MAΘ Competition Team Problem Set 16

Anders Christensen, Hannah Kim

April 4, 2025

Problem 1. Find the expected value of the sum of two six-sided dice.

Problem 2. A company plans to invest in a particular construction project. There is a 35% chance that it will lose \$30, a 40% chance that it will break even, and a 25% chance that it will make a profit of \$55. How much can the company expect to make or lose on this project?

Problem 3. Two jokers are added to a 52 card deck and the entire stack of 54 cards is shuffled randomly. What is the expected number of cards that will be strictly between the two jokers?

Problem 4. Five balls are arranged around a circle. Chris chooses two adjacent balls at random and interchanges them. Then Silva does the same, with her choice of adjacent balls to interchange being independent of Chris's. What is the expected number of balls that occupy their original positions after these two successive transpositions?

Problem 5. 5 people are voting in an election among 5 candidates. If each person votes for a single candidate at random, what is the expected number of candidates that will be voted for?

Problem 6. In his spare time, Richard shuffles a standard deck of 52 playing cards. He then turns the cards up one by one from the top of the deck until the third ace appears. What is the expected number of cards Richard will turn up?