

Commutative	$A \cup B = B \cup A$	$A \cap B = B \cap A$
Associative	$A \cup (B \cup C) = A \cup (B \cup C)$	$A \cap (B \cap C) = A \cap (B \cap C)$
Neutral element	$A \cup \emptyset = A$	$A \cap E = A$
Absorbing element	$A \cup E = E$	$A \cap \emptyset = \emptyset$
Distributive	$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$	$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
De Morgan's laws	$\overline{A \cap B} = \bar{A} \cup \bar{B}$	$\overline{A \cup B} = \bar{A} \cap \bar{B}$
Laplace laws	$P(A) = \frac{\text{Number of ways it can happen}}{\text{Total number of outcomes}}$	
Complement of an Event	$P(\bar{A}) = 1 - P(A)$	
Union of Events	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$	
Conditional Probability	$P(A B) = \frac{P(A \cap B)}{P(B)}$	
Independent Events	$P(A B) = P(A)$	$P(A \cap B) = P(A) \times P(B)$
Permutation	$P_n = n! = n \times (n - 1) \times \dots \times 2 \times 1$	ex: $P_4 = 4! = 4 \times 3 \times 2 \times 1 = 24$
Permutations without repetition	${}^n A_p = \frac{n!}{(n - p)!}$	ex: ${}^6 A_2 = \frac{6!}{(6 - 2)!} = 30$
Permutations with repetition	${}^n A'_p = n^p$	ex: ${}^5 A'_3 = 5^3 = 125$
Combination	${}^n C_p = \frac{{}^n A_p}{p!} = \frac{n!}{(n - p)! \times p!}$	ex: ${}^5 C_4 = \frac{{}^5 A_4}{4!} = 5$
Probability Distribution	Average value	$\mu = x_1 p_1 + x_2 p_2 + \dots + x_k p_k$
	Standard deviation	$\sigma = \sqrt{\sum_{i=1}^k p_i (x_i - \mu)^2}$
Binomial distribution	$P(X = k) = {}^n C_k \cdot p^k \cdot (1 - p)^{n-k}$	ex: $B(10; 0, 6)$ $P(X = 3) = {}^{10} C_3 \times 0,6^3 \times 0,4^7$