PROBABLITY

The application or uses of probability can be seen in quantitative aptitude as well as i n daily life. It is needful to learn the basic concept of probability. We will cover the ba sics as well as the hard level problems for all levels of students for all competitive exa ms especially SBI PO, SBI CLERK, IBPS PO, IBPS CLERK, RRB PO, NICL AO, LIC AAO, SNAP, MAT, SSC CGL etc.

Definition:

Probability means the possibility or chances of an event occurring or happening.
For example, when a coin is tossed, then we will get ahead or tail. It is a state of proba bility.

In an event, the happening probability is equal to the ratio of favourable outcomes to t he total number of possible outcomes.
It represents as,

$$\text{Number of favourable outcomes} = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}}$$

Sample Space:-

It is a set of all possible outcomes of an experiment. It is denoted by S.
For example,
the Sample space of a die, S = [1, 2, 3 , 4, 5, 6]
The Sample space of a coin, S= [Head, Tail]

Types of questions asked in the competitive exam:

1) Based on Coins

2) Based on Dice

3) Based on playing Cards

4) Based on Marbles or balls

5) Miscellaneous

Important Questions:

1. Question

A coin is thrown two times .what is the probability that at least one tail is obtained?

A) 3/4

B) 1/4

C) 1/3

D) 2/3

E) None of these

Answer :- A

Sol:

Sample space = [TT, TH, HT,HH]

Total number of ways = $2 \times 2 = 4$.

Favourite Cases = 3

P (A) = 3/4

Tricks:-

P (of getting at least one tail)

= 1 – P (no head)$\Rightarrow$ 1 – 1/4 = 3/4

2. Question

What is the probability of getting a numbered card when drawn from the pack of 52 ca rds?

A) 1/13

B) 1/9

C) 9/13

D) 11/13

E) None of these

Answer :- C

Sol:

Total Cards = 52.

Numbered Cards = 9 (2,3,4,5,6,7,8,9,10) in each suit

Numbered cards in four suit = 4 ×9 = 36

P (E) = 36/52 = 9/13

3.Question

There are 7 purple clips and 5 brown clips. Two clips are selected one by one without replacement. Find the probability that the first is brown and the second is purple.

A) 1/35

B) 35/132

C) 1/132

D) 35/144

E) None of these

Answer :- B

Sol:

P (B) × P (P) = (5/12) x (7/11) = 35/132

4.Question

Find the probability of getting a sum of 8 when two dice are thrown?

A) 1/8

B) 1/5

C) 1/4

D) 5/36

E) 1/3

Answer

Sol:

Total number of ways = 6 × 6 = 36 ways.

Favorable cases = (2 , 6) (6, 2) (3, 5) (5, 3) (4, 4) — 5 ways.

P (A) = 5/36 = 5/36

5.Question

Find the probability of an honour card when a card is drawn at random from the pack of 52 cards.

A) 4/13

B) 1/3

C) 5/12

D) 7/52

E) None of these

Answer :-A

Sol:

Honor cards = 4 (A, J, Q, K) in each suit

Honor cards in 4 suit = 4 × 4 = 16

P (honor card) = 16/52 = 4/13

6. Question

What is the probability of a face card when a card is drawn at random from the pack o f 52 cards?

A) 1/13

B) 2/13

C) 3/13

D) 4/13

E) 5/13

Answer :-C

Solution:

face cards = 3 (J,Q,K) in each suit

Face cards in 4 suits = 3 × 4 = 12 Cards.

P (face Card) = 12/52 = 3/13

7.Question

If two dice are rolled together then find the probability as getting at least one ‘3’?

A) 11/36

B) 1/12

C) 1/36

D) 13/25

E) 13/36

Answer :- A

Sol:

Total number of ways = 6 × 6 = 36.

Probability of getting number ‘3′ at least one time

= 1 – (Probability of getting no number 4)

= 1 – (5/6) x (5/6)

= 1 – 25/36

= 11/36

8. Question

If a single six-sided die is rolled then find the probability of getting either 3 or 4.

A) 1/2

B) 1/3

C) 1/4

D) 2/3

E) 1/6

Answer:- B

Solution:-

Total outcomes = 6

Probability of getting a single number when rolled a die = 1/6

So, P(3) = 1/6 and P(4) = 1/6

Thus, the probability of getting either 3 or 4

= P(3)+P(4)

= 1/6 + 1/6

= 1/3

9. Question

A container contains 1 red, 3 black, 2 pink and 4 violet gems. If a single gem is chose n at random from the container, then find the probability that it is violet or black?

A) 1/10

B) 3/10

C) 7/10

D) 9/10

E) None of these

Answer :-C

Sol :-

Total gems =(1 + 3 + 2 + 4) = 10

probability of getting a violet gem = 4/10

Probability of getting a black gem = 3/10

Now, P (Violet or Black) = P(violet) + P(Black)

= 4/10 + 3/10

= 7/10

10.Question

A jar contains 63 balls (1,2,3,……., 63). Two balls are picked at random from the jar one after one and without any replacement. what is the probability that the sum of bot h balls drawn is even?

A) 5/21

B) 3/23

C) 5/63

D) 19/63

E) None of these

Answer :- A

Sol.

Total balls = 63

Total even balls = 31 (2 , 4 , 6,……., 62)

Now the required probability

$=^{31}C_2/63C_2$

= (31!/2!29!)/(63!/2!61!)

= (31 × 30/1× 2)/(63×62/1×2)

= (31 × 30)/(63×62)

= 30/63×2

= 5/21

11.Question

There are 30 students in a class, 15 are boys and 15 are girls. In the final exam, 5 boys and 4 girls made an A grade. If a student is chosen at random from the class, what is t he probability of choosing a girl or an ‘A grade student?

A) 1/4

B) 3/10

C) 1/3

D) 2/3

E) None of these

Answer:- D

Sol:

Here, the total number of boys = 15 and the total number of girls = 15

Also, girls getting A grade = 4 and boys getting an A grade = 5

Probability of choosing a girl = 15/30

Probability of choosing A grade student= 9/30

Now, an A-grade student chosen can be a girl.

So the probability of choosing it = 4/30

Required probability of choosing a girl or an A grade student

= 15/30 + 9/30 – 4/30

= 1/2 + 3/10 – 2/15
= 2/3

12. Question

What is the probability when a card is drawn at random from a deck of 52 cards is either an ace or a club?

A) 2/13
B) 3/13
C) 4/13
D) 5/23
E) None of these

Answer:- C

Sol:

There are 4 aces in a pack, 13 club cards and 1 ace of club card.

Now, the probability of getting an ace = 4/52

Probability of getting a club = 13/52

Probability of getting an ace of club = 1/52

Required probability of getting an ace or a club

= 4/52 + 13/52 – 1/52
= 16/52
= 4/13

13. Question

One card is drawn from a deck of 52 cards well shuffling. Calculate the probability that the card will not be a king.

A) 12/13

B) 3/13

C) 7/13

D) 5/23

E) None of these

Answer:- A

Solution:

Well-shuffling ensures equally likely outcomes.

Total king of a deck = 4

The number of favourable outcomes F= 52 – 4 = 48

The number of possible outcomes = 52

Therefore, the required probability

= 48/52 = 12/13

14.Question

If P(A) = 7/13, P(B) = 9/13 and P(A∩B) = 4/13, find the value of P(A|B).

A) 1/9

B) 2/9

C) 3/9

D) 4/9

E) None of these

Answer :- D

Solution:

$P(A|B) = P(A \cap B)/P(B) = (4/13)/(9/13) = 4/9$.

15. Question

A one rupee coin and a two rupee coin are tossed once, then calculate a sample space.

A) [HH, HT, TH, TT]

B) [HH, TT]

C) [TH, HT]

D) [HH, TH, TT]

E) None of these

Answer:- A

Solution:

The outcomes are either Head (H) or tail(T).

Now,heads on both coins = (H,H) = HH

Tails on both coins = (T, T) = TT

Probability of head on one rupee coin and Tail on the two rupee coins = (H, T) = HT

And Tail on one rupee coin and Head on the two rupee coin = (T, H) = TH

Thus, the sample space ,S = [HH, HT, TH, TT]

16. Question

There are 20 tickets numbered 1 to 20. These tickets are mixed up and then a ticket is

drawn at random. Find the probability that the ticket drawn has a number which is a m ultiple of 4 or 5?

A) 1/4
B) 2/13
C) 8/15
D) 9/20
E) None of these

Answer: E

Solution:

Here, S = {1, 2, 3, 4, …., 19, 20} = 20

Multiples of 4: 4, 8, 12, 16, 20 (5 tickets)
Multiples of 5: 5, 10, 15, 20 (4 tickets)

Notice that ticket number 20 is a multiple of both 4 and 5, so we have counted it twice . Therefore, we need to subtract one from the total count.

Total number of tickets with numbers that are multiples of 4 or 5: 5 + 4 – 1 = 8

The total number of tickets is 20, so the probability of drawing a ticket with a number that is a multiple of 4 or 5 is:

P = 8/20 = 2/5 = 0.4

Therefore, the probability that the ticket drawn has a number which is a multiple of 4 or 5 is 0.4 or 40%.

Direction (17 – 19):-

In a school the total number of students is 300, 95 students like chicken only, 120 stud ents like fish only, 80 students like mutton only and 5 students do not like anything ab ove. If randomly one student is chosen, find the probability that

17) The student likes mutton.

18) he likes either chicken or mutton

19) he likes neither fish nor mutton.

Solution(17-19):-

The total number of favourable outcomes = 300 (Since there are 300 students altogeth er).

The number of times a chicken liker is chosen = 95 (Since 95 students like chicken).

The number of times a fish liker is chosen = 120.

The number of times a mutton liker is chosen = 80.

The number of times a student is chosen who likes none of these = 5.

17. Question

Find the probability that the student like mutton?

A) 3/10
B) 4/15
C) 1/10
D) 1/15
E) None of these

Answer:- B

Solution:-

Therefore, the probability of getting a student who likes mutton

= 80/300

= 4/15

18. Question

What is the probability that the student likes either chicken or mutton?

A) 7/12

B) 5/12

C) 3/4

D) 1/12

E) None of these

Answer:- A

Solution:-

The probability of getting a student who likes either chicken or mutton

= (95+80)/300

= 175/300

= 7/12

19. Question

Find the probability that the student likes neither fish nor mutton.

A) 1/2

B) 1/5

C) 1/3

D) 1/4

E) 1/6

Answer:- C

Solution:-

The probability of getting a student who likes neither fish nor mutton

= (300–120−80)/300

= 100/300

= 1/3

Direction (20-22):-

A box contains 90 number plates numbered 1 to 90. If one number plate is drawn at ra ndom from the box then find out the probability that

20) The number is a two-digit number

21) The number is a perfect square

22) The number is a multiply of 5

20. Question

Find the probability that the number is a two-digit number.

A) 1/9

B) 1/10

C) 9/10

D) 7/10

E) None of these

Answer:-C

Solution :

Total possible outcomes = 90 (Since the number plates are numbered from 1 to 90).

Number of favourable outcomes

= 90 – 9 = 81 (here, except 1 to 9, other numbers are two-digit number.)

Thus required probability

= Number of Favourable Outcomes /Total Number of Possible Outcomes

= 81/90

= 9/10.

21. Question

What is the probability that the number is a perfect square?

A) 1/9

B) 1/10

C) 9/10

D) 1/7

E) None of these

Answer:- B

Solution:-

Total possible outcomes = 90.

Number of favourable outcomes = 9 [here 1, 4, 9, 16, 25, 36, 49, 64 and 81 are the pe rfect squares]

Thus the required probability = 9/90 =1/10

22.Question

Find the probability that the number is a multiple of 5.

A) 1/5

B) 1/6

C) 1/10

D) 1/8

E) 9/10

Answer:- A

Solution:-

Total possible outcomes = 90.

Number of favourable outcomes = 18 (here, 5 × 1, 5 × 2, 5 × 3, …., 5 × 18 are multip le of 5).

Thus, the required probability= 18/90 =1/5