Classical definition of Probability.

If a random experiment results in n mutually exclusive, equally likely and exhaustive outcomes, out of which m are favorable to the occurrence of an event A, then the probability of occurrence of A is given by

$$P(A) = \frac{m}{n} = \frac{\text{Number of outcomes favourable to } A}{\text{Number of total outcomes}}$$

It is obvious that $0 \le m \le n$. If an event A is certain to happen, then $m = n$, thus $P(A) = 1$.
If A is impossible to happen, then $m = 0$ and so $P(A) = 0$. Hence we conclude that

$$0 \le P(A) \le 1.$$

Further, if $\overline{A}$ denotes negative of A i.e. event that A doesn't happen, then for above cases m, n; we shall have

$$P(\overline{A}) = \frac{n-m}{n} = 1 - \frac{m}{n} = 1 - P(A)$$

$$\therefore \qquad P(A) + P(\overline{A}) = 1\,.$$

Notations: For two events A and B,

(i) A' or $\overline{A}$ or A^C stands for the non-occurrence or negation of A.

(ii) $A \cup B$ stands for the occurrence of at least one of A and B.

(iii) $A \cap B$ stands for the simultaneous occurrence of A and B.

(iv) $A' \cap B'$ stands for the non-occurrence of both A and B.

(v) $A \subseteq B$ stands for "the occurrence of A implies occurrence of B".