1. A box contains 4 red, 5 green and 6 white balls. A ball is drawn at random from the box. What is the probability that the ball drawn is either red or green?

a. 2/5

b. 3/5

c. 1/5

d. 7/15

Ans: B

Total number of balls = (4 + 5 + 6) = 15.
P(drawing a red ball or a green ball) = P(red) + P(green)
$$= \left(\frac{4}{15} + \frac{5}{15}\right) = \frac{9}{15} = \frac{3}{5}.$$

2. An urn contains 3 red, 3 green and 2 blue balls. If 2 balls are drawn at random, find the probability that no ball is blue.

a. 5/7

b. 10/21

c. 2/7

d. 11/21

Ans: B

Total number of balls $= (2 + 3 + 2) = 7$.

Let E be the event of drawing 2 non-blue balls.

Then, $n(E) = {}^5C_2 = \dfrac{5 \times 4}{2 \times 1} = 10$.

And, $n(S) = {}^7C_2 = \dfrac{7 \times 6}{2 \times 1} = 21$.

$\therefore \quad P(E) = \dfrac{n(E)}{n(S)} = \dfrac{10}{21}$.

3. Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even?

a. 1/2

b. 3/4

c. 3/8

d. 5/16

Ans: B

'. In a simultaneous throw of two dice, we have $n(S) = (6 \times 6) = 36$.

Let E = event of getting two numbers whose product is even.

Then, $E = \{(1, 2), (1, 4), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 2), (3, 4), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 2), (5, 4), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)\}$.

$\therefore \quad n(E) = 27$.

$\therefore \quad P(E) = \dfrac{n(E)}{n(S)} = \dfrac{27}{36} = \dfrac{3}{4}$.

4. A box contains 10 black and 10 white balls. What is the probability of drawing 2 balls of the same colour?

a. 9/19

b. 9/38

c. 10/19

d. 5/19

Ans: A

Total number of balls = (10 + 10) = 20.
Let E be the event of drawing 2 balls of the same colour.
$n(E)$ = number of ways of drawing 2 black balls or 2 white balls

$$n(E) = (^{10}C_2 + {}^{10}C_2) = 2 \times {}^{10}C_2 = 2 \times \frac{10 \times 9}{2 \times 1} = 90.$$

$n(S)$ = number of ways of drawing 2 balls out of 20

$$= {}^{20}C_2 = \frac{20 \times 19}{2 \times 1} = 190.$$

$$\therefore \quad P(E) = \frac{n(E)}{n(S)} = \frac{90}{190} = \frac{9}{19}.$$

5. An urn contains 6 red, 4 blue, 2 green and 3 yellow marbles. If two marbles are drawn at random from the urn, what is the probability that both are red?

a. 1/6

b. 1/7

c. 2/15

d. 2/5

Ans: B

Total number of balls = (6 + 4 + 2 + 3) = 15.
Let E be the event of drawing 2 red balls.
Then, $n(E) = {}^6C_2 = \dfrac{6 \times 5}{2 \times 1} = 15$.

Also, $n(S) = {}^{15}C_2 = \dfrac{15 \times 14}{2 \times 1} = 105$.

$\therefore \quad P(E) = \dfrac{n(E)}{n(S)} = \dfrac{15}{105} = \dfrac{1}{7}$.

6. A basket contains 4 red, 5 blue and 3 green marbles. If three marbles are picked up at random what is the probability that at least one is blue?

a. 7/12

b. 37/44

c. 5/12

d. 7/44

Ans: B

Total number of marbles = (4 + 5 + 3) = 12.
Let E be the event of drawing 3 marbles such that none
is blue.
Then, $n(E)$ = number of ways of drawing 3 marbles out
of 7 = ${}^7C_3 = \dfrac{7 \times 6 \times 5}{3 \times 2 \times 1} = 35$.

And, $n(S) = {}^{12}C_3 = \dfrac{12 \times 11 \times 10}{3 \times 2 \times 1} = 220$.

$\therefore \quad P(E) = \dfrac{n(E)}{n(S)} = \dfrac{35}{220} = \dfrac{7}{44}$.

Required probability = $1 - P(E) = \left(1 - \dfrac{7}{44}\right) = \dfrac{37}{44}$.

7. Four persons are chosen at random from a group of 3 men, 2 women and 4 children.
The chance that exactly 2 of them are children, is

a. 1/9

b. 1/5

c. 1/12

d.10/21

Ans: D

$n(S)$ = number of ways of choosing 4 persons out of 9

$$= {}^9C_4 = \frac{9 \times 8 \times 7 \times 6}{4 \times 3 \times 2 \times 1} = 126.$$

$n(E)$ = Number of ways of choosing 2 children out of 4 and 2 persons out of (3 + 2) persons

$$n(E) = ({}^4C_2 \times {}^5C_2) = \left(\frac{4 \times 3}{2 \times 1} \times \frac{5 \times 4}{2 \times 1}\right) = 60.$$

$$\therefore \quad P(E) = \frac{n(E)}{n(S)} = \frac{60}{126} = \frac{10}{21}.$$

8. In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green?

a. 2/3

b. 3/4

c. 7/19

d. 8/21

e. 9/21

Ans: D

Total number of balls = (8 + 7 + 6) = 21.
Let E = Event that the ball drawn is neither red nor green
   = Event that the ball drawn is red.
∴ $n(E) = 8$.
∴ $P(E) = \dfrac{8}{21}$.

9. 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?

a. 3/4

b. 4/7

c. 1/8

d. 3/7

Ans: B

Total number of balls = (6 + 8) = 14.
Number of white balls = 8.
$P(\text{drawing a white ball}) = \dfrac{8}{14} = \dfrac{4}{7}$.

10. From a pack of 52 cards, one card is drawn at random. What is the probability that the card drawn is a ten or a spade?

a. 4/13

b. 1/4

c. 1/13

d. 1/26

Ans: A

Here, $n\,(S) = 52$.

There are 13 spades (including one ten) and there are 3 more tens.

Let E = event of getting a ten or a spade.

Then, $\quad n\,(E) = (13 + 3) = 16$.

$\therefore \quad P\,(E) = \dfrac{n\,(E)}{n\,(S)} = \dfrac{16}{52} = \dfrac{4}{13}$.