

**PSTAT 5A: Discussion Worksheet 02***Spring 2023, with Ethan P. Marzban*

1. Consider two events A and B . Express the following events using **only** these two events, along with unions, intersections, and complements. Additionally, for each part, sketch a Venn Diagram of the specified event.
 - (a) Both A and B occur.
 - (b) Either A or B occur.
 - (c) Neither A nor B occur.
 - (d) Either A or B occur, but not both.

2. Consider the experiment of tossing a fair coin and rolling a fair 6-sided die (and recording the outcome of both the coin flip and the die roll).
 - (a) Use a table to express the outcome space of this experiment.
 - (b) Use a tree diagram to express the outcome space of this experiment.
 - (c) Find the probability that the die lands on an even number.
 - (d) Find the probability that the coin lands on 'heads'.
 - (e) Find the probability that the die lands on an even number, or the coin lands 'heads'.

3. A jar contains 3 red candies, 4 blue candies, and 2 purple candies. Three candies are to be drawn at random, and their color is to be recorded. The order in which the colors appear is not important.
 - (a) How many elements are in the outcome space Ω associated with this experiment?
 - (b) In how many outcomes do we observe exactly 3 red candies?

4. Consider an outcome space $\Omega = \{a, b, c\}$ for arbitrary elements a , b , and c . Suppose that $\mathbb{P}(\{a\}) = \mathbb{P}(\{b\})$, and that $\mathbb{P}(\{c\}) = 0.1$. What is $\mathbb{P}(\{a\})$? **Hint:** Recall the second axiom of probability; i.e. that $\mathbb{P}(\Omega) = 1$.