Question 1: An event is not likely to happen. Its probability is closest to
(A) 0.0001
(B) 0.001
(C) 0.01
(D) 0.1
Answer 1: (A) 0.0001
Explanation:
The probability for the event which is not likely to happen is closest to zero, and from the given alternative, 0.0001 is closest to zero.
So, the correct answer is an option (A).

Question 2. When an event cannot occur, its probability is
(A)1
(B) ¾
(C) ½
(D) 0
Answer 2: (D) 0
Explanation:
The event which cannot occur is called an impossible event.
The probability of an impossible event is zero.Therefore, the probability is 0.
So, option (D) is correct.

Question 3. Which among the following cannot be the probability of an event?
(A)1/3
(B) 0.1
(C) 3%
(D)17/16
Answer 3: (D)17/16
Explanation:
The probability for the event always lies between 0 and 1.
Probability for the event cannot be more than 1 or negative as (17/16) > 1
So, option (D) is correct

Question 4: When the probability for the event is p, the probability of the complementary event will be
(A) $p – 1$
(B) p
(C) $1 – p$
(D) 1-1/p
Answer 4: (C) $1 – p$
Explanation:
As the probability for the event + probability for the complimentary event = 1
It can be written as
Probability for the complimentary event = (1 – Probability for the an event) = $1 – p$
Thus, the correct answer is an option (C).

Question 5: The probability expressed as the percentage for the particular occurrence can never be
(A) less than 100
(B) less than 0

(C) greater than 1
(D) anything but the whole number
Answer 5: (B) less than 0
Explanation:
We are aware that the probability expressed as a percentage always lies between 0 and 100. Thus, it cannot be less than 0.
Thus, the correct answer is an option (B).

Question 6: When you P(A) denotes the probability for the event A, then
(A) P(A) < 0
(B) P(A) > 1
(C) 0 ≤ P(A) ≤ 1
(D) –1 ≤ P(A) ≤1
Answer 6: (C) 0 ≤ P(A) ≤ 1
Explanation:
The probability for the event always lies between 0 and 1.
we conclude that a correct answer is an option (C).

Question 7: A card has been selected from a deck of 52 cards. The probability for the being the red face card is
(A) 3/26
(B)3/13
(C) 2/13
(D) 1/2
Answer 7: (A) 3/26
Explanation:
In a deck for the 52 cards, there are 12 face cards that are 6 red and 6 black cards.
Hence, probability for getting a red face card = 6/52 = 3/26.
we conclude a correct answer is an option (A).

Question 8: The probability, which is a non-leap year selected at random, will contain 53 Sundays is
(A) 1/7
(B) 2/7
(C)3/7
(D) 5/7
Answer 8: (A) 1/7
Explanation:
A non-leap year has 365 days and thus 52 weeks and 1 day. This 1 day may be Sunday, Monday, Tuesday, Wednesday or Thursday or Friday, or Saturday.
Hence, out of 7 possibilities, 1 favourable event is the event that the one day is Sunday.
The required probability = 1/7
So, the correct answer is an option (A).

Question 9: When the die is thrown, the probability for the getting an odd number less than 3 is
(A) 1/6
(B) 1/3
(C) 1/2
(D) 0

Answer 9: (A) 1/6
Explanation :
If the die is thrown, then the total number of outcomes = 6
The odd number less than 3 is 1 only. Number of possible outcomes = 1
The required probability =1/6
we conclude the correct answer is an option (A).

Question 10: A card is drawn for the deck of 52 cards. The event E so that card is not the ace for the hearts. The number for the outcomes favourable to E is
(A) 4
(B) 13
(C) 48
(D) 51
Answer 10: (D) 51
Explanation :
In the deck of 52 cards, there are 13 cards of the heart, and 1 is the ace of the heart.
thus, the number of outcomes favourable to E = 52 − 1 = 51
Therefore, the correct answer is an option (D).

Question 11: The probability for getting a bad egg in a lot for the 400 is 0.035. The number for the bad eggs in the lot is
(A) 7
(B) 14
(C) 21
(D) 28
Answer 11: (B) 14
Explanation:
The total number of eggs = 400
Probability for the getting a bad egg = 0.035
Probability for the getting bad egg = Number for the bad eggs / Total number of eggs
⇒ Probability for the getting bad egg = Number for the bad eggsTotal number of eggs
⇒0.035 = Number for the bad eggs / 400
Number for the bad eggs = 0.035 × 400 = 14
Thus, the correct answer is option (B).

Question 12: A girl calculates that the probability of winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought?
(A) 40
(B) 240
(C) 480
(D) 750
Answer 12: (C) 480
Explanation: Given that,
The total number for sold tickets = 6000
Assume that girl bought X tickets.
probability for winning the first prize is given as,
X / 6000=0.08
X = 480
Thus, the correct answer is option (C).

Question 13: One ticket was drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is
(A) 1/5
(B) 3/5
(C)4/5
(D) 1/3
Answer 13: (A) 1/5
Explanation:
The number of total outcomes = 40
Multiples of 5 between 1 to 40 = 5, 10, 15, 20, 25, 30, 35, 40
Total number for the possible outcomes = 8
Required probability = 8/40 = ⅕
Therefore, the correct answer is Option (A).

Question 14: Someone is asked to take the number from 1 to 100. The probability which is a prime is
(A) 1/5
(B) 6/25
(C) 1/4
(D) 13/50
Answer 14: (C) 1/4
Explanation:
Total numbers for the outcomes = 100
Thus, the prime numbers for the 1 to 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 56, 61, 67, 71, 73, 79, 83, 89 and 97.
Total number of possible outcomes = 25
Required probability =25/100 = ¼
Therefore, the probability that it is a prime is ¼
we conclude a correct answer is an option (C).

Question 15: The school has five houses A, B, C, D, and E. A class has 23 students, 4 from house A, 8 from house B, 5 from house C, 2 from house D, and the rest from house E. A single student is selected at random to be the class monitor. The probability of the selected student is not among A, B, and C is
(A) 4/23
(B) 6/23
(C) 8/23
(D) 17/23
Answer 15: (B) 6/23
Explanation:
Total **number for students = 23**
Number for the students in houses A, B and C = 4 + 8 + 5 = 17
Remaining students = 23 − 17 = 6
Thus, probability that the selected student is not from houses A, B and C = 6/23
Therefore, the correct answer is option (B).

Question 16: In a family that has three children, there might be no girl, one girl, two girls, or three girls. Hence, the probability for each is 1/4. Is this correct? Justify your answer.
Answer 16:

No, the probability for each is not 1/4.
Let the boys be B and girls be G.
Outcomes could be {BBB, GGG, BBG, BGB, GBB, GGB, GBG, BGG}.
The total number for the outcomes = 8
Thus,
P(No girl) = 1/8
P(1 girl) = 3/8
P(2 girls) = 3/8
P(3 girls) = 1/8

Question 17: Apoorv throws two dice once as well as computes the product for the numbers appearing on the dice. Peehu throws one die as well as squares the number which appears on it. Who has the better chance of getting the number 36? Why?
Answer 17:
Apoorv has thrown two dice once.
Thus, the total number for the outcomes is 62 = 36
The number for the outcomes for getting product 36 = 1 (6 × 6)
Probability for Apoorv = 1/36
Peehu threw one die.
Thus, the total number for the outcomes is 6
The number for the outcomes for getting square 36 = 1 (62)
Probability of Peehu = 1/6
T Therefore, Peehu has a better chance of getting the number 36.

Question 18: When we toss the coin, there are two possible outcomes – Head or tail. Thus, the probability of each outcome is 1/2. Justify your answer.
Answer 18:
Yes, the probability of each outcome is ½ as the head and tail both are equally likely events.

Question 19: A student says that when you throw a die, it will show up 1 or not 1. Hence, the probability for getting 1 and the probability for getting 'not 1' each is equal to 1/2. Is this correct? State reason.
Answer 19:
No, this is not correct.
Suppose we throw the die, then the total number **for the** outcomes = 6
For the possible outcomes = 1 or 2 or 3 or 4 or 5 or 6
Probability for the getting 1 = ⅙
Then, the probability for the getting, not 1 = 1 – Probability for getting 1
= 1-1/6
= ⅚

Question 20: I toss the three coins together. The possibilities for the outcomes are no heads, 1 head, 2 heads as well as 3 heads. So, I say that the probability for the no heads is 1/4. What is wrong with the given conclusion?
Answer 20:
Total number for the outcomes = 23 = 8
Possible outcomes are (HHH), (HTT), (THT), (TTH), (HHT), (THH), (HTH), and (TTT).
Then, the probability for the getting no head = ⅛
So, the given conclusion is wrong as the probability for the no head is 1/8.

Question 21: When you toss a coin 6 times, and it comes down heads on each occasion tossed, can you say that the probability for getting the head is 1? State reasons.

Answer 21:

No, when we toss a coin, the possible outcomes are head or tail.
Both the events are equally likely.
Hence, the probability is 1/2.
When we toss the coin six times, the probability will be the same in each case.
Thus, the probability of getting the head is not 1.

Question 22: A bag has slips numbered from 1 to 100. When Fatima chooses the slip at random from the bag, it will either have an odd number or an even number. Since the situation has only two possible outcomes, therefore, the probability for each is 1/2. Give justification.

Answer 22 :

We have numbers between 1 to 100. Half the numbers are even, as well as half the numbers are odd is 50 numbers that are (2, 4, 6, 8, …, 96, 98, 100) even, as well as 50 numbers that are (1, 3, 5, 7, …, 97, 99) odd.
Thus, both the events are equally likely.
Hence, the probability for the getting an even number = 50/100 = ½
Also, probability for the getting odd number = 50/100 = ½
Therefore, the probability of each is 1/2.

Question 23: The coin is tossed two times. Find out the probability for getting at most one head.

Answer 23:

The possibility of outcomes, when a coin is tossed 2 times are
S = {(HH), (TT), (HT), (TH)}
n(S) = 4
Let E = Event for the getting at most one head = {(TT), (HT), (TH)}
n(E) = 3
Therefore, required probability = n(E)/n(S)=3/4.

Question 24. Complete the following sentences:
(i) Probability for the event E + Probability for the event 'not E' = ___________.
(ii) The probability for the event that cannot happen is __________. Such an event is known as________.
(iii) The probability for the event that is certain to happen is _________. Such an event is known as _________.
(iv) The sum for the probabilities of all the elementary events for the experiment is __________.
(v) The probability for the event is greater than or same as ___ and less than or same as__________.

Answer 24:

(i) Probability for the event E + Probability for the event 'not E' = 1.
(ii) The probability for the event that cannot happen is 0. Such an event is known as an impossible event.
(iii) The probability for the event that is certain to happen is 1. Such an event is known as a sure or certain event.
(iv) The sum for the probabilities of all the elementary events for the experiment is 1.
(v) The probability for the event is greater than or same as 0 and less than or same as 1.

Question 25. Why is tossing the coin considered to be a fair way for deciding which team shall bring the ball at the beginning of the football game?
Answer 25:
Tossing for the coin is a fair way of deciding as the number for the possible outcomes is only 2, that is, either head or tail. As these two outcomes are equally likely outcomes, tossing is unpredictable as well as considered to be completely unbiased.

Question 26. Which among the following cannot be the probability for the event?
(A) 2/3 (B) -1.5 (C) 15% (D) 0.7
Answer 26:
The probability for the event (E) always lies between 0 and 1, i.e., $0 \leq P(E) \leq 1$. Thus, from the above alternatives, option (B) -1.5 cannot be the probability for the event.

Question 27. When P(E) = 0.05, what is the probability for the 'not E'?
Answer 27:
We have,
P(E)+P(not E) = 1
Given that, P(E) = 0.05
Thus, P(not E) = 1-P(E)
And P(not E) = 1-0.05
P(not E) = 0.95

Question 28. A bag consists of lemon-flavoured candies only. Malini removes one candy without looking into the bag. What is the probability which she takes out
(i) an orange-flavoured candy?
(ii) a lemon-flavoured candy?
Answer 28:
(i) We have a bag that only contains lemon-flavoured candies.
Therefore, the no. of orange-flavoured candies = 0
The probability for the taking out orange-flavoured candies = 0/1 = 0
(ii) Since there are only lemon-flavoured candies, P(lemon-flavoured candies) = 1 (or 100%)

Question 29. It is given that in a group for the 3 students, the probability for the 2 students who do not have the same birthday is 0.992. What is the probability when the 2 students have the same birthday?
Answer 29:
Assume the event where 2 students have the same birthday be E
Given, P(E) = 0.992
We have,
P(E)+P(not E) = 1
And P(not E) = 1–0.992 = 0.008
The probability for the 2 students have the same birthday is 0.008

Question 30. A bag consists of 3 red balls and 5 black balls. A ball is removed at random from the bag. What is the probability for the ball drawn is
(i) red?
(ii) not red?
Answer 30:
The total number for the balls = No. for the red balls + No. of black balls

So, the total no. for the balls = 5+3 = 8
We know that the probability for the event is the ratio between the no. of favourable outcomes and the total number of outcomes.
P(E) = (Number for the favourable outcomes/ Total number for the outcomes)
(i) Probability for the drawing red balls = P (red balls) = (no. for the red balls/total no. of balls) = 3/8
(ii) Probability for the drawing black balls = P (black balls) = (no. of black balls/total no. of balls) = ⅝

Question 31. A game consists of tossing the one rupee coin three times as well as noting the outcome each time. Hanif wins when all the tosses give the same result, that is, three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.
Answer 31:
The total number for the outcomes = 8 (HHH, HHT, HTH, THH, TTH, HTT, THT, TTT)
Total outcomes for which Hanif will lose the game = 6 (HHT, HTH, THH, TTH, HTT, THT)
P (lose the game) = 6/8 = ¾ = 0.75
Therefore, the probability that Hanif will lose the game is 0.75

Question 32. A bag consists of 5 red balls and some blue balls. When the probability for drawing a blue ball
is double for the red ball, determine the number for the blue balls in the bag.
Answer 32:
It is given that the total number for the red balls = 5
Assume the total number for the blue balls = x
Hence, the total no. of balls = x+5
P(E) = (Number for the favourable outcomes/ Total number of outcomes)
P (drawing the blue ball) = [x/(x+5)] ———(i)
Same as,
P (drawing the red ball) = [5/(x+5)] ———(i)
From the equation (i) and (ii)
x = 10
Hence, the total number for blue balls are = 10

Question 33. A jar consists of 24 marbles, some are green as well as others are blue. When marble is drawn at random from the jar, the probability for the green is ⅔. Find out the number for the blue balls in the jar.
Answer 33:
The Total marbles = 24
Assume the total green marbles = x
Thus, the total blue marbles = 24-x
P(getting green marble) = x/24
From the given question, x/24 = ⅔
Hence, the total green marbles = 16
Therefore, the total blue marbles = 24-16 = 8

Question 34. A die is numbered in a way that the faces show the numbers 1, 2, 2, 3, 3, and 6. It is thrown two times, as well as the total score in two throws, is noted. Complete the following table. It gives a few values for the total score on the two throws:
What is the probability for the total score is

(i) even?
(ii) 6?
(iii) at least 6?
Answer 34:
The table is as follows:

+	1	2	2	3	3
1	2	3	3	4	4
2	3	4	4	5	5
2	3	4	4	5	5
3	4	5	5	6	6
3	4	5	5	6	6
6	7	8	8	9	9

Thus, the total number for the outcomes = 6×6 = 36
(i) E (Even) = 18
P (Even) = 18/36 = ½
(ii) E (addition is 6) = 4
P (addition is 6) = 4/36 = 1/9
(iii) E (addition is at least 6) = 15
P (addition is at least 6) = 15/36 = 5/12

Question 35. A die is thrown once. Find out the probability for getting a prime number.
Answer 35: Total possible events if a dice is thrown = 6 (1, 2, 3, 4, 5, and 6)
P(E) = (Number for the favourable outcomes/ Total number of outcomes)
Total number for the prime numbers = 3 (2, 3 and 5)
P (getting a prime number) = 3/6 = ½

Question 36. Five cards are the ten, jack, queen, king, and an ace for the diamonds are well-shuffled with their face downwards. One card is picked up at random. When the queen is taken out and put aside, what is the probability that the second card picked up is a queen?
Answer 36:
Total numbers for the cards = 5
P(E) = (Number for the favourable outcomes/ Total number of outcomes)
When the queen is taken out and put aside, the total numbers for the cards left is (5-4) = 4
Total numbers for the queen = 0
P (picking a queen) = 0/4 = 0

Question 37. 12 defective pens are accidentally mixed by 132 good ones. It is not possible to just look for the pen and tell if or not it is defective. One pen is removed at random from the lot. Finding out the probability that the pen is taken out is a good one.

Answer 37: Numbers for the pens = Numbers for the defective pens + Numbers for the good pens

∴ Total number for the pens = 132+12 = 144 pens

P(E) = (Number for the favourable outcomes/ Total number for the outcomes)

P (pickup a good pen) = 132/144 = 11/12 = 0.916

Question 38. A lot consists of 144 ball pens, in which 20 are defective, and the others are good. Nuri will buy a pen when it is good but will not buy it when it is defective. The shopkeeper draws one pen at random to give it to her. What is the probability that she would not buy it?

Answer 38: The total numbers having outcomes, i.e., pens = 144

Given that numbers having defective pens = 20

∴ The numbers having non-defective pens = 144-20 = 124

P(E) = (Number having favourable outcomes/ Total number of outcomes)

Total numbers of events for which she will not buy them = 20

Thus, P for (not buying) = 20/144 = 5/36

Question 39. When two coins are tossed simultaneously, there are three possible outcomes, i.e., two heads, two tails, or one for each. Hence, for each of the outcomes, the probability is ⅓

Answer 39: The possibility for the events are (H,H); (H,T); (T,H) and (T,T)

Thus, P for (getting two heads) = ¼

also,

P for (getting one of the each) = 2/4 = ½

The statement is incorrect.

Question 40. When a die is thrown, there are two possible outcomes that are an odd number or an even number. Thus, the probability for getting an odd number is 1/2

Answer 40:

As the two outcomes are equally likely, the statement is correct.

Question 41. The probability for the event that will surely happen is. This event is called.

Answer 41: The probability for the event that is certain to happen is 1. This event is called a sure or a certain event.

Question 42. A box consists of 5 red marbles, 8 white marbles, and 4 green marbles. One marble is taken out from the box randomly. What is the probability that the marble removed will be red?

Answer 42:

The Total no. for balls = 5+8+4 = 17

P(E) = (Number for favourable outcomes/ Total number for outcomes)

Total number for the red balls = 5

P for (red ball) = 5/17 = 0.29

Question 43. A piggy bank consists of hundred 50p coins, fifty ₹1 coins, twenty ₹2 coins, and ten ₹5 coins. When it is equally likely for one of the coins, it will fall out if the bank is turned upside down. What will be the probability that the coin will be a 50 p coin?

Answer 43: Total no. for coins = 100+50+20+10 = 180

P(E) = (Number for favourable outcomes/ Total number for outcomes)

Total number for 50 p coin = 100
P for (50 p coin) = 100/180 = 5/9

Question 44. Two coins are tossed simultaneously. The student argues that there are 11 possibilities of outcomes for the sum for the numbers on two dice: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. Thus, each of them has a probability of 1/11. Do you agree with the argument?
Answer 44: The student's argument that there are 11 possible outcomes is correct, but the outcomes are not equally likely. Hence, each of the outcomes would not have an equal probability **for** 11/36.
As a result, the student's argument is incorrect.

Question 45. For a family of 3 children, find out the probability of having at least one boy.
Answer 45:
The probability of each child being a boy will be 1/2.
The probability of each child being a girl will be 1/2.
Probability of no boys = 1/2 × 1/2 × 1/2 = 1/8
Probability of at least 1 boy = 1 – Probability of no boys = 1 – 1/8 = 7/8
or
The number of the possibilities is as given below:

- Probability of 0 boys = 1/8
- Probability of 1 boy = 3 × 1/8 = 3/8
- Probability of 2 boys = 3 × 1/8 = 3/8
- Probability of 3 boys = 1/8

So the probability of at least 1 boy is equal to the probability of 1 or 2 or 3 boys.
i.e. = 3/8 + 3/8 + 1/8 = 7/8.

Question 46. A letter of the English alphabet is chosen at random. Find out the probability that the chosen letter is a consonant.
Answer 46:
Total English alphabets are = 26
The number of consonants is = 21
So, P for (letter is a consonant) = 21/26

Question 47. A card is drawn at random in a well-shuffled pack of 52 playing cards. Find out the probability of getting neither a red card nor a queen.
Answer 47:
For S = 52
P for (neither a red card nor a queen)
= 1 – P for (red card or a queen)
[Red card = 26, Red Queen = 2, Queen = 4]
= 1 – [(26+4+2)/52]
= 1 – (28/52)
= 24/52
= 6/ 13

Question 48. A box consists of cards numbered 6 to 50. A card is drawn randomly from the box. The probability with the drawn card has a number that is a complete square is.
Answer 48:
Total number for cards = 50 – 6 + 1 = 45
complete square numbers are 9, 16, 25, 36, 49, that is
5 numbers
Thus, P for (a perfect square) = 5/45 =1/9

Question 49: The probability for selecting a rotten apple at random from a heap of 900 apples is 0.18. What is the number of rotten apples in a heap?
Answer 49:
Given,
Total number having apples in the heap = n(S) = 900
Let E be the event for selecting a rotten apple from the heap.
Number having outcomes favourable to E = n(E)
P(E) = n(E)/n(S)
0.18 = n(E)/900
⇒ n(E) = 900 × 0.18
⇒ n(E) = 162
Thus, the number having rotten apples in a heap = 162

Question 50. A die is thrown with repetition until a six comes up. What is the sample space of the experiment? HINT: A={6}, B={1,2,3,4,5,}
Answer 50: The sample space of the given experiment is
{A, BA, BBA, BBBA, BBBBA)

Question 51. Two dice are thrown together. Find out the probability of getting it.
(i) same number on both the dice.
(ii) different numbers on both the dice.
Answer 51: Total number having possible outcomes = 62 = 36
(i) We now have the same number on both dice.
Hence, the possible outcomes are (1,1), (2,2), (3, 3), (4, 4), (5, 5) and (6, 6).
Number having possible outcomes = 6
So, the required probability = 6/36 = 1/6
(ii) We have different numbers on both the dice.
Thus, the number having possible outcomes
= 36 – Number having possible outcomes for the same number on both the dice
= 36 −6= 30
The required probability is =30/36 = 5/6

Question 52: Two dice are thrown together. What is the probability for the sum of the numbers appearing on the dice is
(i) 7?
(ii) a prime number?
(iii) 1?
Answer 52: Two dice are thrown together. [given]
Thus, the number having possible outcomes = 36
(i) Sum having the numbers appearing on the dice is 7.
Hence, the possible ways are (1, 6), (2,5), (3, 4), (4, 3), (5, 2), and (6, 1).

Number having possible ways = 6
Required probability is = 6/36 =1/6
(ii) Sum having the numbers appearing on the dice is a prime number, i.e., 2, 3, 5, 7, and 11. Thus, the possible ways are (1, 1), (1, 2), (2, 1), (1, 4), (2, 3), (3, 2), (4, 1), (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1), (5, 6) and (6, 5).
Number having possible ways = 15
Required probability is = 15/36 =5/12
(iii) Sum having the numbers appearing on the dice is 1.
This is not possible. Thus its probability is 0.

Question 53: Two dice are thrown simultaneously. Find out the probability for the product having the numbers on the top of the dice is
(i) 6
(ii)12
(iii) 7
Answer 53 : Number having total outcomes = 36
(i) Product having the numbers on the top of the dice is 6.
Thus, the possible ways are (1, 6), (2, 3), (3, 2), and (6, 1).
Number having possible ways = 4
Required probability is = 4/36 = 19
(ii) If the product has the number on the top of the dice is 12.
Thus, the possible ways are (2, 6), (3, 4), (4, 3), and (6, 2).
Number having possible ways = 4
So, the required probability is = 4/36= 19
(iii) Product having the numbers on the top of the dice cannot be 7. Thus, the probability is 0.

Question 54: Two dice are thrown simultaneously as well as the product for the numbers appearing on them is noted. Find out if the probability for the product is less than 9.
Answer 54: Number having total outcomes = 36
When product having numbers appearing on them is less than 9, the possibility of ways (1, 6), (1, 5), (1, 4), (1, 3), (1, 2), (1, 1), (2, 1), (2, 2), (2, 3), (2, 4), (3, 1), (3, 2), (4, 2), (4, 1), (5, 1), (6, 1).
Number having possible ways = 16
Probability = No. having favourable outcomes/Total no. having outcomes
= 16/36
Thus, Required probability is = 16/36 = 4/9

Question 55: A coin is tossed continuously 3 times. List all the possible outcomes. Find out the probability of: .
(i) all heads
(ii) at least 2 heads
Answer 55 : The possibility of outcomes when a coin is tossed 3 times is
For S = {(HHH), (TTT), (HTT), (THT), (TTH), (THH), (HTH), (HHT)}
So, n(S) = 8
(i) Let E1 = Event having getting all heads = {(HHH)}
n(E1) = 1
So, P(E1)=n(E1)/n(S)=1/8
(ii) Let E2 = Event having getting at least 2 heads = {(HHT), (HTH), (THH), (HHH)}
n(E2) = 4

So, P(E2)=n(E2)/n(S)=4/8=½

Question 56: Two dice are thrown simultaneously. Determine the probability of having the difference for the numbers on the two dice is 2.
Answer 56: The total number having sample space in two dice, n(S) = 62=36
Let E be the event for getting the numbers whose difference is 2.
E = {(1, 3), (2, 4), (3, 5), (4, 6), (3, 1), (4, 2), (5, 3), (6, 4)}
So, n(E) = 8
Thus, P(E)=n(E)/n(S)=8/36=2/9

Question 57: A bag consists of 10 red, 5 blue, and 7 green balls. A ball is drawn randomly. Find out the probability that this ball is a
(i) red ball
(ii) green ball
(iii) not a blue ball
Answer 57: No. having a red ball = 10
No. having a blue ball = 5
No. having green balls = 7
When the ball is drawn out of 22 balls (5 blue + 7 green + 10 red), the total number having outcomes is n(S) = 22.
(i) Let E1 = Event for getting a red ball
n(E1) = 10
So, Required probability=n(E1)/n(S)=10/22=5/11
(ii) Let E2 = Event for getting a green ball n(E2) = 7.
So, Required probability=n(E2)/n(S)=7/22
(iii) Let E3 = event for getting a red ball or a green ball..
n(E3) = (10 + 7) = 17
Required probability=n(E3)/n(S)=17/22
Therefore, the required probability of not getting a blue ball is 17/22
Question 58: The king, queen, and jack having clubs are removed from a deck having 52 playing cards and then well shuffled. Now one card is drawn randomly from the remaining cards. Find out the probability for the card is
(i) a heart
(ii) a king
Answer 58 : When we remove one king, one queen and one jack having clubs from 52 cards, the remaining cards left,
For n(S) = 49
(i) Let E1 = Event having getting a heart
n(E1) = 13
So, Required probability is =n(E1)/n(S)=13/49
(ii) Let E2 = Event for getting a king
n(E2) = 3 [As out of 4 kings, one club cards is already removed]
Thus, Required probability is =n(E2)/n(S)=3/49

Question 59: The king, queen, and jack having clubs are removed from a deck of 52 playing cards and then well shuffled. Now one card is drawn randomly from the remaining cards. What is the probability for the card is
(i) a club
(ii) 10 of hearts
Answer 59: (i) Total number having cards = 52 −3 = 49

Let E1 = Event for getting a club

n(E1) = (13 −3) = 10

So, Required probability = n(E1)/n(S)=10/49

(ii) Let E2 = Event having getting 10 of hearts

n(E2) = 1

[In 52 playing cards, only 13 cards are the heart cards, and only one 10 in 13 are the heart cards]

Thus, Required probability = n(E2)/n(S)= 1/49

Question 60: All the jacks, queens, and kings are removed from a deck having 52 playing cards. The remaining cards are well-shuffled, and then one card is drawn randomly. Giving ace a value one similar value for the other cards, find out the probability for the card having the value.

(i) 7

(ii) greater than 7

(iii) less than 7

Answer 60: Out of 52 playing cards, 4 jacks, 4 queens, and 4 kings are removed, for the remaining cards are left,

For n(S) = 52 −3 × 4 = 40.

(i) Let E1 = Event for getting a card which has value is 7

E1 = Card having value 7 may be of a spade, a diamond, a club or a heart

n(E1) = 4

P(E1)=n(E1)/n(S)=4/40=1/10

(ii) Let E2 = Event for getting a card which has value is greater than 7

= Event for getting a card which has value is 8, 9 or 10

n(E2) = 3 × 4 = 12

P(E2)=n(E2)/n(S)=12/40=3/10

(iii) Let E3 = An event for getting a card whose value is less than 7

= An event for getting a card which has value equal to 1, 2, 3, 4, 5 or 6

So, n(E3) = 6 × 4 = 24

So, P(E3) = n(E3) / n (S) = 24/40 = 3/5

Question 61: An integer is chosen for **0 to 100. What is the probability for it is**

(i) divisible by 7?

(ii) not divisible by 7?

Answer 61 : The number having integers between 0 and 100 is n(S) = 99

(i) Let E1 = Event for choosing an integer which is divisible by 7

= Event for choosing and integer which is multiple of 7

= {7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, 98}

n(E1) = 14

P(E1) = n(E1)/n(S) = 14/99

(ii) Let Event for choosing an integer which is not divisible by 7

n(E2) = n(S) −n(E1)= 99 −14 = 85

P(E2) = n(E2)/n(S)=85/99

Question 62: Cards with numbers 2 to 101 are placed in a box. A card is selected randomly. Find out the probability for **the card has**

(i) an even number

(ii) a square number

Answer 62: Total number having out comes for numbers 2 to 101, n(S) = 100

(i) Let E1 = Event for selecting a card which is an even number = {2, 4, 6, …100}

For an AP, $l = a + (n-1)d$, here $l = 100$, $a = 2$ and $d = 2$
$100 = 2 + (n-1)2$
$(n-1) = 49$
$n = 50$
$n(E1) = 50$
Required probability is = n(E1)/n(S)=50/100=1/2
(ii) Let E2 = Event for selecting a card which is a square number
= {4 ,9, 16 ,25, 36, 49, 64, 81, 100}
= {(2)2, (3)2, (4)2, (5)2, (6)2, (7)2, (8)2, (9)2, (10)2}
= n(E2) = 9
So, the required probability = n(E2)/n(S)=9/100

Question 63: A letter of the English alphabet is chosen randomly. Determine the probability for **the letter that is a consonant.**
Answer 63: We are aware,
In English alphabets include, there are (5 vowels + 21 consonants) = 26 letters. Hence, the total number for outcomes in English alphabets is n(S) = 26
Let E = Event for choosing an English alphabet, which is a consonant = {*b, c, d, f, g, h, j, k, l, m, n, p, q, r, s t, v, w, x, y, z*}
n(E) = 21
So, the required probability is
= n(E)/n(S)
= 21/26
Therefore, the probability of choosing an alphabet that is a consonant is 21/26.

Question 64: There are 1000 sealed envelopes in the box, 10 of them consist of a cash prize having Rs 100 each, 100 of them consist of a cash prize of Rs 50 each, and 200 of them consist of a cash prize of Rs 10 each and the rest do not consist of any cash prize. When they are well-shuffled and an envelope is picked out, what is the probability that it consists of no cash prize?
Answer 64 : Total number having sealed envelopes in a box, n(S) = 1000
Number of envelopes having cash prize = 10 + 100 + 200 = 310
Number of envelopes having no cash prize,
n(E) = 1000 −310 = 690
P(E) = n(E)/n(S)=690/1000=69/100

Question 65. Two customers, Shyam and Ekta, are going to a particular shop in the same week (Tuesday through Saturday). Each is equally likely to go to the shop on any day as on another day. What is the probability that both will go to the shop on
(i) the same day?
(ii) consecutive days?
(iii) different days?
Answer 65: As there are 5 days and both can visit the shop in 5 ways each so,
The total number having possible outcomes = 5×5 = 25
(i) The number having favourable events = 5 (Tue., Tue.), (Wed., Wed.), (Thu., Thu.), (Fri., Fri.), (Sat., Sat.)
Thus, P for (both visiting on the same day) = 5/25 = 1/5
(ii) The number having favourable events = 8 (Tue., Wed.), (Wed., Thu.), (Thu., Fri.), (Fri., Sat.), (Sat., Fri.), (Fri., Thu.), (Thu., Wed.), and (Wed., Tue.)
Thus, P for (both visiting on the consecutive days) = 8/25

(iii) P for (both visiting on the different days) = 1-P for (both visiting on the same day)
Hence, P for (both visiting on the different days) = 1-(⅕) = ⅘

Question 66. A box contains 12 balls, for which x are black. If one ball is taken out randomly from the box, what is the probability that it will contain a black ball? If 6 more black balls are added in the box, the probability of drawing a black ball is now double what it was earlier. Find out x

Answer 66: Total number having black balls = x
Total number having balls = 12
P(E) = (Number having favourable outcomes/ Total number having outcomes)
P for (getting black balls) = x/12 ——————-(i)
If 6 more black balls are added,
Total balls become = 18
Total number having black balls = x+6
Then, P for (getting black balls) = (x+6)/18 ——————-(ii)
We have the probability for drawing a black ball is double of what it was earlier
(ii) = 2 × (i)
(x+6)/18 = 2 × (x/12)
x + 6 = 3x
2x = 6
∴ x = 3

Question 67. A box consists of 90 discs that are numbered from 1 to 90. When one disc is drawn randomly from the box, find out the probability for it bears
(i) a two-digit number
(ii) a perfect square number
(iii) a number divisible by 5.

Answer 67:
The total number having discs = 90
P(E) = (Number having favourable outcomes/ Total number for outcomes)
(i) Total number for the discs having two digit numbers = 81
(here, 1 to 9 are single digit numbers and thus, total 2 digit numbers are 90-9 = 81)
P for (bearing a two-digit number) = 81/90 = 9/10 = 0.9
(ii) Total number having perfect square numbers = 9 (1, 4, 9, 16, 25, 36, 49, 64 and 81)
P for (getting the perfect square number) = 9/90 = 1/10 = 0.1
(iii) Total numbers which can be divided with
5 = 18 (5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85 and 90)
P for (getting a number divisible by 5) = 18/90 = ⅕ = 0.2

Question 68. (i) A lot having 20 bulbs contain 4 defective ones. One bulb is drawn randomly from the lot. What is the probability that this bulb will be defective?
(ii) Consider the bulb drawn in (i) is not defective and is not replaced. Now one bulb is drawn randomly from the rest. What is the probability that this bulb is not defective?

Answer 68:
(i) Number having defective bulbs = 4
The total number having bulbs = 20
P(E) = (Number for favourable outcomes/ Total number for outcomes)
∴ Probability for getting a defective bulb = P (defective bulb) = 4/20 = ⅕ = 0.2
(ii) As 1 non-defective bulb is drawn, the total numbers having bulbs left are 19
Thus, the total number for the events (or outcomes) = 19

Number having non-defective bulbs = 19-4 = 15
Hence, the probability for the bulb is not defective = 15/19 = 0.789

Question 69. One card is removed from a well-shuffled deck of 52 cards. Find out the probability for getting
(i) a king of red colour
(ii) a face card
(iii) a red face card
(iv) the jack of hearts
(v) a spade
(vi) the queen of diamonds
Answer 69:
Total number for possible outcomes = 52
P(E) = (Number having favourable outcomes/ Total number having outcomes)
(i) Total numbers having king of red colour = 2
P for (getting a king of red colour) = 2/52 = 1/26 = 0.038
(ii) Total numbers having face cards = 12
P for (getting a face card) = 12/52 = 3/13 = 0.23
(iii) Total numbers having red face cards = 6
P for (getting a king of red colour) = 6/52 = 3/26 = 0.11
(iv) Total numbers having jack of hearts = 1
P for (getting a king of red colour) = 1/52 = 0.019
(v) Total numbers having king of spade = 13
P for (getting a king of red colour) = 13/52 = ¼ = 0.25
(vi) Total numbers having queen of diamonds = 1
P for (getting a king of red colour) = 1/52 = 0.019

Question 70. A bag consists of 5 red balls and some blue balls. When the probability for drawing a blue ball is double that of a red ball, determine the number having blue balls in the bag.
Answer 70: We have the total number for red balls = 5
Let the total number for blue balls = x
Thus, the total no. for balls = x+5
P(E) = (Number for favourable outcomes/ Total number for outcomes)
P for (drawing a blue ball) = [x/(x+5)] ———(i)
In the same way,
P for (drawing a red ball) = [5/(x+5)] ———(i)
From the equation (i) and (ii)
x = 10
Thus, the total number having blue balls = 10

Question 71. A box consists of 12 balls in which x are black. When 6 more black balls are put in the box, the probability of drawing a black ball is now double what it was earlier. Find out x
Answer 71: Total number for black balls = x
Total number for balls = 12
P(E) = (Number for favourable outcomes/ Total number for outcomes)
P for (getting black balls) = x/12 ———————-(i)
If 6 more black balls are added,
Total balls become = 18

Total number for black balls = x+6
Then P for (getting black balls) = (x+6)/18 ——————-(ii)
We have the probability for drawing a black ball now is double of what it was earlier
(ii) = 2 × (i)
(x+6)/18 = 2 × (x/12)
x + 6 = 3x
2x = 6
∴ x = 3

Question 72. A jar consists of 24 marbles, some are green, and others are blue. When marble is drawn randomly from the jar, the probability for it to be green is ⅔. Find out the number of blue balls in the jar.
Answer 72:
Total marbles = 24
Let the total green marbles = x
Thus, the total blue marbles = 24-x
P for (getting green marble) = x/24
From the given question, x/24 = ⅔
Hence, the total green marbles = 16
Also, the total blue marbles = 24-x = 8

Question 73: A bag consists of 15 white and some black balls. When the probability for drawing a black ball from the bag is thrice that of drawing a white ball, find out the number of black balls in the bag.
Answer 73:
Given,
Number having white balls = 15
Let x be the number having black balls.
Total number having balls in the bag = 15 + x
And the probability for drawing a black ball from the bag is thrice that of drawing a white ball.
⇒ x/(15 + x) = 3[15/(15 + x)]
⇒ x = 3 × 15 = 45
So, the number having black balls in the bag = 45.

Question 74: The probability for selecting a blue marble randomly from a jar that contains only blue, black, and green marbles is 1/5. The probability for selecting a black marble randomly from the same jar is 1/4. When the jar consists of 11 green marbles, find out the total number of marbles in the jar.
Answer 74:
Given that,
P for (selecting a blue marble) = 1/5
P for (selecting a black marble) = 1/4
We are aware that the sum for all probabilities of events associated having a random experiment is equal to 1.
Thus, P for (selecting a blue marble) + P for (selecting a black marble) + P for (selecting a green marble) = 1
(1/5) + (1/4) + P for (selecting a green marble) = 1
P for (selecting a green marble) = 1 – (1/4) – (1/5)

= (20 – 5 – 4)/20
= 11/20
P for (selecting a green marble) = number for green marbles/Total number for marbles
11/20 = 11/Total number having marbles {as the number having green marbles in the jar = 11}
Thus, the total number having marbles = 20

Question 75. An integer is chosen randomly from the first two hundred digits. What will the probability that the integer chosen can be divisible with 6 or 8?
Answer 75:
First 200 integers which are multiples of 6 are listed as
6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114, 120, 126, 132, 138, 144, 150, 156, 162, 168, 174, 180, 186, 192, 198
First 200 integers which are multiples of 8 are listed as
8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120, 128, 136, 144, 152, 160, 168, 176, 184, 192, 200.
So, there are a total of 50 numbers that are multiples of 6 or 8.
So, the probability for the integer chosen, which is divisible by 6 or 8, is
= 50/200 = ¼

Question 76. Assume points A, B, C, and D are the centres of four circles. Each had a radius of 1 unit. Suppose a point is chosen randomly from the interior of the square ABCD. What is the probability that the point which will be chosen from the shaded region?
Answer 76:
It is given as the radius of the circle is 1 unit.
Hence, the area of the circle = Area of 4 sectors.
Therefore, the side of the square ABCD is 2 units.
Hence, the area of the square =2 × 2=4units.
thus, the area of the shaded region = area of square − 4× area of the sectors.
=(4−π).
Hence, the required probability = (4 − π)/4

Question 77. The bag consists of cards numbered from 1 to 49. A card is removed from the bag at random after mixing the cards thoroughly. Find out the probability that the number on the drawn card is:
(i) an odd number
(ii) a multiple of 5
(iii) a perfect square
(iv) an even prime number (2014D)
Answer 77:
Total number of the cards = 49
(i) Odd numbers which are 1, 3, 5, …., 49, i.e., 25
therefore, P(an odd number) = 2549
(ii) ‘A multiple for 5’ numbers are 5, 10, 15, ……., 45, i.e., 9
therefore, P(a multiple of 5) = 949
(iii) “A complete square” numbers are 1, 4, 9, …….., 49, i.e., 7
therefore, P(a perfect square number) = 749=17
(iv) “the even prime number” is 2, i.e., only one number
therefore, P(an even prime number) = 149

Question 78. The box contains 20 cards numbered from 1 to 20. A card is taken out at random from the box. Find out the probability that the number on the removed card is
(i) divisible by 2 or 3,
(ii) a prime number.
Answer 78: (i) Numbers divisible with 2 or 3 from 1 to 20 are 2, 4, 6, 8, 10, 12, 14, 16, 18, 3, 9, 15, 20 = 13
thus, Total outcomes = 20
possibility of outcomes = 13
therefore, P(divisible by 2 or 3) = 13/20
(ii) The Prime numbers from 1 to 20 are 2, 3, 5, 7, 11, 13, 17, 19 = 8
Total Outcomes = 20
possibility of outcomes = 8
therefore, P(a prime number) = 8/20=2/5

Question 79. The bag consists of 25 cards numbered from 1 to 25. A card is taken out at random from the bag. Find out the probability that the number on the drawn card is:
(i) divisible by 3 or 5
(ii) a complete square number.
Answer 79:
Total number of the outcomes = 25
(i) possibility of outcomes of numbers divisible with 3 or 5 in numbers 1 to 25 are (3, 6, 9, 12, 15, 18, 21, 24, 5, 10, 20, 25) = 12
∴P(No. divisible with 3 or 5) = 12/25
(ii) possibility of outcomes of numbers which are a perfect square = 5, i.e., (1, 4, 9, 16, 25)
∴ P(a complete square no.) = 5/25=⅕

Question 80. A number x is selected randomly from the numbers 1, 2, 3, and 4. Another number, y, is selected randomly from the numbers 1, 4, 9, and 16. Find the probability that the product for x and y is less than 16.
Answer 80:
X can be anyone having 1, 2, 3, and 4, i.e., 4 ways
Y can be anyone having 1, 4, 9, and 16, i.e., 4 ways
Total no. of cases of XY = 4 × 4 = 16 ways
No. of cases, here product is less than 16 (1, 1), (1, 4), (1, 9), (2, 1), (2, 4), (3, 1), (3, 4), (4,1) i.e., 8 ways
∴ P (product x & y less than 16) = 8/16=½

Question 81. Cards numbered from 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is: (2014D)
(i) an odd number
(ii) a perfect square number
(iii) divisible by 5
(iv) a prime number less than 20
Answer 81:
Total number of cards = 60 – 11 + 1 = 50
(i) Odd nos, are 11, 13, 15, 17, …. 59 = 25 no.
∴ P(an odd number) = 25/50=1/2
(ii) Perfect square numbers are 16, 25, 36, 49 = 4 numbers

∴ P(a perfect square no.) = 4/50=2/25
(iii) “Divisible by 5” numbers are 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, = 10 numbers
∴ P(divisible by 5) = 10/50=2/25
(iv) Prime numbers less than 20 are 2, 3, 5, 7, 11, 13, 17, 19 = 8 numbers
∴ P(a prime no. less than 20) = 8/50=4/25

Question 82. The Five cards, the ten, jack, queen, king, and ace of diamonds, are well-shuffled with their faces downwards. One card is then picked up at random. (2014OD)
(a) What is the probability that the drawn card is the queen?
(b) If the queen is drawn and put aside, and a second card is drawn, find the probability that the second card is (i) an ace or (ii) a queen.
Answer 82:
(a) Total events = 5; P(queen) = 1/5
(b) Now total events = 4
(i) P (an ace) = 1/4
(ii) P (a queen) = 0/4
= 0 …As there is no queen left

Question 83. There are 100 cards in the bag on which numbers from 1 to 100 are written. A card is taken out from the bag at random. Find the probability that the number on the selected card
(i) is divisible by 9 and is a perfect square
(ii) is a prime number greater than 80. (2016OD)
Answer 83:
Total cards = 100
(i) Numbers which are “Divisible by 9 and perfect squares” are 9, 36, 81, i.e., 3.
∴ P(Divisible by 9 & perfect square) = 3/100
(ii) Numbers which are “prime numbers greater than 80” are 83, 89, 97, i.e., 3
∴ P(Prime nos. > 80) = 3/100

Question 84. Two different dice are rolled together. Find the probability of getting: (2015 D)
(i) the sum of numbers on two dice to be 5.
(ii) even numbers on both dice.
Answer 84:
Total possible outcomes = 6n = 62 = 36
(i) The possible outcomes are (2, 3), (3, 2), (1, 4), (4, 1) when the sum of numbers on two dice is 5, i.e., 4
∴ Required Probability, P(E) = 4/36=1/9
(ii) The possible outcomes are (2, 2), (2, 4), (2, 6), (4, 2), (4, 4), (4, 6), (6, 2), (6, 4), (6, 6) for even numbers on both dice; 9
∴ Required Probability, P(E) = 9/36=1/4

Question 85. Two different dice are thrown together. Find the probability of:
(i) getting a number greater than 3 on each die
(ii) getting a total of 6 or 7 of the numbers on two dice (2016D)
Answer 85:
Two dice can be thrown in 6 x 6 = 36 ways
(i) “getting a number > 3 on each die” can be obtained as (4, 4), (4, 5), (4, 6), (5, 4), (5, 5), (5, 6), (6, 4), (6, 5), (6, 6), i.e., 9 ways.

P(number > 3 on each die) = 9/36=1/4
(ii) "a total of 6 or 7 can be obtained as (2, 4),(4, 2),(3, 3), (1, 6),(6, 1),(2, 5) (1, 5),(5, 1) (5, 2),(3, 4),(4, 3), i.e., 11 ways
Total 6 Total "7′
P(a total of 6 or 7) = 11/36

Question 86. From a pack of 52 playing cards, Jacks, Queens, and Kings of red colour are removed. From the remaining, a card is drawn at random. Find out the probability that the drawn card is:
(i) a black King
(ii) a card of red colour
(iii) a card of black colour (2016OD)
Answer 86:
Total cards in the pack = 52
Cards removed
= 2(Jacks) + 2(Queens) + 2(Kings) = 6
∴ Remaining cards = 52 – 6 = 46
(i) Number of black Kings = 2
∴ P(a black King) = 2/46=1/23
(ii) Total red cards in the pack = 26
Red cards removed = 6
Remaining red cards = 26 – 6 = 20
∴ P(a card of red colour) =20/46=10/23
(iii) Total black cards in the pack = 26
∴ P(a card of black colour) = 26/46=13/23

Question 87. All red face cards are removed from a pack of playing cards. The remaining cards were well-shuffled, and then a card was drawn at random from them. Find the probability that the drawn card is (2015D)
(i) a red card
(ii) a face card
(iii) a card of clubs.
Answer 87:
Number of red face cards removed = 6
∴ Remaining cards = 52 – 6 = 46
Hence, Total no. of outcomes = 46
(i) Possible outcomes of red cards = 26 – 6 = 20
∴ P(a red card) = 20/46=10/23
(ii) Possible outcomes of face cards = 6
∴ P(a face card) = 6/46=3/23
(iii) Possible outcomes of card of clubs = 13
∴ P(a card of clubs) = 13/46

Question 88. In a single throw for the pair of different dice, what is the probability for getting
(i) a prime number on each dice?
(ii) a total of 9 or 11? (2016D)
Answer 88:
Two dice can be thrown as 6 × 6 = 36 ways

(i) For “a prime number on each dice” can be obtained as (2, 2), (2, 3), (2, 5), (3, 2), (3, 3), (3, 5), (5, 2), (5, 3), (5, 5), i.e., 9 ways.
∴ P for (a prime no. on each dice) = 9/36=1/4
(ii) “a total of 9 or 11” can be obtained as (3, 6),(6, 3),(4, 5),(5, 4) (5, 6),(6, 5).
Total ‘9’ Total ’11’ i.e., 6 ways
∴ P(a total of 9 or 11) = 6/36=1/6

Question 89: In the game, the entry fee is Rs 5. The game involves tossing a coin 3 times. When one or two heads show, Sweta gets the entry fee back. When she throws 3 heads, she receives double the entry fees. Otherwise, she will lose. For tossing the coin three times, find out the probability that she
(i) loses the entry fee.
(ii) gets a double entry fee.
(iii) just gets her entry fee.
Answer 89: Total possible outcomes for tossing a coin 3 times,
For S = {(HHH), (TTT), (HTT), (THT), (TTH), (THH), (HTH), (HHT)}
n(S) = 8
(i) Let E1 = Event for Sweta losses the entry fee
= She tosses the tail on three times
n(E1) = {(T T T)}
P(E1)=n(E1)/n(S)=1/8
(ii) Let Event for Sweta gets double entry fee
= She tosses the tail on three times = {(HHH)}
n(E2) = 1
PE2=n(E2)/n(S)=1/8
(iii) Let event for Sweta gets her entry fee back
= Sweta gets heads one or two times
= {(HTT), (THT), (TTH), (HHT), (HTH), (THH)}
n(E3) = 6
P(E3)=n(E3)/n(S)=6/8=3/4

Question 90: A die has the six faces marked 0, 1, 1, 1, 6, 6. Two such dice are thrown simultaneously, and the total score is recorded.
(i) How many different scores are possible for?
(ii) What will be the probability of getting the total of 7?
Answer 90 : Given that
The die has the six faces marked {0, 1, 1, 1, 6, 6}
Total sample space for *n*(S) = 62 = 36
(i)Numbers for favourable outcomes are (0, 0), (0, 1), (0, 6), (1, 0), (1, 1), (1, 6), (6, 0), (6, 1), (6, 6).
The different scores that are possible for 6 scores i.e. 0, 1, 2, 6, 7 and 12.
(ii) Let E = Event for getting a sum 7
= {(1, 6), (1, 6), (1, 6), (1, 6), (1, 6), (1, 6), (6, 1), (6, 1), (6, 1), (6, 1), (6, 1), (6, 1)}
n(E) = 12
P(E) = n(E)/n(S)=12/36=1/3

Question 91: A bag consists of 24 balls, of which *x* are red, 2*x* are white, and 3*x* are blue. A ball is selected randomly. What is the probability which is
(i) not red?
(ii) white?

Answer 91:
Given that,
A bag consists of 24 balls of which x are red, $2x$ are white and $3x$ are blue.
Total number for balls = $x + 2x + 3x = 24$
$6x = 24$
$x = 4$
Number having red balls = x = 4
Number having white balls = $2x = 2×4 = 8$
also number having blue balls = $3x = 3×4 = 12$
Thus, the total number of outcomes for a ball is selected at random in a bag containing 24 balls.
$n(S) = 24$
(i) Let E1 = Event for selecting a ball which is not red i.e.can be white or blue.
n(E1) =Number for white balls + Number of blue balls
$n(E1) = 8 + 12 = 20$
Required Probability is = n(E1)/n(S)=20/24=5/6
Required Probability is = n(E1)n(S)=2024=56
(ii) Let E2 Event for selecting a ball which is white.
$n(E2) = 8$
So the required probability is = n(E2)/n(S)=8/24=1/3

Question 92: At a fete, cards bearing numbers from 1 to 1000, one number on one card, are put in the box. Each player selects one card randomly, and that card is not replaced. When the selected card has the perfect square greater than 500, the player wins a prize. What is the probability for which
(i) the first player wins the prize?
(ii) the second player wins the prize if the first has won?
Answer 92:
Given that,
At a fete, cards bearing numbers from 1 to 1000 one number on one card, are put in a box. Each player selects one card randomly and that card is not replaced
Thus, the total number having outcomes are $n(S) = 1000$
When the selected card has a perfect square greater than 500, then the player wins the prize.
(i) Let E1 = Event first player wins the prize = Player select a card that is a perfect square greater than 500
= {529, 576, 625, 676, 729, 784, 841, 900, 961}
= {(23)2, (24)2, (25)2, (26)2, (27)2, (28)2, (29)2, (30)2, (31)2}
$n(E) = 9$
So, the required probability is
= n(E1)/n(S)
= 9/1000
= 0.009
(ii) First, has won. That is, one card is already selected, greater than 500, and has a perfect square as the repetition is not allowed. So, one card is removed from the 1000 cards. Thus, the number of the remaining cards is 999.
Total number having remaining outcomes, $n(S') = 999$
Let E2 be the event such that the second player wins a prize if the first has won.
Then, the remaining cards have the perfect square greater than 500 = 8
n(E2) = 9-1 = 8
Thus, the required probability is

= n(E2)/n(S')
= 8/999

Question 93. Complete the table given below:

Event: The sum of 2 dice	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Probability	**1/36**						**5/36**		

Answer 93: When 2 dices are thrown, the possible events are as follows:
(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6)
(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6)
(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6)
(4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6)
(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6)
(6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)
So, the total numbers for events: 6×6 = 36
(i) We have to get the sum as 2, the probability is 1/36 as the only possible outcomes is = (1,1)
For getting the sum as 3, the chances of the events or outcomes are = E (sum 3) = (1,2) and (2,1)
Thus, P for (sum 3) = 2/36
Same as,
E for (sum 4) = (1,3), (3,1), and (2,2)
Hence, P for (sum 4) = 3/36
E for (sum 5) = (1,4), (4,1), (2,3), and (3,2)
Thus, P for (sum 5) = 4/36
E for (sum 6) = (1,5), (5,1), (2,4), (4,2), and (3,3)
Thus, P for (sum 6) = 5/36
E for (sum 7) = (1,6), (6,1), (5,2), (2,5), (4,3), and (3,4)
Thus, P for (sum 7) = 6/36
E for (sum 8) = (2,6), (6,2), (3,5), (5,3), and (4,4)
Thus, P for (sum 8) = 5/36
E for (sum 9) = (3,6), (6,3), (4,5), and (5,4)
Thus, P for (sum 9) = 4/36
E for (sum 10) = (4,6), (6,4), and (5,5)
Thus, P for (sum 10) = 3/36
E for (sum 11) = (5,6), and (6,5)
Thus, P for (sum 11) = 2/36
E for (sum 12) = (6,6)
Thus, P for (sum 12) = 1/36
Thus, the table will be as follows:

Event: The sum of 2 dice	2	3	4	5	6	7	8	9	10
Probability	1/36	2/36	3/36	4/36	5/36	6/36	5/36	4/36	3/36

Question 94. A die is thrown two times. What is the probability which
(i) 5 will not come up either two times?

(ii) 5 can come up at least once?
Answer 94: The outcomes are:
(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6)
(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6)
(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6)
(4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6)
(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6)
(6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)
Thus, the total number for outcome = 6×6 = 36
(i) Method 1:
Consider the following events.
A = 5 comes in the first throw,
B = 5 comes in the second throw
P for (A) = 6/36,
P for (B) = 6/36
P for (not B) = ⅚
Thus, P for (not A) = 1-(6/36) = 5/6
The required probability is = (5/6)×(5/6) = 25/36
Method 2:
Let E be the event for which 5 does not come up each time.
Thus, the favourable outcomes are [36–(5+6)] = 25
P for (E) = 25/36
(ii) Number for events when 5 comes at least once = 11(5+6)
The required probability is = 11/36

Question 95: Two dice are numbered as 1, 2, 3, 4, 5, 6 and 1, 1, 2, 2, 3, 3, respectively. They are thrown, and the sum for the numbers on them is noted. Find out the probability for getting each sum from 2 to 9 separately.
Answer 95: Number for total outcome = n(S) = 36
(i) Let E1 be the event for 'getting sum 2'
Favourable outcomes of the event E1 = {(1,1),(1,1)}
n(E1) = 2
P(E1) = n(E1)/n(S) = 2/36 = 1/18
(ii) Let E2 be the event for 'getting sum 3'
Favourable outcomes of the event E2 = {(1,2),(1,2),(2,1),(2,1)}
n(E2) = 4
P(E2) = n(E2)/n(S) = 4/36 = 1/9
(iii) Let E3 be the event for 'getting sum 4'
Favourable outcomes of the event E3 = {(2,2)(2,2),(3,1),(3,1),(1,3),(1,3)}
n(E3) = 6
P(E3) = n(E3)/n(S) = 6/36 = 1/6
(iv) Let E4 be the event for 'getting sum 5'
Favourable outcomes of the event E4 = {(2,3),(2,3),(4,1),(4,1),(3,2),(3,2)}
n(E4) = 6
P(E4) = n(E4)/n(S) = 6/36 = 1/6
(v) Let E5 be the event for 'getting sum 6'
Favourable outcomes of the event E5 = {(3,3),(3,3),(4,2),(4,2),(5,1),(5,1)}
n(E5) = 6
P(E5) = n(E5)/n(S) = 6/36 = 1/6
(vi) Let E6 be the event for 'getting sum 7'

Favourable outcomes of the event E6 = {(4,3),(4,3),(5,2),(5,2),(6,1),(6,1)}
n(E6) = 6
P(E6) = n(E6)/n(S) = 6/36 = 1/6
(vii) Let E7 be the event for 'getting sum 8'
Favourable outcomes of the event E7 = {(5,3),(5,3),(6,2),(6,2)}
n(E7) = 4
P(E7) = n(E7)/n(S) = 4/36 = 1/9
(viii) Let E8 be the event for 'getting sum 9'
Favourable outcomes of the event E8 = {(6,3),(6,3)}
n(E8) = 2
P(E8) = n(E8)/n(S) = 2/36 = 1/18

Question 96: A bag consists of a red ball, a blue ball, and a yellow ball. All the balls have the same size. Kritika takes out the ball from the bag without looking into it. What will the probability that she takes out the
(i) yellow ball?
(ii) red ball?
(iii) blue ball?
Answer 96: Kritika takes out the ball from the bag without looking into it. Hence, it is equally likely for her to take out any one of them from the bag.
Let Y be the event for 'the ball taken out is yellow,' B be the event for 'the ball taken out is blue,' and R be the event for 'the ball taken out is red.'
The number having possible outcomes = Number for balls in the bag = n(S) = 3.
(i) The number having outcomes favourable to the event Y = n(Y) = 1.
So, P(Y) = n(Y)/n(S) =1/3
Same as, (ii) P(R) = 1/3
and (iii) P(B) = ⅓
Question 97: A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is
(i) a black king
(ii) either a black card or a king
(iii) black and a king
(iv) a jack, queen, or a king
(v) neither a heart nor a king
(vi) spade or an ace
(vii) neither an ace nor a king
(viii) neither a red card nor a queen.
(ix) other than an ace
(x) a ten
(xi) a spade
(xii) a black card
(xiii) the seven of clubs
(xiv) jack
(xv) the ace of spades
(xvi) a queen
(xvii) a heart
(xviii) a red card
(xix) neither a king nor a queen
Answer 97:
Given: A card is drawn at random from a pack of 52 cards

TO FIND: Probability of the following
Total number of cards = 52
(i) Cards which are black king is 2
We know that Probability = number of the favourable event/Total number of event
therefore, the probability of getting a black king is similar to 2/52 = 1/26
(ii) Total number of the black cards is 26
The total numbers of the kings are 4 in, which contains 2 black kings
therefore, the total number of black cards or kings will be = 26+2 = 28/
We know that Probability = number of the favourable events/Total number of event
therefore, the probability of getting a black card or a king = 28/52 = 7/13
(iii) Total number of the black and a king card is 2
We know that Probability = number of the favourable events/Total number of event
Hence the probability of getting a black card and the king is 2/52 = 1/26
(iv) A jack, queen, or the king are 3 from every 4 suits
The total number of a jack, queen, and the king is 12
We know that Probability = Number of the favourable events/Total number of event
therefore, the probability of getting a jack, queen, or a king is = 12/52 = 3/13
(v) Total number of the heart cards is 13, and the king is 4, in which the king of heart is also included.
The total number of cards which are a heart and a king, is equal to = 13+ 3 = 16
therefore, the Total number of cards that are neither a heart nor a king = 52-16 = 36
We know that Probability = Number of the favourable events/the Total number of events
Hence the probability of getting cards with neither a heart nor a king =36/52 = 9/13
(vi) the Total number of spade cards is 13
T The Total number of aces is 4, in which the ace of the spade is included in the spade cards.
therefore, total number of card which are spade or ace = 13 + 3 = 16
We know that Probability = Number of the favourable events/Total number of event
therefore, the probability of getting a card which is a spade or an ace = 16/52=4/13
(vii) Total number for the ace card is 4, and the king is 4
The total number of cards which are an ace and a king is equal to = 4+4 = 8
therefore, the Total number of cards that are neither an ace nor a king is = 52 – 8 =44
We know that Probability = Number of the favourable events/Total number of event
therefore, the chances of getting cards neither an ace nor the king = 44/52 = 11/13
(viii) the Total number of red cards is 26
The total numbers of queens are 4, of which 2 red queens are also included
therefore, the total number of red cards or queens will be = 26+2 = 28
therefore, the Total number of cards that are neither a red nor a queen= 52-28 = 24
We know that Probability = Number of the favourable events/Total number of event
therefore, the chances of getting neither a red card nor the queen are equal to = 24/52 = 6/13
(ix) the Total number of cards other than ace is =52-4 = 48
We know that Probability = Number of the favourable events/Total number of event
therefore, the probability of getting other than ace is = 48/52 =12/13
(x) Total number of ten is 4
We know that Probability = Number of the favourable events/Total number of event
therefore, the probability of getting a ten is = 4/52 =1/13
(xi) Total number of spades is 13
We know that Probability = Number of the favourable events/Total number of event
therefore, chances of getting a spade = 13/52 = 1/4
(xii) Total number of the black cards is 26
We know that Probability = Number of the favourable events/Total number of event

therefore, chance of getting black cards is = 26/52 = 1/2
(xiii) Total number of 7 of the club is 1
We know that Probability = Number of the favourable events/Total number of event
therefore, the probability of getting a 7 of the club is equal to = 1/52
(xiv) Total number of the jack is 4
We know that Probability = Number of the favourable events/Total number of event
therefore, chances of getting jack = 4/52 = 1/13
(xv) the Total number of the ace of the spade is 1
We know that Probability = Number of the favourable events/Total number of event
therefore, chances of getting an ace of spade = 1/52
(xvi) Total number of queens is 4
We know that Probability = Number of the favourable events/Total number of event
therefore, chances of getting a queen = 4/52 = 1/13
(**xvii)** the Total number of heart cards is 13
We know that Probability = Number of the favourable events/Total number of event
therefore, the chances of getting a heart card = 13/52 =¼
(xviii) the Total number of red cards is 26
We know that Probability = Number of the favourable events/Total number of event
therefore, the chances of getting a red card =26/52 =1/2