

Exercise: 15.2

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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?

Solution:

Since there are 5 days and both can go to the shop in 5 ways each so,
The total number of possible outcomes = $5 \times 5 = 25$

(i) The number of favourable events = 5 (Tue., Tue.), (Wed., Wed.), (Thu., Thu.), (Fri., Fri.), (Sat., Sat.)

So, $P(\text{both visiting on the same day}) = \frac{5}{25} = \frac{1}{5}$

(ii) The number of favourable events = 8 (Tue., Wed.), (Wed., Thu.), (Thu., Fri.), (Fri., Sat.), (Sat., Fri.), (Fri., Thu.), (Thu., Wed.), and (Wed., Tue.)

So, $P(\text{both visiting on the consecutive days}) = \frac{8}{25}$

(iii) $P(\text{both visiting on the different days}) = 1 - P(\text{both visiting on the same day})$

So, $P(\text{both visiting on the different days}) = 1 - (\frac{1}{5}) = \frac{4}{5}$

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:

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

What is the probability that the total score is

- (i) even?
- (ii) 6?

(iii) at least 6?

Solution:

The table will be as follows:

| | | | | | | |
|---|---|---|---|---|---|----|
| + | 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 |

So, the total number of outcomes = $6 \times 6 = 36$

(i) E (Even) = 18

P (Even) = $18/36 = \frac{1}{2}$

(ii) E (sum is 6) = 4

P (sum is 6) = $4/36 = 1/9$

(iii) E (sum is atleast 6) = 15

P (sum is atleast 6) = $15/36 = 5/12$

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.

Solution:

It is given that the total number of red balls = 5

Let the total number of blue balls = x

So, the total no. of balls = $x+5$

$P(E) = (\text{Number of favourable outcomes} / \text{Total number of outcomes})$

$\therefore P$ (drawing a blue ball) = $[x/(x+5)]$ -----(i)

Similarly,

P (drawing a red ball) = $[5/(x+5)]$ -----(i)

From equation (i) and (ii)

$$x = 10$$

So, the total number of blue balls = 10

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

Solution:

Total number of black balls = x

Total number of balls = 12

$P(E) = (\text{Number of favourable outcomes} / \text{Total number of outcomes})$

$$P(\text{getting black balls}) = x/12 \text{ -----(i)}$$

Now, when 6 more black balls are added,

Total balls become = 18

$$\therefore \text{Total number of black balls} = x+6$$

$$\text{Now, } P(\text{getting black balls}) = (x+6)/18 \text{ -----(ii)}$$

It's given that, **the probability of drawing a black ball now is double of what it was before**

$$(ii) = 2 \times (i)$$

$$(x+6)/18 = 2 \times (x/12)$$

$$x + 6 = 3x$$

$$2x = 6$$

$$\therefore x = 3$$

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 of blue balls in the jar.

Solution:

Total marbles = 24

Let the total green marbles = x

So, the total blue marbles = $24-x$

$P(\text{getting green marble}) = x/24$

From the question, $x/24 = \frac{2}{3}$

So, the total green marbles = 16

And, the total blue marbles = $24-16 = 8$