Probability

1. **Experiment:**
   An operation which can produce some well-defined outcomes is called an 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:
   i. Rolling an unbiased dice.
   ii. Tossing a fair coin.
   iii. Drawing a card from a pack of well-shuffled cards.
   iv. Picking up a ball of certain colour from a bag containing balls of different colours.
   Details:
   v. When we throw a coin, then either a Head (H) or a Tail (T) appears.
   vi. 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.
   vii. 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**.
   There are 4 honours of each unit.
   There are **Kings, Queens and Jacks**. These are all called **face cards**.

3. **Sample Space:**
   When we perform an experiment, then the set S of all possible outcomes is called the **sample space**.
   Examples:
   1. In tossing a coin, S = {H, T}
   2. If two coins are tossed, the S = {HH, HT, TH, TT}.
   3. In rolling a dice, we have, S = {1, 2, 3, 4, 5, 6}.

Event:

Any subset of a sample space is called an **event**.

Probability of Occurrence of an Event:

Let S be the sample and let E be an event.
Then, E $\subseteq$ S.

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

Results on Probability:

. P(S) = 1
i. $0 \leq P(E) \leq 1$
ii. $P(\phi) = 0$
iii. For any events A and B we have : $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
iv. If A denotes (not-A), then P(A) = 1 - P(A).

1. A bag contains 2 yellow, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

A. 1/2 B. 10/21 C. 9/11 D. 7/11

2. A die is rolled twice. What is the probability of getting a sum equal to 9?

A. 2/3 B. 2/9 C. 1/3 D. 1/9

3. Three coins are tossed. What is the probability of getting at most two tails?

A. 7/8 B. 1/8 C. ½ D. 1/7

4. When tossing two coins once, what is the probability of heads on both the coins?

A. 1/4 B. 1/2 C. 3/4 D. None of these

5. What is the probability of getting a number less than 4 when a die is rolled?

A. 1/2 B. 1/6 C. 1/3 D. 1/4

6. A bag contains 4 black, 5 yellow and 6 green balls. Three balls are drawn at random from the bag. What is the probability that all of them are yellow?

A. 2/91 B. 1/81 C. 1/8 D. 2/81

7. One card is randomly drawn from a pack of 52 cards. What is the probability that the card drawn is a face card(Jack, Queen or King)

A. 1/13 B. 2/13 C. 3/13 D. 4/13

8. A dice is thrown. What is the probability that the number shown in the dice is divisible by 3?

A. 1/6 B. 1/3 C. 1/4 D. 1/2

9. John draws a card from a pack of cards. What is the probability that the card drawn is a card of black suit?

A. 1/2 B. 1/4 C. 1/3 D. 1/13

10. There are 15 boys and 10 girls in a class. If three students are selected at random, what is the probability that 1 girl and 2 boys are selected?

A. 1/40 B. 1/2 C. 21/46 D. 7/42

11. What is the probability of selecting a prime number from 1,2,3,.. 10 ?

A. 2/5 B. 1/5 C. 3/5 D. 1/7

12. 3 balls are drawn randomly from a bag contains 3 black, 5 red and 4 blue balls. What is the probability that the balls drawn contain balls of different colors?

A. 3/11 B. 1/3 C. 1/2 D. 2/11

13. 5 coins are tossed together. What is the probability of getting exactly 2 heads?

A. 1/2 B. 5/16 C. 4/11 D. 7/16

14. What is the probability of drawing a "Queen" from a deck of 52 cards?

A. 1/2 B. 1/13 C. 1/6 D. 1/3

15. A card is randomly drawn from a deck of 52 cards. What is the probability getting an Ace or King or Queen? A. 3/13 B. 2/13 C. 1/13 D. 1/2

16. When two dice are rolled, what is the probability that the sum is either 7 or 11?

A. 1/4 B. 2/5 C. 1/9 D. 2/9

17. A card is randomly drawn from a deck of 52 cards. What is the probability getting either a King or a Diamond? A. 4/13 B. 2/13 C. 1/3 D. 1/2

18. John and Dani go for an interview for two vacancies. The probability for the selection of John is 1/3 and whereas the probability for the selection of Dani is 1/5. What is the probability that none of them are selected?

A. 3/5 B. 7/12 C. 8/15 D. 1/5