Multiplication Rule:

- $P(A \text{ and } B) = P(A)\, P(B \,|\, A)$.
- If A and B are independent, then $P(A \text{ and } B) = P(A)\, P(B)$.

Sum Rule:

- $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
- If A ane B are mutually exclusive, then $P(A \text{ or } B) = P(A) + P(B)$

The chance that an event will occur exactly k times out of n is given by the binomial formula:

$$\frac{n!}{k!\,(n-k)!}\, p^k\, (1-p)^{n-k}$$

A standard deck of cards has the following properties.

- 52 cards
- 4 suits: hearts $\heartsuit$, spades $\spadesuit$, clubs $\clubsuit$, and diamonds $\diamondsuit$
- Hearts and diamonds are red. Spades and clubs are black
- 13 cards of each suit: 2 – 10, J, Q, K, and ace
- 4 cards of each rank: 2 – 10, J, Q, K, and ace
- J, Q, and K are face cards

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