card, and the card with the higher value wins the round. Her friend’s card is a 5. Ally has cards of 2, 5, 6, and 8 in her pile but does not know which is next. Should Ally be confident she will win the round?

3. Paxton must spin a value of 6 or greater on his next turn or he is out for   
the following round. The spinner has only even numbered sections from   
2 through 10. Should he spin or pass?

4. Find the probability of a success in Exercises 1–3. Would using probability rather than expected value change your advice to each person? Explain.

5. Are expected value and probability the same thing? Which is better for predicting a success? Explain.