Dice Simulation – Part 1

Game: Primes, Pairs, and Perfect Squares

In this game the player rolls two dice and sums them. Score each round in the following way:

- If the sum is a prime, score 2 points.
- If the dice show a pair, score 3 points.
- If the sum is a perfect square, score 5 points.

Write a simulation in Excel or Google Sheets that simulates 500 turns, calculates the score for each type, and calculates the overall score.

Calculate the mean score for each scoring types: primes, pairs, and perfect squares, and for the overall score.

Primes:

Pairs:

Perfect Squares:

Find the theoretical probability of each scoring type occurring on a single turn. You might like to use the table of dice sums that we created in class.

$P(\text{prime}) =$

$P(\text{pair}) =$

$P(\text{square}) =$

Find the product of each type's score (i.e. 2, 3, or 5) with the theoretical probability of scoring that type.

$2 \times P(\text{prime}) =$

$3 \times P(\text{pair}) =$

$5 \times P(\text{square}) =$

How does each value above compare to the average scores of each type? How does the sum of the values above compare with the average overall score?