QUESTION 1:Two different dice are rolled simultaneously. Find the probability that the sum of the numbers on the two dice is 10.

Solution:

When two different dice are thrown, the total number of outcomes = 36.

Let E_1 be the event of getting the sum of the numbers on the two dice is 10.

These numbers are (4, 6), (5, 5) and (6, 4).

Number of favorable outcomes = 3

Therefore, P(getting the sum of the numbers on the two dice is 10) = $P(E_1) = \frac{Number\ of\ outcomes\ favorable\ to\ E_1}{Number\ of\ all\ possible\ outcomes} = \frac{3}{36} = \frac{1}{12}$

Thus, the probability of getting the sum of the numbers on the two dice is 10 is $\frac{1}{12}$.

QUESTION 2:When two dice are tossed together, find the probability that the sum of the numbers on their tops is less than 7.

Solution:

When two different dice are thrown, the total number of outcomes = 36.

Let E be the event of getting the sum of the numbers less than 7.

These numbers are (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (2, 1), (2, 2), (2, 3), (2, 4), (3, 1), (3, 2), (3, 3), (4, 1), (4, 2) and (5, 1).

Number of favorable outcomes = 15

Therefore, P(getting the sum of the numbers less than 7) = $P(E) = \frac{Number\ of\ outcomes\ favorable\ to\ E}{Number\ of\ all\ possible\ outcomes} = \frac{15}{36} = \frac{5}{12}$

Thus, the probability of getting the sum of the numbers less than 7 is $\frac{5}{12}$.

QUESTION 3:Two dice are rolled together. Find the probability of getting such numbers on two dice whose product is perfect square.

Solution:

When two different dice are thrown, then total number of outcomes = 36.

Let E be the event of getting the product of numbers, as a perfect square.

These numbers are (1, 1), (1, 4), (2, 2), (3, 3), (4, 1), (4, 4), (5, 5) and (6, 6).

Number of favorable outcomes = 8

Therefore, P(getting the product of numbers, as a perfect square) = P(E) = $\frac{Number\ of\ outcomes\ favorable\ to\ E}{Number\ of\ all\ possible\ outcomes}$ = $\frac{8}{36}$ = $\frac{2}{9}$

Thus, the probability of getting the product of numbers, as a perfect square is $\frac{2}{9}$.

QUESTION 4: Two dice are rolled together. Find the probability of getting such numbers on the two dice whose product is 12.

Solution:

Number of all possible outcomes = 36

Let E be the event of getting all those numbers whose product is 12.

These numbers are (2, 6), (3, 4), (4, 3) and (6, 2).

Therefore, P(getting all those numbers whose product is 12) = P(E) = $\frac{Number\ of\ outcomes\ favorable\ to\ E}{Number\ of\ all\ possible\ outcomes}$ = $\frac{4}{36}$ = $\frac{1}{9}$

Thus, the probability of getting all those numbers whose product is 12 is $\frac{1}{9}$.

QUESTION 1:A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card was drawn is

(i) a card of a spade or an Ace

(ii) a red king

(iii) either a king or queen

(iv) neither a king nor the queen.

Solution:

Total number of all possible outcomes = 52

(i) Number of space card = 13

Number of aces = 4 (including 1 of spade)

Therefore, number of spade cards and aces = (13 + 4 – 1) = 16

Therefore, P(getting a spade or an ace card) = $\frac{16}{52}$ = $\frac{4}{13}$

(ii) Number of red kings = 2

Therefore, P(getting a red king) = $\frac{2}{52}$ = $\frac{1}{26}$

(iii) Total number of kings = 4

Total number of queens = 4

Let E be the event of getting either a king or a queen.

Then, the favorable outcomes = 4 + 4 = 8

Therefore, P(getting a king or a queen) = P(E) = $\frac{8}{52}$ = $\frac{2}{13}$

(iv) Let E be the event of getting either a king or a queen. Then, (not E) is the event that drawn card is neither a king nor a queen.

Then, P(getting a king or a queen) = $\frac{2}{13}$

Now, P(E) + P(not E) = 1

Therefore, P(getting neither a king nor a queen) = 1 – $\frac{2}{13}$ = $\frac{11}{13}$

QUESTION 2:A box contains 25 cards numbers from 1 to 25. A card is drawn at random from the bag. Find the probability that the number on the drawn card is

(i) divisible by 2 or 3,

(ii) a prime number.

Solution:

Total number of outcomes = 25

(i) Let E_1 be the event of getting a card divisible by 2 or 3.

Out of given numbers, numbers divisible by 2 are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 and 24.

Out of the given numbers, numbers divisible by 3 are 3, 6, 9, 12, 15, 18, 21 and 24.

Out of the given numbers, numbers divisible by both 2 and 3 are 6, 12, 18 and 24.

Number of favorable outcomes = 16

Therefore, P(getting a card divisible by 2 or 3) = $P(E_1) = \frac{\text{Number of outcomes favorable to } E_1}{\text{Number of all possible outcomes}} = \frac{16}{25}$

Thus, the probability that the number on the drawn card is divisible by 2 or 3 is $\frac{16}{25}$.

(ii) Let E_2 be the event of getting a prime number.

Out of the given numbers, prime numbers are 2, 3, 5, 7, 11, 13, 17, 19 and 23.

Number of favorable outcomes = 9

Therefore, P(getting a prime number) = $P(E_2) = \frac{\text{Number of outcomes favorable to } E_2}{\text{Number of all possible outcomes}} = \frac{9}{25}$

Thus, the probability that the number on the drawn card is a prime number is $\frac{9}{25}$.