Following are the example problems in Probability

Probability: It is the measure of possible occurrence of an event.

$$\text{Probability} = \frac{\text{No.of times an event can occur}}{\text{Total number of possible}}$$

- Tossing a coin and what is the probability of getting Head
  - Pr(H) = ½

- Rolling a dice and what is the probability of getting 1
  - Pr(1) = 1/6

Mutual Exclusive Events: In the experiment or event, one only possible outcome can be occurred.

- Tossing a coin possibility of Head or Tail is possible but Head and Tail is not possible.
- Rolling a die possibility of 1 or 2 or 3 or 4 or 5 or 6 is possible but both 1 and 2 or 2 and 3 or 3 and 4 similarly combination not possible.

Additive Rule for Mutual Exclusive Events (Formulae)

Pr(A or B) = Pr(A) + Pr(B)

- Tossing a coin, probability of Head or Tail

  Pr(H or T) = Pr(H) + Pr(T)
  = ½ + ½
  = 1

- Rolling a die, probability of 1 or 2 or 3

  Pr(1 or 2 or 3) = Pr(1) + Pr(2) + Pr(3)
  = 1/6 + 1/6 + 1/6
  = 3/6

Non-mutual Exclusive Events: In the experiment or event, more than one possible outcome can be occurred.

- Taking out a card from deck of pack possibility of King or Heart can be possible.

Additive Rule for Non-Mutual Exclusive Events (Formulae):

Pr(A or B) = Pr(A) + Pr(B) – Pr(A ∩ B)

- Taking out a card from deck, what is the probability of value King or Heart

  Pr(K or H) = Pr(K) + Pr(H) – Pr(K ∩ H)

  = 4/52 + 13/52 – 1/52

  Pr(King or Heart) is 16/52

Multiplicative Rule (Formulae)

A. Independent Event: Total number of Outcome will not reduce in the next trial.

- Tossing a coin 3 times independently, what is the probability of first time Head, second time Tail then third time Head
  Pr(H and T and H) = Pr(H) * Pr(T) * Pr(H)
  = ½ * ½ * ½
  = 1/8

B. Dependent Event (Conditional Event): Total number of Outcome will reduce in the next trial.

Pr(A and B) = Pr(A) * Pr(B/A)

Pr(B/A) means Probability of B given A

- What is the probability first remove King then Queen from deck of cards?
  Pr(K and Q) = Pr(K) * Pr(Q/K)
  Pr(Q/K) means Probability of Q after taking K as first card
  = 1/52 * 1/51