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

- Multiplication rule : $P(A \cap B) = P(A|B)\,P(B)$
  $= P(B|A)\,P(A)$

  For n events; $P\left(\bigcap_{i=1}^{n} A_i\right) = P(A_1) \cdot P(A_2|A_1) \cdot P(A_3|A_1 \cap A_2) \cdots P\left(A_n \mid \bigcap_{i=1}^{n-1} A_i\right)$

- Total probability theorem:

$$P(A) = P(A|B_1)\,P(B_1) + P(A|B_2)\,P(B_2) + \cdots + P(A|B_n)\,P(B_n)$$

- Bayes Theorem:

$$P(B_r|A) = \frac{P(A|B_r)\,P(B_r)}{\sum_{i=1}^{n} P(A|B_i) \cdot P(B_i)} \qquad r = 1, 2, \cdots, n$$

- Two independent events : $P(A \cap B) = P(A) \cdot P(B)$

- Three independent events : $P(A \cap B) = P(A)\,P(B)$
  $P(B \cap C) = P(B)\,P(C)$
  $P(A \cap C) = P(A)\,P(C)$
  $P(A \cap B \cap C) = P(A)\,P(B)\,P(C)$