Probability Formulas

Links: Math 3339

Probability Range
$0 \leq Pr(E) \leq 1$

Complementary Events
$Pr(E^C) = 1 - Pr(E)$

Addition Rule
$Pr(A \cup B) = Pr(A) + Pr(B) - Pr(A \cap B)$

Multiplication Rule
$Pr(A \cap B) = Pr(A) * Pr(B|A)$

Other Properties
$Pr(A \cap B^C) = Pr(A) - Pr(A \cap B)$
$Pr(A^C \cap B) = Pr(B) - Pr(A \cap B)$

Disjoint Events
Events *A* and *B* are disjoint if and only if
$Pr(A \cap B) = 0$

Conditional Probability
$Pr(A|B) = \frac{Pr(A \cap B)}{Pr(B)}$

Bayes Formula
$Pr(A|B) = \frac{Pr(B|A) * Pr(A)}{Pr(B)}$

Independent Events
Events *A* and *B* are independent if and only if $Pr(A \cap B) = Pr(A) * Pr(B)$
or
$Pr(A|B) = Pr(A)$ (*the conditioning of one does not affect the probability of the other*)