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: Covariance
- Textbook: Section 7.3

Objectives

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

- Compute the covariance of a pair of random variables, and prove properties of covariance.
- Calculate the correlation of a pair of random variables and interpret its value as the strength of a linear relationship.
- Determine the variance of certain random variables by computing appropriate covariances.

Reflection Questions

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

1. Determine whether each of the following statements are true or false. Briefly justify your answer by citing the relevant property of Variance or Covariance.
   (a) $\text{Cov}(X, X+5) = \text{Var}(X)$.
   (b) If X and Y have $\text{Cov}(X, Y) = 0$, then X and Y are independent.
   (c) If X and Y are independent and both have variance 1, then $\text{Var}(X - Y) = \text{Var}(X) - \text{Var}(Y) = 0$.
2. (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?