

Tender Heart High School, Sec. - 33B chd.

Class: VIII

Teacher:

Subject: Mathematics

Ms. Deepa

Topic: Chapter - 27: Probability

Probability is the measure of uncertainty or certainty of any events.

In our day-to-day life, we come across many questions like

- Will it rain tomorrow?
- While rolling a die, chance of getting a 6.
- Tossing a coin and getting a 'Head'.

Terms related to Probability:

1. Experiment: Any activity which produces, some well-defined outcomes.

for e.g: (i) Rolling a die

(ii) Tossing two coins simultaneously

(iii) To choose a card from deck of 52 cards.

Sample space: Total outcomes of an 'Experiment'

(i) Rolling a die

$$S = \{1, 2, 3, 4, 5, 6\}$$

(ii) Tossing a coin

$$S = \{H, T\}$$

(iii) Tossing two coins simultaneously

$$S = \{HH, HT, TH, TT\}$$

2. Event: The collection of all the possible or favourable outcomes, consist an "Event"

for eg:

1. While rolling a die, and the event is getting an odd number

$$E = \{1, 3, 5\}$$

2. While tossing 2 coins, the event is getting one head

$$H = \{HT, TH\}$$

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Probability of any event is,  
 $0 \leq P(E) \leq 1$

- Probability of 'impossible event' = 0
- Probability of 'Sure event' = 1

for eg:

- $P(\text{getting } 7 \text{ in rolling a dice}) = 0$
- $P(\text{getting a number less than } 7) = 1$

Exercise - 27A

$$\text{Probability} = \frac{\text{favourable outcomes}}{\text{Total outcomes}}$$

Soln 1  $S = \{H, T\}$   
 $E = \text{getting a head.}$   
 $P(E) = \frac{1}{2}$

Soln 2 Die is rolled once,  $S = \{1, 2, 3, 4, 5, 6\}$

(i)  $E_1 = \text{an odd number} = \{1, 3, 5\}$   $P(E_1) = \frac{3}{6} = \frac{1}{2}$

(ii)  $E_2 = \text{a Composite number} = \{4, 6\}$   $P(E_2) = \frac{2}{6} = \frac{1}{3}$

(iii)  $E_3 = \text{a Number less than } 5 = \{1, 2, 3, 4\}$   $P(E_3) = \frac{4}{6} = \frac{2}{3}$

(iv)  $E_4 = \text{a multiple of } 3 = \{3, 6\}$   $P(E_4) = \frac{2}{6} = \frac{1}{3}$

Soln 3. Two coins are tossed simultaneously  
 $S = \{HH, HT, TH, TT\}$

(i)  $E_1 = \text{exactly one head} = \{HT, TH\}$   
 $P(E_1) = \frac{2}{4} = \frac{1}{2}$

(ii)  $E_2 = \text{atleast one tail} = \{HT, TH, TT\}$   $P(E_2) = \frac{3}{4}$

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(iii)  $E_3 = \text{no tail} = \{HH\}$

$$P(E_3) = \frac{1}{4}$$

(iv)  $E_4 = \{\text{at most one head}\}$

$$= \{HT, TH, TT\}$$

$$P(E_4) = \frac{3}{4}$$

Sol<sup>n</sup> 5 Total bulbs = 100

no. of defective bulbs = 8

no. of non-defective bulbs =  $100 - 8 = 92$

(i)  $P(\text{defective bulbs}) = \frac{8}{100} = \frac{2}{25}$

(ii)  $P(\text{non-defective bulbs}) = \frac{92}{100} = \frac{23}{25}$

Sol<sup>n</sup> 7. Total no. of cards = 19

(i)  $E_1 = \text{a prime number} = \{2, 3, 5, 7, 11, 13, 17, 19\}$

$$P(E_1) = \frac{8}{19}$$

(ii)  $E_2 = \text{a multiple of 4} = \{4, 8, 12, 16\}$

$$P(E_2) = \frac{4}{19}$$

(iii)  $E_3 = \text{a composite no. less than 10} = \{4, 6, 8, 9\}$

$$P(E_3) = \frac{4}{19}$$

(iv)  $E_4 = \{\text{neither divisible by 3 nor 5}\} = \{1, 2, 3, 4, 7, 8, 11, 13, 14, 16, 17, 19\}$

$$P(E_4) = \frac{12}{19}$$

Sol<sup>n</sup> 8 (i)  $P(\text{black king}) = \frac{2}{52} = \frac{1}{26}$

(ii)  $P(\text{a jack}) = \frac{4}{52} = \frac{1}{13}$

(iii)  $P(\text{a spade}) = \frac{13}{52} = \frac{1}{4}$

(iv)  $P(\text{a king or queen}) = \frac{8}{52} = \frac{2}{13}$