Pre-class preparation

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

- Video: Continuous random variables

- Textbook: Section 5.1 (up until Example 5.1.6)

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.

Reflection Questions

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

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

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

   How (if at all) would your answer change if X were instead discrete?

2. True or False (and explain why): If $f(x)$ 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. (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?