Math 351 - Spring 2025: Homework 2

Due: Wednesday, February 4, 2025

Instructions: Be sure to give explanations to your answers. I'm interested not only in whether you get the correct answer but also how you obtained it and your thought process along the way. Don't just write down a number even if the answer seems obvious.

1. A standard deck of 52 cards is dealt out. (a) What is the probability that the 10th card dealt is an King? (b) What is the probability that the first King is the 10th card?

2. In the game of Poker Dice, five dice are rolled all at once. A straight is the event that the numbers $1, 2, 3, 4, 5$ appear or that the numbers $2, 3, 4, 5, 6$ appear. What is the probability of rolling a straight?

3. Two dice are rolled. Denote by E the event in which the sum of the two dice is even. Denote by F the event that at least one of the dice is a 5. Denote by G the event for which the numbers on the two dice are the same.

   Find $P(E)$, $P(F)$, $P(G)$, $P(E \cup F)$, $P(EF)$, $P(F \cup G)$, and $P(FG)$.

4. An urn contains 8 red balls, 10 green balls, 10 yellow balls, and 9 blue balls. A set of three balls is randomly selected. (a) What is the probability that all three balls are red? (b) What is the probability that all three balls have different colors?