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: Conditional expectation given a RV
- Textbook: Sections 9.2-9.3 (stop after Theorem 9.3.7)

Objectives

By the end of the day's class, students should be able to do the following:

- Use properties of conditional expectation to compute the conditional expectation of a variable given another in a variety of situations.
- State and prove "Adam's Law".
- Distinguish between conditional expectation given an event, and conditional expectation given a random variable.

Reflection Questions

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

1. Let X and Y be discrete random variables. Describe at least one key difference between the expressions $\mathbb{E}[Y|X = x]$ and $\mathbb{E}[Y|X]$.
2. Suppose X and Y are random variables. Under what circumstances is $\mathbb{E}[X|Y] = X$? Under what circumstances is $\mathbb{E}[X|Y] = \mathbb{E}[X]$?
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?