STAT 5700 formulas

$(A \cup B)' = A' \cap B'$

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$P(A) = 1 - P(A')$

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

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

${}_nC_r = \frac{{}_nP_r}{r!} = \frac{n!}{(n-r)!r!}$

$\binom{n}{n_1 \; n_2 \cdots \; n_k} = \frac{n!}{n_1!n_2!\cdots n_k!}$

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

$P(B'|A) = 1 - P(B|A)$

Bayes Rule: $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$

$\mu = E(Y) = \sum_{y \in \mathbb{S}} yp(y)$

$\sigma^2 = V(Y) = \sum_{y \in \mathbb{S}} (y - \mu)^2 p(y)$

Discrete Uniform distribution:

$$p(y) = \frac{1}{m} \quad y = 1, 2, \ldots, m,$$

$$F(y) = P(Y \leq y) = \begin{cases} 0, & y < 1, \\ \frac{k}{m} & k \leq y < k+1, \\ 1, & m \leq y. \end{cases}$$