

Expected Value Practice Problems

1. Throw a die. If you win \$2 when the number is even and lose \$1 when the number is odd, what is the expected value? If you pay \$1 to play the game, will you win in the long run?
2. A company has a choice of three marketing strategies. The first will cost \$150,000 and has a 40% chance of \$1,500,000 in profits and a 60% chance of \$500,000 in profits. The second strategy will cost \$50,000 and has a 20% chance of \$1,000,000 in profits and an 80% chance of \$600,000 in profits. The third strategy will cost \$80,000 and has a 50% chance of \$1,000,000 in profits and a 50% chance of \$400,000 in profits. Which is the best strategy?
3. Remove the face cards and the aces from a standard deck, leaving the cards 2 through 10 of each suit. Choose a card from this smaller deck and look at the number on the card. What is the expected value?
4. In a board game, players take turns spinning a wheel with 4 spaces and values of \$100, \$300, \$400, \$800. The probability of landing on \$100 is $\frac{4}{9}$. The probability of landing on \$300 is $\frac{2}{9}$. The probability of landing on \$400 is $\frac{2}{9}$. The probability of landing on \$800 is $\frac{1}{9}$. What is the expected value of spinning the wheel once? What is the expected value of spinning the wheel 5 times?
5. An urn contains six balls – three balls are numbered 2, and the others are numbered 5, 6, and 7. You draw one ball at random. What is the expected value of the number on the ball?
6. A \$20 bill, two \$10 bills, three \$5 bills and four \$1 bills are placed in a bag. If a bill is chosen at random, what is the expected value for the amount chosen?
7. In a game you flip a coin twice, and record the number of heads that occur. You get 10 points for 2 heads, zero points for 1 head, and 5 points for no heads. What is the expected value for the number of points you'll win per turn?
8. There is an equally likely chance that a falling dart will land anywhere on the rug below. The following system is used to find the number of points the player wins. What is the expected value for the number of points won?
Black = 40 points
Gray = 20 points
White = -10 points



9. One hundred fifty tickets for a raffle are sold for \$20 per ticket. The 4 winning prizes are \$300, \$150 and 2 \$50 prizes. Find the expected value per ticket.
10. A dice game involves rolling 2 dice. If you roll a 2, 3, 4, 10, 11, or a 12 you win \$5. If you roll a 5, 6, 7, 8, or 9 you lose \$3. Find the expected value you win (or lose) per game.
11. Two players 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 each player.
12. An airline is considering adding a route to the city of New Orleans, Louisiana. Market research predicts that if the airline serves New Orleans, 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 New Orleans?

13. A landscaper mows 25 lawns per day on sunny days and 15 lawns per day on cloudy days. If the weather is sunny 65% and cloudy 35% of the time, how many lawns can he expect to mow per day?

14. You are playing a number cube game where you need 60 points to win. On each turn you roll a pair of dice (6-sided number cube). If you roll doubles, your score is the product of the numbers. If you do not roll doubles, you do not score any points. Find the expected value of each turn. How many turns will it take on average to score 60 points?