

PROBABILITY LAB 2

CHRISTOPHER MUNOZ

Introduction

In this laboratory we are tasked with investigating the nature of games of chance, in particular games involving dice and coin flips. We are tasked with using R in our investigation.

Problem 1

In this problem, we will explore the sum of the roll of five(the sheet had an error) dice for sample sizes $n = 10, 25, 50, 100$.

Exercise (a). Suppose we roll the five dice and sum the outcomes repeatedly. In this game we earn \$0.25 times this sum, for instance, a roll of 1,1,1,1,2 earns \$1.50. We want to find the expected earnings on average of this game. Let $E(Y)$ represent our expected earnings and $E(D)$ represent our expected value for the roll of 1 die. For 5 dice rolls our expected earnings is

$$\begin{aligned} E(D) &= \sum_{k=1}^6 \frac{k}{6} = \frac{1}{6} + \frac{2}{6} + \frac{3}{6} + \frac{4}{6} + \frac{5}{6} + \frac{6}{6} = \frac{21}{6} = 3.5 \\ E(Y) &= 0.25 * 5 * E(D) \\ &= 0.25 * 5 * 3.5 \\ &= 4.375 \end{aligned}$$

So we are expected to earn \$4.375 dollars in a game where we roll 5 die For a general case, the function for our expected earnings is

$$E(Y) = 0.25 * n * 3.5$$

Where $n \in \mathbb{N}$ is the number of dice rolls.

Exercise (b).