What have you learned?

1. What is population? Sample? Sample space? Events?
2. What is the relationship and difference between mean and median?
3. What is variance? What is it for?
4. How to determine the probability of an event?
5. What is the interpretation of probability?
6. How do you understand probability? What does it really mean when you are given a condition?
7. What is independence? Is it a practical assumption? Why do we need it?
8. What is the law of total probability? What is Bayes’ formula? When is it useful?
9. What is a random variable? What are the characteristics of a continuous random variable?
10. How to compute expected value of a discrete random variable? Does it always exist?

11. Think about the formulas below. When will you need them?

\[
P(A) = 1 - P(A^c)
\]

If \( A_1, A_2, \cdots, A_n \) are disjoint, then

\[
P(\bigcup_{i=1}^{n} A_i) = \sum_{i=1}^{n} P(A_i)
\]

\[
P(A \cup B) = P(A) + P(B) - P(A \cap B)
\]

\[
P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(B \cap C) - P(A \cap C) + P(A \cap B \cap C)
\]

\[
P(A \mid B) = \frac{P(A \cap B)}{P(B)}
\]

\[
P(A \cap B) = P(A \mid B)P(B)
\]

\[
P(A \cap B \cap C) = P(A \mid B \cap C)P(B \mid C)P(C)
\]

If \( A \) and \( B \) are independent, \( P(A \cap B) = P(A)P(B) \). Does this imply \( P(A \mid B) = P(A) \)?

\[
E(aX + b) = aE(X) + b
\]