12-5 Additional Practice

Expected Value

1. The expected payout for each play of a carnival game is $0.15. If each game costs $0.50 to play, what is the carnival's expected gain per play? Explain.
   $0.35; The carnival will make an average of $0.50 − $0.15 = $0.35 each time the game is played.
2. A tile is drawn from a bag at random and then replaced. The probability of drawing a blue tile is 80% and the probability of drawing a red tile is 20%. What is the expected number of blue tiles in 25 draws?
   20
3. A ten-sided die has the numbers 0 through 9 on its ten faces. What is the expected value when rolling a ten-sided die? Is the expected value a possible outcome? Explain.
   4.5; No; Sample answer: It is not a possible outcome since as a non-integer value, it is not actually one of the outcomes.
4. A bag has 6 red marbles, 3 blue marbles, and 1 orange marble. In a game to raise money for a class trip, parents pay $5 and pull a marble randomly from the bag. The payout is $10 for pulling an orange marble, $4 for a blue marble, and $1 for a red marble. How much can the class expect to earn per game?
   $2.20
5. An insurance company offers two policy options. A motorcycle owner can choose an annual premium of $500 with a $600 deductible or an annual premium of $900 with a $100 deductible. Suppose that the probability that a motorcycle will be damaged in a given year is 20% and that if the motorcycle is damaged, the cost of repairs will be about $800. Which option has the least expected cost for the motorcycle owner? What is the expected cost?
   premium of $500 with $600 deductible; $620
6. At a ski resort, there is a 30% chance of snow for each of the next four days. What is the probability that it snows 0 days? 1 day? 2 days? 3 days? 4 days? How many snowy days should a skier expect during this time period?
   0.2401; 0.4116; 0.2646; 0.0756; 0.0081; 1.2 days
7. The probability that a plane will arrive on time from Airport A to Airport B is 0.625. The probability that the plane is 1 hour late is 0.25. The probability that the plane is 2 hours late is 0.125. What is the expected number of minutes the plane will be late? Explain.
   30 minutes; $E = 0(0.625) + 1(0.25) + 2(0.125) = 0.5$ and 0.5 hour = 30 minutes