



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.
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?
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. 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?
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?
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?
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.



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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