7th Probability Solved Questions

1. Experiment : An operation which can produce some well-defined outcome is called as experiment.

2. Random Experiment: An experiment in which all possible outcomes are known and the exact output cannot be predicted in advance, is called a random experiment.

Examples : Rolling an unbiased dice, Tossing a fair coin, Drawing a card from a pack of well-shuffled cards.

3. Sample Space : When we perform an experiment, then **the set S of all possible outcomes** is called the sample space.

Examples :

In tossing a coin, S = {H, T}

If two coins are tossed, the S = {HH, HT, TH, TT}.

In rolling a dice, we have, S = {1, 2, 3, 4, 5, 6}.

4. Event : Any subset of a sample space is called an event.

5. Results on Probability :

1. An event having only one outcome of the experiment is called an elementary event.

In example 1, both the events E and F are elementary events.

Similarly, in Example 2, all the three events, Y, B and R are elementary events.

2. P(E) + P(F) = 1

P(Y) + P(R) + P(B) = 1

The sum of the probabilities of all the elementary events of an experiment is 1.

6. Details:

1. When we throw a coin, then either a Head (H) or a Tail (T) appears.

2. A dice is a solid cube, having 6 faces, marked 1, 2, 3, 4, 5, 6 respectively.

When we throw a die, the outcome is the number that appears on its upper face are 1, 2, 3, 4, 5, 6

3. A pack of cards has 52 cards.

It has 13 cards of each suit, name Spades, Clubs, Hearts and Diamonds.

Cards of spades and clubs are black cards. Cards of hearts and diamonds are red cards.

6 . There are 4 honours of each unit.

7. There are Kings, Queens and Jacks. These are all called face cards.

Example 1: One card is drawn from a well-shuffled deck of 52 cards.

Calculate the probability that the card will (i) be an ace,(ii) not be an ace.

Solution : Well-shuffling ensures equally likely outcomes.

(i) There are 4 aces in a deck. Let E be the event 'the card is an ace'.

The number of outcomes favourable to E = 4

The number of possible outcomes = 52

Therefore, P(E) = $\frac{4}{52} = \frac{1}{13}$

(ii) Let E' be the event 'card drawn is not an ace'.

P(E,) = 1 – P(E) =1 – $\frac{1}{13} = \frac{12}{13}$

Example- 2 Savita and Hamida are friends. What is the probability that both will have (i) different birthdays? (ii) the same birthday? (Ignoring a leap year).

Out of the two friends, one girl, say, Savita's birthday can be any day of the year. Now, Hamida's birthday can also be any day of 365 days in the year.

We assume that these 365 outcomes are equally likely.

(i) If Hamida's birthday is different from Savita's, the number of favourable outcomes for her birthday is 365 – 1 = 364

So, P (Hamida's birthday is different from Savita's birthday) = $\frac{364}{365}$

(ii) P(Savita and Hamida have the same birthday)= 1 – $\frac{364}{365} = \frac{1}{365}$

Example 3 : A box contains 3 blue, 2 white, and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will be (i) white? (ii) blue? (iii) red?

solution= Total marbles=Number of possible outcomes = 3 +2 + 4 = 9

$(i)p(\ white) = \frac{2}{9}\ (ii)\ p(blue) = \frac{3}{9} = \frac{2}{3}\ (iii)\ p(red) = \frac{4}{9}$

Test yourself

1. In a lottery, there are 10 prizes and 25 blanks. A lottery is drawn at random. What is the probability of getting a prize

Ans: The probability of getting a prize = $\frac{10}{10+25} = \frac{10}{35} = \frac{2}{7}$

2. A bag contains 6 black and 8 white balls. One ball is drawn at random. What is the probability that the ball drawn is white?

Ans: The probability that the ball drawn is white = $\frac{8}{6+8} = \frac{8}{14} = \frac{9}{7}$

3. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

Ans: Here, S = {1, 2, 3, 4, ..., 19, 20}. = 20

Let E = event of getting a multiple of 3 or 5 = {3, 6 , 9, 12, 15, 18, 5, 10, 20} = 9

P(E) = $\frac{n(E)}{n(S)} = \frac{9}{20}$

4. What is the probability of getting a sum 9 from two throws of a dice?

Ans: $S = 6 \text{ x } 6 = 36$

Let E = event of getting a sum 9 $= [(3,6), (4,5), (6,3), (5,4)] = 4$

So probability(E) = $\frac{4}{36} = \frac{1}{9}$

5. Three unbiased coins are tossed. What is the probability of getting at most two heads?

Here S = {TTT, TTH, THT, HTT, THH, HTH, HHT, HHH}
Let E = event of getting at most two heads.
Then E = {TTT, TTH, THT, HTT, THH, HTH, HHT}.

$\therefore\ P(E) = \frac{n(E)}{n(S)} = \frac{7}{8}.$