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.

- Sections 5.1, 4.6

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

- Lecture 12: Discrete vs. Continuous (from beginning to 29:00)

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

- State the definition of a continuous random variable, along with the definition of the probability density function for a continuous random variable.
- Determine whether a given function is a valid probability density function.
- Compute the expected value and variance for a continuous random variable.
- Use the Law of the Unconscious Statistician to compute express the expected value of one continuous variable in terms of the pdf of another related variable.
- Compute the variance of both discrete and continuous random variables.

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

1) Suppose X is a continuous random variable whose support contains the interval $[0, 1]$. Find the value of

$$P(0 \leq X \leq 1) - P(0 < X < 1).$$

Would your answer be the same if X were instead a discrete random variable?

2) True or False: If f is the pdf for a continuous random variable X and $\epsilon > 0$ is small, then $P(x \leq X \leq x + \epsilon) \approx f(x)$.

3) Suppose X is a random variable with the property that $E[X^2] = (E[X])^2$. What must be true about the distribution of X? *Hint: Think about this from the perspective of variance.*

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.*