CBSE Class–10 Mathematics

NCERT solution

Chapter - 15

Probability - Exercise 15.2

1. Two customers Shyam and Ekta are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days?

Ans. Total favourable outcomes associated to the random experiment of visiting a particular shop in the same week (Tuesday to Saturday) by two customers Shyam and Exta are:

(T, T) (T, W) (T, TH) (T, F) (T, S)

(W, T) (W, W) (W, TH) (W, F) (W, S)

(TH, T) (TH, W) (TH, TH) (TH, F) (TH, S)

(F, T) (F, W) (F, TH) (F, F) (F, S)

(S, T) (S, W) (S, TH) (S, F) (S< S)

where T = Tuesday, W = Wednesday, Th = Thursday, F = Friday, S = Saturday

∴ Total number of favourable outcomes = 5 x 5 = 25

(i) The favourable outcomes of visiting on the same day are (T, T), (W, W), (TH, TH), (F, F) and (S, S).

∴ Number of favourable outcomes = 5

Hence required probability = $\frac{5}{25} = \frac{1}{5}$

(ii) The favourable outcomes of visiting on consecutive days are (T, W), (W, T), (W, TH), (TH, W), (TH, F), (F, TH), (S, F) and (F, S).

∴ Number of favourable outcomes = 8

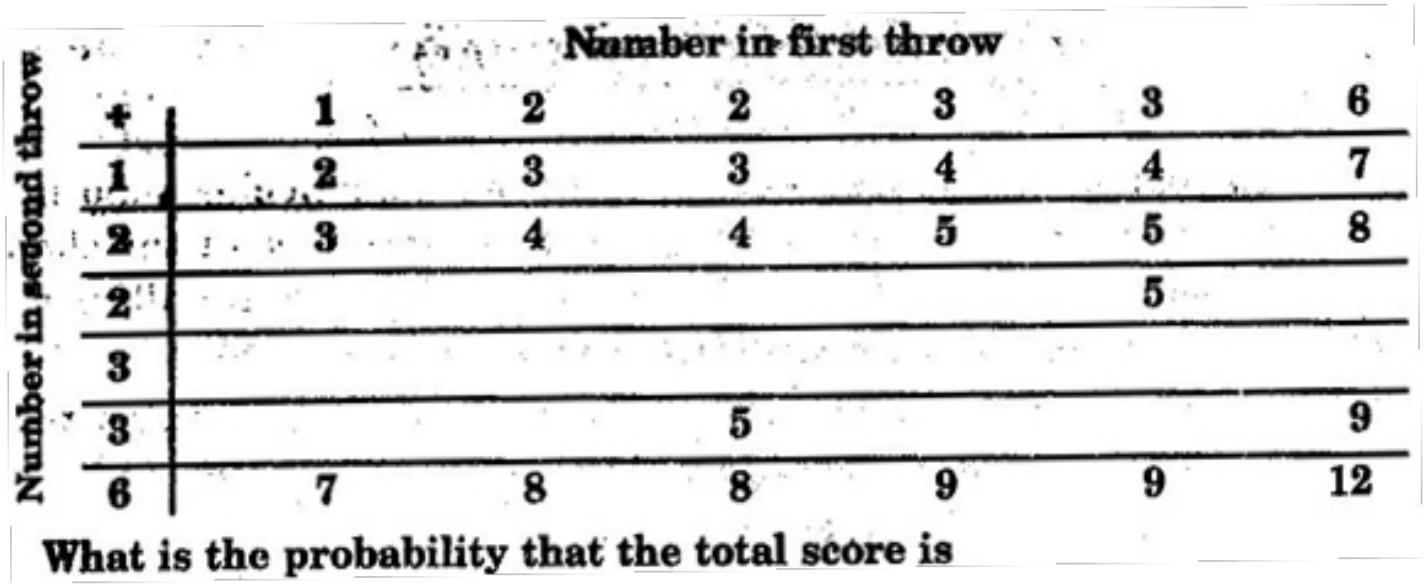
Hence required probability = $\frac{8}{25}$

(iii) Number of favourable outcomes of visiting on different days are 25 – 5 = 20

∴ Number of favourable outcomes = 20

Hence required probability = $\frac{20}{25} = \frac{4}{5}$

2. A die is numbered in such a way that its faces show the numbers 1, 2, 2, 3, 3, 6. It is thrown two times and the total score in two throws is noted. Complete the following table which gives a few values of the total score on the two throws:



What is the probability that the total score is:

(i) even

(ii) 6

(iii) at least 6?

Ans. Complete table is as under:

Number in second throw \ Number in first throw	1	2	2	3	3	6
1	2	3	3	4	4	7
2	3	4	4	5	5	8
2	3	4	4	5	5	8
3	4	5	5	6	6	9
3	4	5	5	6	6	9
6	7	8	8	9	9	12

It is clear that total number of favourable outcomes = 6×6 = 36

(i) Even scores are: 2, 4, 4, 4, 4, 8, 4, 4, 8, 4, 6, 4, 6, 6, 8, 8, 12

Number of favourable outcomes of getting total score even are 18

Hence P (getting total score even) = $\frac{18}{36} = \frac{1}{2}$

(ii) Number of favourable outcomes of getting total score 6 are 4

Hence P (getting total score 6) = $\frac{4}{36} = \frac{1}{9}$

(iii) Total score at least 6 = 7, 8, 8, 6, 6, 9, 6, 6, 9, 7, 8, 8, 9, 9, 12

Number of favourable outcomes of getting total score at least 6 are 15

Hence P (getting total score at least 6) = $\frac{15}{36} = \frac{5}{12}$

3. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, determine the number of blue balls in the bag.

Ans. Let there be x blue balls in the bag.

$\therefore$ Total number of balls in the bag = $5 + x$

Now, P_1 = Probability of drawing a blue ball = $\frac{x}{5+x}$

And P_2 = Probability of drawing a red ball = $\frac{5}{5+x}$

But according to question, $P_1 = 2P_2$

$$\Rightarrow \frac{x}{5+x} = 2 \times \frac{5}{5+x}$$

$$\Rightarrow \frac{x}{5+x} \times \frac{5+x}{5} = 2$$

$$\Rightarrow x = 10$$

Hence, there are 10 blue balls in the bag.

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4. A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball?

If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x.

Ans. There are 12 balls in the box.

Therefore, total number of favourbale outcomes = 12

The number of favourable outcomes (Black balls) = x

Therefore P_1 = P (getting a black ball) = $\frac{x}{12}$

If 6 more balls put in the box, then

Total number of favourable outcomes = 12 + 6 = 18

And Number of favourable outcomes = $x+6$

$\therefore$ P_2 = P (getting a black ball) = $\frac{x+6}{18}$

According to question, $P_2 = 2P_1$

$\Rightarrow \frac{x+6}{18} = 2 \times \frac{x}{12}$

$\Rightarrow \frac{x+6}{18} = \frac{x}{6}$

$\Rightarrow 6x + 36 = 18x$

$\Rightarrow 18x - 6x = 36$

$\Rightarrow 12x = 36$

$\Rightarrow x = 3$

5. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number if blue balls in the jar.

Ans. Here, Total number of favourable outcomes = 24
Let there be x green marbles.
Therefore, Favourable number of outcomes = x

$\therefore$ P(Green ball) = $\frac{x}{24}$

But P(Green ball) = $\frac{2}{3}$

$\therefore \frac{x}{24} = \frac{2}{3}$

$\Rightarrow x$ = 16

Therefore, number of green marbles are 16
And number of blue marbles = 24 – 16 = 8