

Review:

1. review the definitions of permutations / combinations and be able to identify them. be able to calculate probabilities with permutations / combinations.
 - Permutations: $P(n, r) = \frac{n!}{(n-r)!}$
 - If the problem says "order matters" then it is a permutation problem.
 - Combinations: $C(n, r) = \frac{n!}{r!(n-r)!}$
 - If the problem says "order doesn't matter" then it is a combination problem.
2. Know the addition rule.
 - $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 - If the problem is asking for the probability of A or B happening then it is an addition rule problem.
3. Know about intersection probabilities (AND) and conditional probabilities (GIVEN) and Homework they differ conceptually.
 - Intersection probabilities are the probability of two events happening at the same time.
 - $P(A \cap B) = P(A)P(B)$
 - Conditional probabilities are the probability of an event happening given that another event has already happened.
 - $P(A|B) = \frac{P(A \cap B)}{P(B)}$
4. How the difference between mutually exclusive and independent. Be able to calculate both of these options.
 - Mutually exclusive events are events that cannot happen at the same time.
 - $P(A \cap B) = 0$
 - Independent events are events that do not affect each other.
 - $P(A|B) = P(A)$
5. Be able to calculate probabilities when you don't have things that are mutually exclusive or independent when having trouble draw a picture.
6. Know how to use the compliment rule when trying to calculate greater than or equal to probabilities.
 - $P(A^c) = 1 - P(A)$
7. Be able to calculate probabilities using Bayes' Rule Tree Diagrams and how to draw them.
 - $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$
 - Bayes' Rule is used when you are given the probability of B given A and you need to find the probability of A given B.
 - Tree diagrams are used to help visualize the problem.
 - The first branch is the probability of A happening.
 - The second branch is the probability of B happening given that A has already happened.
 - The third branch is the probability of B happening given that A has not happened.