$$P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

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

$$P(A \cap B) = P(B) \cdot P(A \mid B)$$

Given A and B are independent $P(A \cap B) = P(A) \cdot P(B)$

$$E(X) = x_1 p_1 + x_2 p_2 + \ldots + x_n p_n$$

$$\frac{P(E)}{P(E^c)}$$

$$\frac{P(E^c)}{P(E)}$$

If the odds in favor of an event E occurring are *a* to *b*, then the probability of E occurring is

$$P(E) = \frac{a}{a+b}$$

$$Var(X) = p_1(x_1 - \mu)^2 + p_2(x_2 - \mu)^2 + \ldots + p_n(x_n - \mu)^2$$

$$\sigma = \sqrt{Var(X)}$$

$$P(\mu - k\sigma \le X \le \mu + k\sigma) \ge 1 - \frac{1}{k^2}.$$

$$P(X = x) = C(n, x) p^x q^{n-x}$$

$$\mu = np$$

$$Var(X) = npq$$

$$\sigma = \sqrt{Var(X)}$$

$$\text{P}(X < b) = P\left(Z < \frac{b-\mu}{\sigma}\right)$$

$$\text{P}(X > a) = P\left(Z > \frac{a-\mu}{\sigma}\right)$$

$$\text{P}(a < X < b) = P\left(\frac{a-\mu}{\sigma} < Z < \frac{b-\mu}{\sigma}\right)$$

$$P(Z < z) = \frac{1}{2}\left[1 + P(-z < Z < z)\right]$$