12 September 2023 20:24

* Conditional Probability

Events

Independent Events

eg:- (1) Whether it will rain tomorrow?
(2) Whether Ashok will get placed?
(3) Whether Leena will pass the exam?

Dependent Events

eg: (1) Whether Ashok will get placed [if he has completed all assignment & projects]
(2) Whether Leena will pass the exam [given that she has studied for 8 hrs/day for last one month?]

The conditional probability of an event B is the probability that the event will occur given the knowledge that an event A has already occured.

← given that.

CP, Notation :- $P(B|A)$

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

eg:- Cards :- 52 cards, 13 each, [diamond, hearts, Spades & clubs]

A
⇒ First player picks a card & King heart turns up.

$P(H) = 13/52$ $\quad 13 - 1 = 12$

Now, the same player draws one more card. What is probability that he will get a heart only

Event B $\quad 12/51$

$P(2^{nd}\ pic \mid 1^{st}\ pick\ is\ already\ heart) = \frac{12}{51}$

$P(B|A) = \frac{12}{51}$

Q. What is the probability that India Wins a match when Sachin scored a century?

Won century	False	True	All
False	160	154	314
True	16	30	46
All	176	184	360

$P(\text{India Wins} \mid \text{Sachin scored a century})$

$= \frac{30/154 \times 46/184}{30/184}$

$\frac{30}{46}$

$\frac{30/46}{}$

· What is the probability of Sachin might have scored a century given that India has won the match?

Won	False	True	All
century			
False	160	154	314
True	16	30	46
All	176	184	360

→ 30/184 } 30/184

46/360 30/184 30/184 30/184

160/314 ⇐ P(IL | SNC)

16/176 ⇐ P(Sachin Scoring a Century | India has won the match)