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|--|------------------------|
| OR $\overline{211}$ Options Cases | and Compulsion ✓ |

Sample space

4 coins $2^4 = 16$

$$S = \left\{ \begin{array}{cccc} 8H & 4H & 2H & 1H \\ 8T & 4T & 2T & 1T \end{array} \right\}$$

XII probability

① conditional probability

② Independent events

③ total law of prob.

④ Bayes' theorem

⑤ ~~Binomial distribution~~

⑥ probability distribution

⑦ general prob. (XI)

Topic: 1 Conditional prob.

✓ $P(A/B) =$ Prob of event A given that event B has already occurred

✓ $P(B|A) =$ vice versa

Formula

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

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

fix pattern

$A \rightarrow$ Required event

$B \rightarrow$ given event

$$A = \{ \dots \}$$
$$B = \{ \dots \}$$
$$A \cap B = \{ \dots \}$$
$$P(A \cap B) =$$
$$P(B) =$$

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

Qns. 1 A family has 2 children.

Find the prob. both are boys, given that there is at least one boy.

Sol. $S = \{ BB, BG, GB, GG \}$

$A \rightarrow$ both are boys

$B \rightarrow$ at least one is a boy

$A = \{ BB \}$

$B = \{ BG, GB, BB \}$

$A \cap B = \{ BB \}$

$$P(A \cap B) = \frac{1}{4}$$

$$P(B) = \frac{3}{4}$$

$$\boxed{P(A|B) = \frac{1}{3}} \text{ Ans}$$

Q=2 A bag contains 10 numbers.
One number is drawn, Find the
Prob of getting no. > 3 , given that
it is an even number

Sol $S = \{1, 2, 3, \dots, 10\}$

$A \rightarrow \text{no. } > 3$

$B \rightarrow \text{Even number}$

$A = \{4, 5, 6, 7, 8, 9, 10\}$

$B = \{2, 4, 6, 8, 10\}$

$A \cap B = \{4, 6, 8, 10\}$

$$P(A \cap B) = \frac{4}{10}$$

$$P(B) = \frac{5}{10}$$

$$P(A|B) = \frac{4}{5}$$

Special Best VCERT
Q=3

A coin is tossed. If head comes, then it is tossed again.

If tails comes, then a die is thrown.

Find the prob of getting number more than 4,
 given that there is at least one tail.

Equally likely outcomes
 chance (prob)

Sol
 $S = \left\{ \left(\frac{1}{2} \times \frac{1}{2} \right) \left(\frac{1}{4} \right) \left(\frac{1}{4} \right) \left(\frac{1}{2} \times \frac{1}{6} \right) \left(\frac{1}{12} \right) \dots (T, 6) \right\}$

A \rightarrow no. >

B \rightarrow at least one tail

$$A = \{ (T, 5), (T, 6) \}$$

$$B = \{ (H, T), (T, 1), \dots, (T, 6) \}$$

$$A \cap B = \{ (T, 5), (T, 6) \}$$

$$P(A \cap B) = \left(\frac{1}{2} \times \frac{1}{6} \right) + \left(\frac{1}{2} \times \frac{1}{6} \right) = \frac{2}{12} = \frac{1}{6}$$

$$P(B) = \left(\frac{1}{2} \times \frac{1}{2} \right) + \left(\frac{1}{2} \times \frac{1}{6} \right) \times 6 = \frac{1}{4} + \frac{1}{2} = \frac{3}{4}$$

$$P(A|B) = \frac{\frac{1}{6}}{\frac{3}{4}} = \frac{4}{18} = \frac{2}{9}$$