I. **Pre-class material** Either read the indicated textbook sections OR watch the indicated video.

(a) **Sections to Read** (All content from Blitzstein and Hwang's *Introduction to Probability* unless otherwise noted). A digital copy of the textbook is available for free via the authors' website.

- Read Appendix A.1 (a refresher on sets) and 1.6

(b) **Videos to Watch** (All videos from Blitzstein's Math 110 YouTube channel, unless otherwise noted)

- Lecture 2: Story Proofs, Axioms of Probability (Just from 39:00 onward)
- Lecture 3: Birthday Problem, Properties of Probability

II. **Objectives** (By the end of the day's class, students should be able to do the following:)

- Perform and interpret operations (unions, intersections, complements) on sets.
- State the general axiomatic definition of a probability space and interpret in everyday language
- Enumerate and apply set-theoretic properties of probability.
- Distinguish between "naive" and axiomatic probability.

III. **Reflection Questions** (Submit answers on Gradescope `https://www.gradescope.com/courses/425901`)

1) Using theorems or definitions from these sections, or by appealing to a picture, explain why for any events A and B, $P(A \cup P) \leq P(A) + P(B)$. Under what circumstances are the left and right expressions actually equal?
2) What are some advantages of the axiomatic probability system described in section 1.6 compared to the 'naive' theory described in section 1.3?
3) Suppose the probability space for an experiment consists of four outcomes $\{a, b, c, d\}$.
   i. Give an example of two mutually exclusive events for this experiment.
   ii. Suppose the probability model for this experiment has

$$P(\{a\}) = \frac{1}{2} \quad P(\{b\}) = \frac{1}{4} \quad P(\{c\}) = \frac{1}{8} \quad P(\{d\}) = \frac{1}{8}.$$

   What is the probability that neither a nor b occurs?

IV. **Additional Feedback** Are there any topics you would like further clarification about? Do you have any additional questions based on the readings / videos? *If not, you may leave this section blank.*