Pre-class preparation

Please read the following textbook sections from Blitzstein and Hwang's *Introduction to Probability* (second edition):

- Appendix A.1 (Set Theory review) and Section 1.6

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 the axioms in everyday language.
- Use the axioms to derive set-theoretic properties of probability, and be able to apply these properties.
- Explain why we require axiomatic probability in addition to the "naive" understanding of probability.

Reflection Questions

Please submit your answers to the following questions to the corresponding Gradescope assignment by 7:45AM:

1. Show that for any events A and B, the following is true: $P(A)+P(B)-1 \leq P(A \cap B)$. When is this inequality ($\leq$) an exact equals ($=$)?
2. You go mushroom foraging and happen to find two mushrooms. You are not a mushroom expert (yet), so you do not know with 100% uncertainty whether either mushroom is toxic. But suppose that the probability that the first mushroom is toxic is $\frac{2}{3}$. The probability that the second mushroom is toxic is $\frac{1}{2}$. The probability that both mushrooms are toxic is $\frac{1}{3}$. What is the probability that neither mushroom is toxic?
3. (Optional) Is there anything from the pre-class preparation that you have questions about? What topics would you like would you like some more clarification on? *If nothing, assign this question to the first page of your submission.*