

Probability:

It is a measure of how likely an event is going to occur. Mostly used when we don't know the outcomes of a specific event.

Example:

If we toss a coin

So Sample Space {H, T}

Formula of Probability:

$P = \text{No of ways an event can occur} / \text{no of possible outcomes or sample space}$

$$P = \frac{1}{2}$$

Mutual exclusive event:

When we do an experiment and the outcome is a single event not double

Example:

Additive rule for mutual exclusive event:

Tossing a coin:

Head will occur or tail both cannot occur at the same time.

$$P(\text{Head or tail}) = P(h) + P(T)$$

$$= \frac{1}{2} + \frac{1}{2}$$

$$= 1$$

Additive rule for not mutual exclusive event:

Example:

Taking a card from the deck:

$P(K \text{ or hearts})$

P = No of ways an event can occur/ no of possible outcomes or sample space

$$P(k) = 4/52$$

$$P(\text{hearts}) = 13/52$$

$$P(K \text{ or hearts}) = P(k) + P(\text{hearts}) - P(k \text{ n hearts})$$

$$= 4/52 + 13/52 - 1/52$$

$$= 16/52$$

Multiplicative Rule:

1. Independent Event:

No of total outcomes will not be reduced

$$P(a \text{ AND } b) = P(a) * P(b)$$

Example:

Tossing a coin for 3 times:

$$SS = \{h, t, h\}$$

$$P(H) = \frac{1}{2}$$

$$P(t) = \frac{1}{2}$$

$$P(h) = \frac{1}{2}$$

2. Independent event:

No of outcomes will be reduced

$$P(a \text{ AND } b) = P(a) * P(b/a)$$

$$P(b/a) = \text{conditional probability}$$

Example:

Taking a card from the deck

1st experiment:

$$P(K) = 1/52$$

2nd experiment:

$$P(\text{hearts}) = 1/51$$

