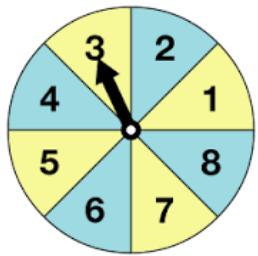


EXPECTED VALUE WORKSHEET

Part A: Questions 1 – 5 all deal with a spinner, in which an arrow in the center spins around and will land on a colour. It is assumed that it never lands on the boundary between colours.

1. Red is 40% of the wheel, yellow is 15% of the wheel and green is the rest of the wheel. Landing on red wins \$23, landing on yellow wins \$175 and landing on green loses \$50. What is the expected value of the wheel?
2. Purple is $\frac{1}{4}$ of the wheel, Cyan is $\frac{2}{5}$ and the rest of the wheel is Fuschia. If you land on purple you win \$40, Cyan you win \$11 and otherwise you win nothing. The game costs \$17 to play. What is your expected value per play?
3. How much do you expect you will win/lose if you play the game in #2 eight times.
4. Yellow is $\frac{1}{3}$, red is $\frac{1}{4}$, green is $\frac{1}{5}$, blue is $\frac{1}{6}$, and orange is $\frac{1}{7}$ of the wheel. Each colour is worth, \$6, 7, 8, 9, and 10 respectively. What is the expected value of one spin of the wheel?
5. What is wrong with the probability distribution in question 4?



Part B: Additional Expected Value Questions

6. A coin is flipped 3 times. If you get tails once you get \$5, tails twice you get \$15, and tails on all three flips you get \$40. What is the expected amount of money you will get?
7. What should the game in #6 cost to play if the game is considered fair?
8. Two 8 sided dice are rolled. What is the expected sum that will be rolled?
9. A 6-sided die is rolled and then a coin is flipped. If the coin flips tails, then the value of the die is doubled. If the coin flips heads, then the value is halved. What is the expected value of the die after the coin flip?
10. A class is holding a fundraising lottery where they will sell 1000 tickets. The cost of each ticket is \$6. One ticket will win a grand prize of \$1500, and ten tickets will win a second prize of \$100. If each ticket can only win one prize, what is the expected value of a ticket? How much do you win/lose if you buy a ticket?

Answers:

- | | |
|-----------------------------|---------------------------|
| 1. \$12.95 | 10. 4.375 |
| 2. -\$2.60 | 11. \$2.50 expect to lose |
| 3. Lose \$20.80 | \$3.50 |
| 4. 84.7% | 12. \$1.08 |
| 5. \$8.28 | |
| 6. Add up to more than 100% | |
| 7. \$12.50 | |
| 8. 3.5 | |
| 9. 9 | |