counting outcomes

example

In a group of six men and four women, I select a committee of three at random. What is the probability that all three committee numbers are women?

The number of ways to select a three-women committee from four women: $\binom{4}{3} = \dfrac{3!}{3!(4-3)!} = 4$

The number of ways to select a three-person committee from the 10 people (the total number of outcomes):

$$\binom{10}{3} = \frac{10!}{10!(10-3)!} = 120$$

Probability of all female committee: $\dfrac{4}{120} = \dfrac{1}{30} = 0.03$

odds

- The odds of an event are the ratio of how likely the event is to occur and how likely it is to not occur.

- Let p denote probability that an event occurs, its complement that it doesn't occur is then $(1 - p)$

$$\text{odds} = \frac{p}{1 - p}$$

- Relationship odds and probability:
  - the odds are greater (less) than 1 if and only if the probability is greater (less) than 0.5
  - The odds are exactly 1 if and only if the probability is 0.5.