$(A \cup B)^c = A^c \cap B^c$

$(A \cap B)^c = A^c \cup B^c$

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$n! = n \cdot (n-1) \cdot (n-2) \cdot \ldots \cdot 3 \cdot 2 \cdot 1$

$0! = 1$

$$P(n,r) = \frac{n!}{(n-r)!}$$

$$C(n,r) = \frac{n!}{r!(n-r)!}$$

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

$P(E^c) = 1 - P(E)$

$$P(E) = \frac{n(E)}{n(S)}$$

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

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

$P(A \cap B) = P(A) \cdot P(B)$ for A and B independent.

$$P(A_i \mid E) = \frac{P(A_i) \cdot P(E \mid A_i)}{P(A_1) \cdot P(E \mid A_1) + \ldots + P(A_n) \cdot P(E \mid A_n)}$$
where $1 \le i \le n$.

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

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

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

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

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

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

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

$p + q = 1$

$\mu = np$

$Var(x) = npq$

$\sigma = \sqrt{npq}$

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

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

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

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