MATHS

BOOKS - ARIHANT MATHS (HINGLISH)

PROBABILITY

Examples

1. If three coins are tossed, represent the sample space and the event of getting atleast two heads, then find the number of elements in them.

Watch Video Solution

2. One ticket is drawn at random from a bag containing 24 tickets numbered 1 to 24. Represent the sample space and the event of drawing a ticket containing number which is a prime. Also, find the number of elements in them.

Watch Video Solution

3. Two dice are thrown simultaneously. What is the probability obtaining a total score less than 11?

Watch Video Solution

4. Find the probability that a leap year selected at random will contain 53 Sundays.

Watch Video Solution

5. From a pack of 52 playing cards, three cards are drawn at random. Find the probability of drawing a king, a queen and a knave.

Watch Video Solution

6. A bag contain 8 red and 5 white balls. Three balls are drawn at random. Find the probability that: All the three balls are white. All the three balls are red. One ball is red and two balls are white.

Watch Video Solution

7. For a post,three persons A, B and C appearin the interview. The probability of A being selected is twice that of B and the probability of b being selected is thrice that of C. What of the individual probability of A, B and C being selected?

Watch Video Solution

8. If A and B are independent events, he probability that both A and B occur is $\frac{1}{8}$ and the probability that none of them occurs is `(3)/(8)1. Find the probability of the occurrence of A.

Watch Video Solution

Watch Video Solution

9. A and B are two candidates seeking admission in IIT. The probability that A is selected is 0.5 and the probability that Aand B are selected is atmost 0.3 . Is it possible that the probability of B geeting selected is 0.9?

Watch Video Solution

10. Let A, B, C be three events. If the probability of occurring exactly one event out of $AandBis1-x,$ out of$BandCis1-2x,$ out of $CandAis1-x,$ and that of occuring three events simultaneously is x^2 , then prove that the probability that atleast one out of A, B, C will occur is greaer than 1/2 .

Watch Video Solution

11. Let A, B and C be three events such that $P(A)=0.3, P(B)=0.4, P(C)=0.8, P(A\cap B)=0.08, P(A\cap C)=0.2$

. If $P(A \cup B \cup C) \geq 0.75$, then show that $P(B \cap C)$ satisfies

Watch Video Solution

12. Two dice are thrown . Find the probability that the sum of number coming up on them is 9, if it is known that the number 5 always occurs on the first dice.

Watch Video Solution

13. In a class, 30% students fail in English, 20% students fail in Hindi and 10% students fail in both English and Hindi. A student is chosen at random, then what is the probability he fail in English, if he has failed in Hindi?

Watch Video Solution

14. The probability that certain electronic component fail, when first used is 0.10. If it does not fail immediately, then the probability that it lasts for one year is 0.99. What is the probability that a new component will last for one year?

Watch Video Solution

15. Three groups A, B and C are contesting for positions on the Board of Directors of a company. The probability of their winning are 0.5, 0.3 and 0.2, respectively. If the froup A wins, then the probabilityof introducing a new product is 0.7 and the corresponding probabilies for groups B and C are 0.6 and 0.5, respectively. Find the probability that the new product will be introduced.

Watch Video Solution

16. An urn contains 2 white and 2 black balls .A ball is drawn at random.If it is white ,it is not replace into urn ,otherwise it is replaced along with another ball of the same colour .the process is repeated , then find the probabiltiy that the third ball drawn is black.

Watch Video Solution

17. A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red and balls. One ball is drawn at random from one of the bags and is found to be red. Find the probability that it was drawn from bag B.

Watch Video Solution

18. A man is known to speak the truth 3 out of 4 times. He throws a dice and reports that it is a six. Find the probability that it is actually a six.

Watch Video Solution

19. In a competitive examination, an examinee either guesses or copies or knows the answer to amultiple choice question with four choices. The probability that he makes a guess is $\frac{1}{3}$ and the probability that he copies the answer is 1/6. The probability that the answer is correct, given that he copiedit, is $\frac{1}{8}$. Find the probability that he knows the answer to the question, given that he correctly answered

Watch Video Solution

20. A and B are two independent witnesses (i.e., there is no collision between them) in a case. The probability that A will speak the truth is x and the probability that B will speak the truth is y. A and B agree in a certain statement. Show that the probability that the statement is true is $\frac{xy}{1-x-y+2xy}$.

Watch Video Solution

21. If one out of 10 coming ships is wrecked. Find the probability that out of five coming ships at least 4 reach safely.

Watch Video Solution

22. Numberse are selected at random, one at a time, from the two-digit numbers 00,01,02,....99 with replacement. An event E occurs if and only if the product of the two digits of a selected number is 18. If four numbers are selected, find probability that the event E occurs at least 3 times.

Watch Video Solution

23. A man takes a step forward with probability 0.4 and backward with probability 0.6. The probability that at the end of eleven steps he is just one step away from the starting point, is

Watch Video Solution

24. The minimum number of tosses of a pair of dice so that the probability of getting the sum of the digits on the dice equal to 7 on atleast one toss is greater than 0.95, is, then $\frac{n+1}{6}$ is

Watch Video Solution

25. Write probability distribution, when three coins are tossed.

Watch Video Solution

26. A random variable X has poisson's distribution with mean 3. Then find the value of $P(X > 2.5)$.

Watch Video Solution

27. A and B throw with one die for a stake of ₹11 which is to be won by the player who first throw 6. If A has the first throw, then what are their respective expectations?

Watch Video Solution

28. A person throws two dice, one the common cube and the other a regular tetrahedron, the number on the lowest face being taken in the case of the tetrahedron, then find the probability that the sum of the numberd appearing on the dice is 6.

Watch Video Solution

29. Five ordinary dice are rolled at random and the sum of the numbers shown on them is 16.What is the probability that the numbers shown on each is any one from 2, 3, 4 or 5?

Watch Video Solution

30. Two persons A and B agree to meet at a place between 11 to 12 noon. The first one to arrive waits for 20 minutes and then leave. if the time of their arrival be independent and at random, then the probabity that A and B meet is:

Watch Video Solution

Watch Video Solution

31. Consider the cartesian plane R^2 and let X denote thsubset of points for which ameterboth coordinates are integers. A coin of dithe probability p thatis tossed randomly onto the plane. Find probability p that the coin coiners a point of X.

Watch Video Solution

32. Three points P, Q and R are selected at random from the cirumference of a circle. Find the probability p that the point lie on a semi-circle

Watch Video Solution

33. A wire of length l is cut into three pleces. What Is the probability that the three pieces form a triangle ?

Watch Video Solution

34. The probability that in a year of $22nd$ centurychosen at random, there will be 53 Sundays is

A. $\frac{3}{28}$

B. $\frac{2}{28}$

C. $\frac{7}{28}$

D. $\frac{5}{28}$

Answer:

Watch Video Solution

35. In a convex hexagon two diagonals are drawn at random. The probability that the diagonals intersect at an interior point of the hexagon is

A. $\frac{5}{12}$

B. $\frac{7}{12}$

C. $\frac{2}{5}$

D. $\frac{3}{5}$

Answer:

Watch Video Solution

36. Three integers are chosen at random from the set of first 20 natural numbers. The chance that their product is a multiple of 3 is $194/285$ b. $1/57$ c. $13/19$ d. $3/4$

A. $\frac{1}{57}$

B. $\frac{13}{19}$

C. $\frac{2}{19}$

D. $\frac{194}{285}$

Answer:

Watch Video Solution

37. If three numbers are selected from the set of the first 20 natural numbers, the probability that they are in GP, is

A. $\frac{1}{285}$

B. $\frac{4}{285}$

C. $\frac{11}{1140}$

D. $\frac{1}{71}$

Answer:

Watch Video Solution

38. Two numbers b and c are chosen at random with replacement from the numbers 1, 2, 3, 4, 5, 6, 7, 8 and 9. The probability that $x^2 + bx + c > 0f \text{ or } all\xi nR,$ is

A. $\frac{17}{123}$

B. $\frac{32}{81}$

C. $\frac{82}{125}$

D. $\frac{45}{143}$

Answer:

Watch Video Solution

39. Three dice are thrown. The probability of getting a sum which is a perfect square, is

A. $\frac{2}{5}$

B. $\frac{9}{20}$

C. $\frac{1}{4}$

D. Non of these

Answer:

Watch Video Solution

40. A quadratic equation is chosen from the set of all quadratic equations which are unchanged by squaring the roots. The chance that the chosen equation has equal root, is

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. Non of these

Answer:

Watch Video Solution

41. Three-digit numbers are formed using the digits $0, 1, 2, 3, 4, 5$ without repetition of digits. If a number is chosen at random, then the probability that the digits either increase or decrease, is

A. $\frac{1}{10}$

B. $\frac{2}{11}$

C. $\frac{3}{10}$

D. $\frac{4}{11}$

Answer:

Watch Video Solution

42. If X follows a binomial distribution with parameters $n = 8$ and $p = 1/2$, then $p(|X - 4| \leq 2)$ equals

A. $\frac{121}{128}$

B. $\frac{119}{128}$

C. $\frac{117}{128}$

D. $\frac{115}{128}$

Answer:

Watch Video Solution

43. A doctor is called to see a sick child. The doctor knows (prior to the visit) that 90% of the sick children in that neighbourhood are sick with the flu, denoted by F, while 10% are sick with the measles, denoted by M. A well-known symptom of measles is a rash, denoted by R. The probability having a rash for a child sick with the measles is 0.95. however, occasionally children with the flu also develop a rash, with conditional probability 0.08. upon examination the child, the doctor finds a rash. The what is the probability that the child has the measles? $91/165$ b. $90/163$ c. $82/161$ d. $95/167$

A. $\frac{89}{167}$

B. $\frac{91}{167}$

C. $\frac{93}{167}$

D. $\frac{95}{167}$

Answer:

Watch Video Solution

44. Let p_n denote the probability of getting n heads, when a fair coinis tossed m times. If p_4, p_5, p_6 are in AP then values of m can be

A. 5

B. 7

C. 10

D. 14

Answer:

Watch Video Solution

45. A random variable X follows binomial distribution with mean α and variance β. Then,

A. $a > b < 0$

B. $\frac{a}{b} < 1$

C. $\frac{a^2}{a-b}$ is a integer

D. $\frac{a^2}{a-b}$ is a integer

Answer:

Watch Video Solution

46. If $A_1, A_2, \ldots, A_n$ are n independent events, such that $P(A_i) = \frac{1}{i+1}, i = 1, 2, \ldots, n$, then the probability that none of $A_1, A_2, \ldots, A_n$ occur, is

A. $\frac{n}{n} + 1)$

B. $\frac{1}{n+1}$

C. less then $\frac{1}{n}$

D. greater than $\frac{1}{n+2}$

Answer:

Watch Video Solution

47. If A and B are two events such that $P(A \cup B) \geq \frac{3}{4}$ and $\frac{1}{8} \leq P(A \cap B) \leq \frac{3}{8}$ then

A. $P(A) + P(B) \leq \frac{11}{8}$

B. $P(A) \cdot P(B) \leq \frac{3}{8}$

C. $P(A) + P(B) \geq \frac{7}{8}$

D. None of these

Answer:

Watch Video Solution

48. A, B, C in order draws a card from a pack of cards, replacing them after each draw, on condition that the first who draws a spade shall win a prize : find their respective chances.

A. A is Rs 96

B. D is Rs 54

C. (A+C) is Rs 200

D. (B-D) is Rs 56

Answer:

Watch Video Solution

49. Each coefficient in the equation $ax^2 + bx + c = 0$ is determined by throwing an ordinary die.

Q. The probability that roots of quadratic are real and distinct, is

A. $\frac{5}{216}$

B. $\frac{19}{108}$

C. $\frac{173}{216}$

D. $\frac{17}{108}$

Answer:

Watch Video Solution

50. Each coefficient in the equation $ax^2 + bx + c = 0$ is determined by throwing an ordinary die.

Q. The probability that roots of quadratics are real and district, is

A. $\frac{5}{216}$

B. $\frac{19}{108}$

C. $\frac{173}{216}$

D. $\frac{17}{108}$

Answer:

Watch Video Solution

51. Each coefficient in the equation $ax^2 + bx + c = 0$ is determined by throwing an ordinary die.

Q. The probability that roots of quadratic are imaginary, is

A. $\frac{103}{216}$

B. $\frac{133}{216}$

C. $\frac{157}{216}$

D. $\frac{173}{216}$

Answer:

Watch Video Solution

52. A box contains n coins, Let $P(E_i)$ be the probability that exactly i out of n coins are biased. If $P(E_i)$ is directly proportional to $i(i+1), 1 \leq i \leq n.$

Q. Proportionality constant k is equal to

A. $\dfrac{3}{n(n^2+1)}$

B. $\dfrac{1}{(n^2+1)(n+2)}$

C. $\dfrac{3}{n(n+1)(n+2)}$

D. $\dfrac{1}{(n+1)(n+2)(n+3)}$

Answer:

Watch Video Solution

53. A box contains n coins, Let $P(E_i)$ be the probability that exactly i out of n coins are biased. If $P(E_i)$ is directly proportional to $i(i+1), 1 \leq i \leq n.$

Q. If P be the probabiloity that a coin selected at random is biased, then $\lim_{x \to \infty} P$ is

A. $\dfrac{1}{4}$

B. $\dfrac{3}{4}$

C. $\dfrac{3}{5}$

D. $\frac{7}{8}$

Answer:

Watch Video Solution

54. A box contains n coins, Let $P(E_i)$ be the probability that exactly i out of n coins are biased. If $P(E_i)$ is directly proportional to $i(i+1), 1 \leq i \leq n.$

Q. If a coin is selected at random is found to be biased, the probability that it is the only biased coin the box. is

A. $\frac{1}{(n+1)(n+2)(n+3)(n+4)}$

B. $\frac{12}{n(n+1)(n+2)(3n+1)}$

C. $\frac{24}{n(n+1)(n+2)(2n+1)}$

D. $\frac{24}{n(n+1)(n+2)(3n+1)}$

Answer:

Watch Video Solution

55. Let S be the set of the first 21 natural numbers, then the probability of choosing $\{x, y\} \in S$, such that `x^3+y^3 is divisible by 3, is

A. $\frac{1}{6}$

B. $\frac{1}{5}$

C. $\frac{1}{4}$

D. $\frac{1}{3}$

Answer:

Watch Video Solution

56. Let S be the set of the first 21 natural numbers, then the probability of Choosing $\{x, y, z\} \subseteq S$, such that x,y,z are in AP, is

A. $\frac{5}{133}$

B. $\frac{10}{133}$

C. $\frac{3}{133}$

D. $\frac{2}{133}$

Answer:

Watch Video Solution

57. Let S be the set of the first 21 natural numbers, then the probability of Choosing $\{x, y, z\} \subseteq S$, such that x,y,z are not consecutive is,

A. $\frac{17}{70}$

B. $\frac{34}{70}$

C. $\frac{51}{70}$

D. $\frac{34}{35}$

Answer:

Watch Video Solution

58. The altitude through A of ΔABC meets BC at Dand the circumscribed circle at E. If $D = (2, 3)$, $E = (5, 5)$, the ordinate of the orthocentre being a natural number. If the probability that the orthocentre lies on the lines $y = 1; y = 2; y = 3......y = 10$ is $\frac{m}{n}$ where m and n are

Watch Video Solution

59. The digits 1, 2, 3, 4, 5, 6, 7, 8, and 9 are written in random order to form a nine digit number.Let p be the probability that this number is divisible by 36, find 9p.

Watch Video Solution

60. A man P speaks truth with probability p and another man A speaks truth with probability 2p.

Statement-1 If P and Q contradict each other with probability $\frac{1}{2}$, then there are two values of p.

Statement-2 a quadratic equation with real coefficients has two real roots.

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer:

Watch Video Solution

61. A fair die is thrown twice. Let (a, b) denote the outcome in which the first throw shows 'a' and the second throw shows 'b' . Let A and B be the following events :

A={(a,b): a is even}, B={(a,b): b is even}

Statement-1: If C={(a,b): a+b is odd}, then

$$P(A \cap B \cap C) = \frac{1}{8}$$

Statement-2: If D={(a,b): a+b is even}, then

$$P(A \cap B \cap D / A \cup B) = \frac{1}{3}$$

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer:

Watch Video Solution

62. Three critics review a book. Odds in favour of the book are 5:2, 4:3 and 3:4 respectively for three critics. Find the probability that eh majority are in favour of the book.

Watch Video Solution

63. A has 3 shares in a lottery containing 3 prizes and 9 blanks, B has 2 shares in a lottery containing 2 prizes and 6 blanks. Compare their chances of success

Watch Video Solution

64. A bag contains a white and b black balls. Two players, $AandB$ alternately draw a ball from the bag, replacing the ball each time after the draw till one of them draws a white ball and wins the game. A begins the game. If the probability of A winning the game is three times that of B, then find the ratio $a:b$

Watch Video Solution

65. Five persons entered the lift cabin on the groud floor of an 8 floors house. Suppose that each of them, independent and with equal probability can leave the cabin at any of floor beginning with the first. Find put the probability of all five persons leaving at different floors.

Watch Video Solution

66. Let X be a set containing n elements. Two subsets A and B of X are chosen at random, the probability that $A \cup B = X$ is

Watch Video Solution

67. Two persons each make a single throw with a pair of dice. The probability that the throws are unequal is given by:

Watch Video Solution

68. If X and Y are independent binomial vatiates $B\left(5, \frac{1}{2}\right)$ and $B\left(7, \frac{1}{2}\right)$ and the value of $P(X + Y = 3)$ is

Watch Video Solution

69. The probability that the graph of $y = 16x^2 + 8(a + 5)x - 7a - 5 = 0,$ is strictly above the x-axis, If $a \in [-20, 0]$

Watch Video Solution

70. 3 distinct integers are selected at random form 1, 2, 3, ..., 20. find out the probability that the sum is divisible by 5

Watch Video Solution

71. 5 girls and 10 boys sit at random in a row having 15 shairs numbered as 1 to 15. Find the probability that end seats are occupied by the girls and between any two girls odd numbers of boys sit.

Watch Video Solution

72. A four digit number (numbered from 0000 to 9999) is said to be lucky if sum of its first two digits is equal to the sum of its last two digits. If a four digit number is picked up at random then the probability that it is lucky number is :-

Watch Video Solution

73. Out of (2n+1) tickets consecutively numbered, three are drawn at random. Find the chance that the numbers on them are in AP.

Watch Video Solution

74. Out of $3n$ consecutive integers, there are selected at random. Find the probability that their sum is divisible by 3.

Watch Video Solution

75. if $6n$ tickets numbered 0,1,2,....... 6n-1 are placed in a bag and three are drawn out , show that the chance that the sum of the numbers on then is equal to 6n is $\frac{3n}{(6n-1)(6n-2)}$

Watch Video Solution

Exercise For Session 1

1. A problem in mathematics is given to three students and their respective probabilities of solving the problem are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. The probability that the problem is solved, is

A. $\frac{3}{4}$

B. $\frac{1}{2}$

C. $\frac{2}{3}$

D. $\frac{1}{3}$

Answer: (a)

Watch Video Solution

2. A die is thrown three times and the sum of the 3 numbers shown is 15.

The probability that the first throw was a four, is

A. $\frac{1}{5}$

B. $\frac{1}{4}$

C. $\frac{1}{6}$

D. $\frac{2}{5}$

Answer: (a)

Watch Video Solution

3. Three faces of a fair die are yellow, two faces red and one blue. The die is tossed three times. Find the probabiliry that the colours yellow, red and blue appear In the 1 st and 2nd and the 3rd tosses respectively

A. $\frac{1}{12}$

B. $\frac{1}{6}$

C. $\frac{1}{24}$

D. $\frac{2}{5}$

Answer: (d)

Watch Video Solution

4. A speaks truth in 75% of cases and B in 80% of cases. The percentage of cases theyare likely to contradict each other in stating the same fact, is

A. 30%

B. 35%

C. 45%

D. 25%

Answer: (b)

Watch Video Solution

5. An unbiased die with faced marked 1, 2, 3, 4, 5, and 6 is rolled four times. Out of four face value obtained, the probability that the minimum face value is not less than 2 and the maximum face value is not greater than five is then $16/81$ b. $1/81$ c. $80/81$ d. $65/81$

A. $\frac{16}{81}$

B. $\frac{1}{81}$

C. $\frac{80}{81}$

D. $\frac{65}{81}$

Answer: (a)

Watch Video Solution

6. Three numbers are chosen at random without replacement from {1,2,3,....10}. The probability that the minimum of the chosen number is 3 or their maximum is 7 , is:

A. $\frac{11}{20}$

B. $\frac{7}{20}$

C. $\frac{11}{20}$

D. $\frac{7}{40}$

Answer: (c)

Watch Video Solution

7. Seven white and 3 black balls are placed in a row. What is the probability if two black balls do not occur together ?

A. $\frac{1}{2}$

B. $\frac{7}{20}$

C. $\frac{2}{15}$

D. $\frac{1}{3}$

Answer: (b)

Watch Video Solution

8. Two numbers are selected randomly from the set $S = \{1, 2, 3, 4, 5, 6\}$ without replacement one by one. The probability that minimum of the two numbers is less than 4 is $1/15$ b. $14/15$ c. $1/5$ d. $4/5$

A. $\frac{1}{15}$

B. $\frac{14}{15}$

C. $\frac{1}{15}$

D. $\frac{4}{5}$

Answer: (d)

Watch Video Solution

9. If $\frac{1+3p}{3}, \frac{1-p}{1}, \frac{1-2p}{2}$ are the probabilities of 3 mutually exclusive events then find the set of all values of p.

A. $[0, 1]$

B. $\left[0, \frac{1}{2}\right]$

C. $\left[\frac{1}{3}, 1\right]$

D. $\left[\frac{1}{3}, \frac{1}{2}\right]$

Answer: (d)

Watch Video Solution

10. Three identical dice are rolled. The probability that same number appears on them, is

A. $\frac{1}{6}$

B. $\frac{1}{36}$

C. $\frac{1}{14}$

D. $\frac{3}{28}$

Answer: (d)

Watch Video Solution

11. If the letters of the word ASSASSIN are written down in a row, the probability that no two S's occur together, is

A. $\frac{1}{35}$

B. $\frac{1}{21}$

C. $\frac{1}{14}$

D. $\frac{1}{28}$

Answer: (c)

Watch Video Solution

12. A box contains 2 black, 4 white, and 3 red balls. One ball is drawn at random from the box and kept aside. From the remaining balls in the box, another ball is drawn at random and kept aside the first. This process is repeated till all the balls are drawn front the box. The probability that the balls drawn are in the sequence of 2 black, 4 white, and 3 red is $1/1260$ b. $1/7560$ c. $1/126$ d. none of these

A. $\frac{1}{126}$

B. $\frac{1}{630}$

C. $\frac{1}{1260}$

D. $\frac{1}{2520}$

Answer: (c)

Watch Video Solution

13. If three distinct numbers are chosen randomly from the first 100 natural numbers, then the probability that all three of then are divisible by 2 or 3, is

Watch Video Solution

14. There are 2 vans each having numbered seats, 3 in the front and 4 at the back. There are 3 girls and 9 boys to be seated in the vans. The probablity of 3 girls sitting together in a back row on adjacent seats, is

A. $\frac{1}{13}$

B. $\frac{1}{39}$

C. $\frac{1}{65}$

D. $\frac{1}{91}$

Answer: (d)

Watch Video Solution

15. A and B stand in a ring with 10 other persons. If the arrangement of the persons is at random, then the probability that there are exactly 3 persons between A and B is

A. $\frac{1}{11}$

B. $\frac{2}{11}$

C. $\frac{3}{11}$

D. $\frac{4}{11}$

Answer: (b)

Watch Video Solution

16. The first 12 letters of English alphabet are written down at random in a row. The probability that there exactly 4 letters between A and B, is

A. $\frac{7}{33}$

B. $\frac{7}{68}$

C. $\frac{7}{99}$

D. $\frac{5}{33}$

Answer: (b)

Watch Video Solution

17. Six boys and six girls sit in a row randomly. Find the probability that (i) the six girls sit together, (ii) the boys and girls sit alternately.

A. $\frac{3}{304}$

B. $\frac{1}{100}$

C. $\frac{2}{205}$

D. $\frac{4}{407}$

Answer: (a)

Watch Video Solution

18. If from each of the three boxes containing 3 white and 1 black, 2 white and 2 black, 1 white and 3 black balls, one ball is drawn at random, then the probability that 2 white and 1 black balls will be drawn, is

A. $\frac{13}{32}$

B. $\frac{1}{4}$

C. $\frac{1}{32}$

D. $\frac{3}{16}$

Answer: (a)

Watch Video Solution

19. The probability that an year chosen at random has 53 Sundays is :

A. $\frac{5}{7}$

B. $\frac{3}{7}$

C. $\frac{5}{28}$

D. $\frac{3}{28}$

Answer: (c)

Watch Video Solution

20. if letters of the word MATHEMATICS are arranged then the probability that C come before E,E before H ,H before I and I before S

A. $\frac{3}{10}$

B. $\frac{1}{20}$

C. $\frac{1}{120}$

D. $\frac{1}{720}$

Answer: (c)

Watch Video Solution

Exercise For Session 2

1. If $P(A) = 0.8, P(B) = 0.5$, then $P(A \cap B)$ lies in the interval

A. $[0.2, 0.5]$

B. $[0.2, 0.3]$

C. $[0.3, 0.5]$

D. $[0.1, 0.5]$

Answer: (c)

Watch Video Solution

2. If $P(A) = \frac{1}{4}, P(B) = \frac{1}{13}$ and $P(A \cap B) = \frac{1}{52}$, then the value of $P(\overline{A} \cap \overline{B})$, is

A. $\frac{3}{13}$

B. $\frac{5}{13}$

C. $\frac{7}{13}$

D. $\frac{9}{13}$

Answer: (d)

Watch Video Solution

3. If A and B are two independent events such that $P(\overline{A} \cap B) = 2/15$ and $P(A \cap \overline{B}) = 1/6$, then P(B), is

A. $\frac{1}{5}$

B. $\frac{1}{6}$

C. $\frac{4}{5}$

D. $\frac{5}{6}$

Answer: (b)

Watch Video Solution

4. If A and B are two events such that $P(A \cup B) = \frac{5}{6}, P(A) = \frac{1}{3}$ and $P(B) = \frac{3}{4}$, then A and B are

A. mutually exclusive

B. dependent

C. independent

D. None of these

Answer: (c)

Watch Video Solution

5. If A, B and C are mutually exclusive and exhaustive events associated with a random experiment, if $P(B) = \frac{3}{2}P(A)$ and $P© = \frac{1}{2}P(B)$, then P(A) is equal to

A. $\frac{2}{13}$

B. $\frac{4}{13}$

C. $\frac{6}{13}$

D. $\frac{8}{13}$

Answer: (b)

Watch Video Solution

6. If A and B are two events, then $P(A)+P(B)=2P(A\cap B)$ if and only if

A. $P(A)+P(B)=1$

B. $P(A)=P(B)$

C. $P(A)+P(B)>1$

D. None of these

Answer: (b)

Watch Video Solution

7. If A and B are two events such that $P(A \cap B) = \frac{1}{4}, P(A) = P(B) = q$ and $P(\overline{A} \cap \overline{B}) = \frac{1}{5}$ then q is equal to

A. $\frac{17}{40}$

B. $\frac{19}{40}$

C. $\frac{21}{40}$

D. $\frac{23}{40}$

Answer: (c)

Watch Video Solution

8. If A and B are two events such that $P(A \cup B) = \frac{3}{4}, P(A \cap B) = \frac{1}{4}, P(\overline{A}) = \frac{2}{3}, then P(\overline{A} \cup B)$ is equal to

A. $\frac{11}{12}$

B. $\frac{3}{8}$

C. $\frac{5}{8}$

D. $\frac{1}{4}$

Answer: (a)

Watch Video Solution

9. If P(B) $= \frac{3}{4}$ P(A cap B cap overset(-)(c))=(1)/(3) and P(overset(" "-)(A) cap B cap overset(-)(C))=(1)/(3), $then$P(B cap C)` is equal to

A. $\frac{1}{12}$

B. $\frac{1}{6}$

C. $\frac{1}{15}$

D. $\frac{1}{15}$

Answer: (a)

Watch Video Solution

10. If A and B are two events such that $P(A) > 0$ and $P(B) \neq 1,$ then $P\left(\frac{\overline{A}}{B}\right)$ is equal to

A. $1 - P\left(\frac{A}{B}\right)$

B. $1 - P\left(\frac{A}{\overline{B}}\right)$

C. $P\left(\frac{\overline{A}}{B}\right)$

D.

Answer: (b)

Watch Video Solution

11. If $P(A) = \frac{3}{8}, P(B) = \frac{5}{8}$ and $P(A \cup B) = \frac{3}{4},$ then $P\left(\frac{\overline{A}}{\overline{B}}\right)$ is equal to

A. $\frac{1}{4}$

B. $\frac{1}{9}$

C. $\frac{2}{3}$

D. $\frac{3}{4}$

Answer: (c)

Watch Video Solution

12. If two events A and B are such that $P(\overline{A}) = 0.3, P(B) = 0.4$ and $P(A \cap \overline{B}) = 0.5$, then $P\left(\frac{B}{A \cup \overline{B}}\right)$ is equal to

A. $\frac{1}{4}$

B. $\frac{1}{5}$

C. $\frac{2}{5}\Big)$

D. $\frac{3}{5}$

Answer: (a)

Watch Video Solution

13. Two dice are thrown. Find the probability that the numbers appeared has the sum 8, if it is known that the second die always exhibits 4.

A. $\frac{5}{6}$

B. $\frac{1}{6}$

C. $\frac{2}{3}$

D. $\frac{1}{3}$

Answer: (b)

Watch Video Solution

14. A is targeting to B, B and C are targeting to A. probability of hitting the target by A, B and C are 2/3, 1.2 and 1/3, respectively. If A is hit, then find the Probability that B hits the target and C does not.

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{2}{3}$

D. $\frac{3}{4}$

Answer: (b)

Watch Video Solution

15. If A and B are two events such that $A \cap B \neq \phi, P\left(\frac{A}{B}\right) = P\left(\frac{B}{A}\right)$.

Then.

A. A=B

B. P(A)=P(B)

C. A and B are independent

D. All of these

Answer: (b)

Watch Video Solution

Exercise For Session 3

1. A bag X contains 3 white and 2 black balls; another bag Y contains 2 white and 4 black balls. A bag and a ball out of it is picked at random. What is the probability that the ball is white?

A. $\frac{2}{7}$

B. $\frac{7}{9}$

C. $\frac{4}{15}$

D. $\frac{7}{15}$

Answer: (d)

Watch Video Solution

2. There are two bags, on e of which contain s 3 black and 4 white, balls, while the other contains 4 black and 3 whit balls. A fair die is cast, if the face 1 or 3 turns up, a ball is taken from the first bag, and if any other face turns up a ball is chosen from the second bag. Find the probability of choosing a black ball.

A. $\frac{7}{15}$

B. $\frac{8}{15}$

C. $\frac{10}{21}$

D. $\frac{11}{21}$

Answer: (d)

Watch Video Solution

3. There are two groups of subjects, one of which consists of 5 science subjects and 3 Engineering subjects and the other consists of 3 science and 5 Engineering subjects. An unbiased die is cast. If number 3 or 5 turns up, a subject from 1 is selected otherwise a subject is selected from group 2. The probability that an Engineering subject is selected ultimately, is

A. $\frac{7}{13}$

B. $\frac{9}{17}$

C. $\frac{13}{24}$

D. $\frac{11}{20}$

Answer: (c)

Watch Video Solution

4. Urn A contains 6 red and 4 black balls and urn B contains 4 red and 6 black balls. One ball is drawn at random from urn A and placed in urn B. Then, one ball is drawn at random from urn B and placed in urn A. If one ball is drawn at random from urn A, the probability that it is found to be red, is....

A. $\frac{6}{11}$

B. $\frac{17}{50}$

C. $\frac{16}{55}$

D. $\frac{32}{55}$

Answer: (d)

Watch Video Solution

5. A box contains N coins, m of which are fair and the rest are biased. The probability of getting a head when a fair coin is tossed is 1/2 while it is 2/3 when a biased coin is tossed. A coin is drawn from the box at random and is tossed twice. The first time it shows head and the second time it shows tail. What is the probability that the coin drawn is fair?

A. $\frac{5m}{m+8n}$

B. $\frac{3m}{m+8N}$

C. $\frac{7m}{m+8N}$

D. $\frac{9m}{m+8N}$

Answer: (d)

Watch Video Solution

6. A pack of playing cards was found to contain only 51 cards. If the first 13 cards, which are examined are all red, then the probability that the missing card is black is :-

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{15}{26}$

D. $\frac{16}{39}$

Answer: (b)

Watch Video Solution

7. A purse contain n coins of unknown values .a coin is drawn from it at random and is found to be a rupee .Then the chance that it is the only rupee coin in the purse is

A. $\frac{1}{n}$

B. $\frac{2}{n+1}$

C. $\frac{1}{(n(n+1))}$

D. $\frac{2}{(n+1)}$

Answer: d

Watch Video Solution

8. A card is lost from a pack of 52 playing cards. From remainder of the pack of a card is drawn and is found to be a spade. The probability that the misssing card is spade, is

A. $\frac{2}{17}$

B. $\frac{3}{17}$

C. $\frac{4}{17}$

D. $\frac{5}{17}$

Answer: c

Watch Video Solution

9. A person is known to speak the truth 4 times out of 5. He throws a die and reports that it is an SIX. The probability that it is actually an six, is

A. $\frac{1}{3}$

B. $\frac{2}{9}$

C. $\frac{4}{9}$

D. $\frac{5}{9}$

Answer: c

Watch Video Solution

10. Each of the n urns contains 4 white and 6 black balls. The $(n+1)$ th urn contains 5 white and 5 black balls. One of the $n+1$ urns is chosen at random and two balls are drawn from it without replacement. Both the balls turn out to be black. If the probability that the $(n+1)$ th urn was chosen to draw the balls is 1/16, then find the value of n .

A. 10

B. 11

C. 13

D. 12

Answer: a

Watch Video Solution

Exercise For Session 4

1. The probability of getting exactly two heads when tossing a coin three times is

A. $\frac{1}{4}$

B. $\frac{1}{8}$

C. $\frac{3}{8}$

D. $\frac{5}{8}$

Answer: (c)

Watch Video Solution

2. A coin is tossed four times. The probability that atleast one heads turns up is

A. $\frac{1}{16}$

B. $\frac{1}{8}$

C. $\frac{7}{8}$

D. $\frac{15}{16}$

Answer: (d)

Watch Video Solution

3. The following is the probability distribution of a random vaiable X.

The value of k is

X	1	2	3	4	5
$P(X)$	0.1	0.2	k	0.3	$2k$

A. $\frac{4}{15}$

B. $\frac{1}{15}$

C. $\frac{1}{5}$

D. $\frac{2}{15}$

Answer: (d)

Watch Video Solution

4. A random variable X has the distribution.

Then , variance of the distribution, is

X	2	3	4
$P(X = x)$	0.3	0.4	0.3

A. 0.6

B. 0.7

C. 1.55

D. 0.77

Answer: (a)

Watch Video Solution

5. A box contains 100 bulbs out of which 10 are defective. A sample of 5 bulbs is drawn. The probability that none is defective , is

A. 10^{-5}

B. 2^{-5}

C. $(0.9)^5$

D. 0.9

Answer: (c)

Watch Video Solution

6. A pair of unbiased dice are rolled together till a sum of either 5 or 7 is obtained. Then find the probability that 5 comes before 7.

A. $\frac{2}{7}$

B. $\frac{2}{5}$

C. $\frac{3}{7}$

D. None of these

Answer: (a)

Watch Video Solution

7. If X follows the binomial distribution with parameters n=6 and p and 9p(X=4)=P(X=2), then p is

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{2}{3}$

Answer: (a)

Watch Video Solution

8. If the probability of a defective bolt is 0.1, find the i. mean and ii. standard deviation for the distribution of bolts in a total of 400 bolts.

A. $30, 3$

B. $40, 5$

C. $30, 4$

D. $40, 6$

Answer: (d)

Watch Video Solution

9. The mean and variance of a binomial distribution are $\frac{5}{4}$ and $\frac{15}{16}$ respectively, then value of p, is

A. $\frac{1}{2}$

B. $\frac{15}{16}$

C. $\frac{1}{4}$

D. $\frac{3}{4}$

Answer: (c)

Watch Video Solution

10. The mean and variance of a binomial distribution are 6 and 4 respectively, then n is

A. 9

B. 12

C. 18

D. 10

Answer: (c)

Watch Video Solution

11. A die is thrown 100 times, getting an even number is considered a success. The variance of the number of successes is

A. 10

B. 20

C. 25

D. 50

Answer: (c)

Watch Video Solution

12. 10% of tools produced by a certain manufacturing process turn out to be defective. Assuming binomial distribution, the probability of 2 defective in sample of 10 tools chosen at random, is

A. 0.368

B. 0.194

C. 0.271

D. Non of these

Answer: (b)

Watch Video Solution

13. If X follows a binomial distribution with parameters $n = 100$ and $p = \frac{1}{3}$, then $P(X = r)$ is maximum when

A. 16

B. 32

C. 33

D. None of these

Answer: (c)

Watch Video Solution

14. The expected value of the number of points, obtained in a single throw of die, is

A. $\frac{3}{2}$

B. $\frac{5}{2}$

C. $\frac{7}{2}$

D. $\frac{9}{2}$

Answer: (c)

Watch Video Solution

15. Two points are taken at random on the given straight line segment of length a. The probability for the distance between them to exceed a given length c, where $0 < c < a$, is

A. $\frac{b}{a}$

B. $\frac{b^2}{a^2}$

C. $\left(\frac{a-b}{a}\right)^2$

D. $\left(\frac{a-2b}{a-b}\right)^2$

Answer: (a)

Watch Video Solution

Exercise Single Option Correct Type Questions

1. There are 2 vans each having numbered seats, 3 in the front and 4 at the back. There are 3 girls and 9 boys to be seated in the vans. The probablity of 3 girls sitting together in a back row on adjacent seats, is

A. $\frac{1}{13}$

B. $\frac{1}{39}$

C. $\frac{1}{65}$

D. $\frac{1}{91}$

Answer: (d)

Watch Video Solution

2. The probability that an year chosen at random has 53 Sundays is :

A. $\frac{1}{7}$

B. $\frac{2}{7}$

C. $\frac{3}{28}$

D. $\frac{5}{28}$

Answer: (b)

Watch Video Solution

3. The probability that a leap year selected ar random contains either 53 sundays or 53 mondays, is

A. $\frac{1}{7}$

B. $\frac{2}{7}$

C. $\frac{3}{7}$

D. $\frac{4}{7}$

Answer: (c)

Watch Video Solution

4. A positive integer N is selected so as to be $100 < N < 200$. Then, the probability that it is divisible by 4 or 7, is

A. $\frac{7}{33}$

B. $\frac{17}{33}$

C. $\frac{32}{99}$

D. $\frac{34}{99}$

Answer: (d)

Watch Video Solution

5. Two numbers are selected at random from 1,2,3,....100 and are multiplied, then the probability correct to two places of decimals that the product thus obtained is divisible by 3, is

A. $\frac{67}{150}$

B. $\frac{83}{150}$

C. $\frac{67}{75}$

D. $\frac{8}{75}$

Answer: (b)

Watch Video Solution

6. Three different numbers are selected at random from the set $A = (1, 2, 3, \ldots, 10)$. The probability that the product of two of the numbers is equal to the third is

A. $\frac{3}{4}$

B. $\frac{1}{40}$

C. $\frac{1}{8}$

D. $\frac{39}{40}$

Answer: (b)

Watch Video Solution

7. The numbers 1,2,3,.., n are arranged in a random order. The probability that the digits $1, 2, 3, \ldots, k(n > k)$ appears as neighbours in that order is

A. $\frac{1}{n!}$

B. $\frac{K!}{n!}$

C. $\frac{(n-k)!}{n!}$

D. $\frac{(n-k+1)!}{n!}$

Answer: (d)

Watch Video Solution

8. The numbers 1,2,3,.., n are arranged in a random order. The probability that the digits $1, 2, 3, \ldots, k(n > k)$ appears as neighbours in that order is

A. $\dfrac{(n-k)!}{n!}$

B. $\dfrac{(n-k+1)!}{.^{n}C_{k}}$

C. $\dfrac{n-k}{,^{n}C_{k}}$

D. $\dfrac{k!}{n!}$

Answer: (b)

Watch Video Solution

9. Four identical dice are rolled once. The probability that at least three different numbers appear on them, is

A. $\dfrac{13}{42}$

B. $\dfrac{17}{42}$

C. $\dfrac{23}{42}$

D. $\dfrac{25}{42}$

Answer: (d)

Watch Video Solution

10. Three of the six vertices of a regular hexagon are chosen the random. What is the probability that the triangle with these vertices is equilateral.

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{10}$

D. $\frac{1}{20}$

Answer: (c)

Watch Video Solution

11. If two of the 64 squares are chosen at random on a chess board, the probability that they have a side in common is

A. $\frac{1}{3}$

B. $\frac{1}{9}$

C. $\frac{1}{18}$

D. $\frac{5}{18}$

Answer: (c)

Watch Video Solution

12. A letter is known to have come from CHENNAI, JAIPUR, NAINITAL, DUBAI and MUMBAI. On the post mark only two consecutive letters AI are legible. Then, the probability that it is come from MUMBAI, is

A. $\frac{42}{319}$

B. $\frac{84}{403}$

C. $\frac{39}{331}$

D. $\frac{42}{331}$

Answer: (b)

Watch Video Solution

13. Let a die is loaded in such a way that prime number faces are twice as likely to occur as a non prime number faces. The probability that an odd number will be show up when die is tossed is-

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{4}{9}$

D. $\frac{5}{9}$

Answer: (d)

Watch Video Solution

14. One ticket is selected at random from 100 tickets numbered 00, 01, 02,.., 99. Suppose A and B are the sum and product of the digit found on the ticket. Then $P(A = 7 / B = 0)$ is given by

A. $\frac{2}{3}$

B. $\frac{2}{19}$

C. $\frac{1}{50}$

D. None of these

Answer: (b)

Watch Video Solution

15. All the spades are taken out from a pack of cards. From these cards; cards are drawn one by one without replacement till the ace of spades comes. The probability that the ace comes in the 4th draw is

A. $\frac{1}{13}$

B. $\frac{12}{13}$

C. $\frac{4}{13}$

D. None of these

Answer: (a)

Watch Video Solution

16. A number is selected at random from the first 25 natural numbers. If it is a composite number, then it is divided by 6. But if it is not a composite number, it is divided by 2. Find the probability that there will be no remainder in the division.

A. $\frac{11}{30}$

B. 0.4

C. 0.2

D. None of these

Answer: (c)

Watch Video Solution

17. A bag contains 50 tickets numbered 1, 2, 3, .., 50 of which five are drawn at random and arranged in ascending order of magnitude `(x_1

A. $\frac{.^{20}C_2 \times .^{29}C_2}{.^{50}C_5}$

B. $\frac{.^{20}C_2}{.^{50}C_5}$

C. $\frac{.^{29}C_2}{.^{50}C_5}$

D. None of these

Answer: (a)

Watch Video Solution

18. India plays two matches each with West Indies and Australia. In any match the probabilities of India getting points $0, 1$ and 2 are $0.45, 0.05$ and 0.50 respectively. Assuming that the outcomes are independent, the probability of India getting at least 7 points is (a) 0.8750 (b) 0.0875 (c) 0.0625 (d) 0.0250

A. 0.8750

B. 0.0875

C. 0.0625

D. 0.0250

Answer: (b)

Watch Video Solution

19. Three six faced dice are tossed together, then the probability that exactly two of the three numbers are equal is :

A. $\frac{165}{216}$

B. $\frac{177}{216}$

C. $\frac{51}{216}$

D. $\frac{90}{216}$

Answer: (d)

Watch Video Solution

20. Three six-faced dice are thrown together. The probability that the sum of the numbers appearing on the dice is $k(3 \leq k \leq 8)$, is

A. $\frac{(k-1)(k-2)}{432}$

B. $\frac{k(k-1)}{432}$

C. $\frac{k^2}{432}$

D. None of these

Answer: (a)

Watch Video Solution

21. A book contains 1000 pages. A page is chosen at random. Find the probability that the sum of the digits of the marked number on the page is equal to 9.

A. $\frac{23}{500}$

B. $\frac{11}{200}$

C. $\frac{7}{100}$

D. None of these

Answer: (b)

Watch Video Solution

22. A bag contains 4 tickets numbered 00, 01, 10 and 11. Four tickets are chosen at random with replacement, the probability that the sum of numbers on the tickets is 22 is

A. $\frac{3}{32}$

B. $\frac{1}{64}$

C. $\frac{5}{256}$

D. $\frac{7}{256}$

Answer: (a)

Watch Video Solution

23. Fifteen coupens are numbered $1, 2, 3, \ldots 15$ respectively. Seven coupons are selected at random one at a time with replacement The Probability that the largest number appearing on a selected coupon is 9 is :

A. $\frac{1}{(15)^7}$

B. $\frac{8}{(15)^7}$

C. $\frac{3}{(5)^7}$

D. None of these

Answer: (c)

Watch Video Solution

24. A box contains tickets numbered 1 to 20.3 tickets are drawn from the box with replacement. The probability that the largest number on the tickets is 7, is

A. $\frac{7}{20}$

B. $1-\left(\frac{7}{20}\right)^3$

C. $\frac{2}{19}$

D. None of these

Answer: (d)

Watch Video Solution

25. An unbiased die with faced marked 1, 2, 3, 4, 5, and 6 is rolled four times. Out of four face value obtained, the probability that the minimum face value is not less than 2 and the maximum face value is not greater than five is then $16/81$ b. $1/81$ c. $80/81$ d. $65/81$

A. $\frac{16}{81}$

B. $\frac{1}{81}$

C. $\frac{80}{81}$

D. $\frac{65}{81}$

Answer: (a)

Watch Video Solution

26. A bag contains four tickets marked with numbers 112, 121, 211,222. One ticket is drawn at random from the bag. Let E_i (i = 1,2,3) denote the event that $i^t h$ digit on the ticket is 2. Then which of the following is incorrect ?

A. E_1 and E_2 are independent

B. E_2 and E_3 are independent

C. E_3 and E_1 are independent

D. E_1, E_2 and E_3 are independent

Answer: (d)

Watch Video Solution

27. Two non negative integers are chosen at random. The probability that the sum of the square is divisible by 10, is

A. $\frac{17}{100}$

B. $\frac{9}{50}$

C. $\frac{7}{50}$

D. $\frac{9}{16}$

Answer: (b)

Watch Video Solution

28. Two positive real numbers x and y satisfying $x \leq 1$ and $y \leq 1$ are chosen at random. The probability that $x + y \leq 1$, given that

$x^2 + y^2 \leq \frac{1}{4}$, is

A. $\frac{\pi}{16}$

B. $\frac{4\pi}{16}$

C. $\frac{\pi}{8}$

D. None of these

Answer: (a)

Watch Video Solution

29. If the lengths of the sides of a triangle are decided by the three thrown of a single fair die,then the probability that the triangle is of maximum area given that it is an isosceles triangle, is

A. $\frac{1}{7}$

B. $\frac{1}{27}$

C. $\frac{1}{14}$

D. None of these

Answer: (b)

Watch Video Solution

Exercise More Than One Correct Option Type Questions

1. For two given event A and B, $P(A \cap B)$ is

A. not less than $P(A) + P(B) - 1$

B. not greater than $P(A) + P(B)$

C. equal to $P(A) + P(B) - P(A \cup B)$

D. equal to $P(A) + P(B) + P(A \cup B)$

Answer: (a,b,c)

Watch Video Solution

2. If E and F are independent events such that $0 < P(E) < 1$ and $0 < P(F) < 1$, then

A. E and F are mutually exclusive

B. E and $\overline{F}$ (complement of the event F) are independent

C. $\overline{E}$ and $\overline{F}$ are independent

D. $P\left(\frac{E}{F}\right) + P\left(\frac{\overline{E}}{F}\right) = 1$

Answer: (b,c,d)

Watch Video Solution

3. For any two events A and B in a sample space, choose the correct option (s)

A. $P\left(\frac{A}{B}\right) \geq \frac{P(A) + P(B) - 1}{P(B)}, P(B) \neq 0$ is always true

B. $P(A \cap \overline{B}) = P(A) - P(A \cap B)$, does not hold

C. $P(A \cup B) = 1 - P(\overline{A})P(\overline{B})$, If A and B are independent

D. $P(A \cup B) = 1 - P(\overline{A})P(\overline{B})$, if A and B are independent

Answer: (a,c)

Watch Video Solution

4. E and F are two independent events. The probability that both e and F happen is 1/12 and the probability that neither E nor F happens is 1/2. Then

A. $P(E) = \frac{1}{3}, P(F) = \frac{1}{4}$

B. $P(E) = \frac{1}{6}, P(F) = \frac{1}{2}$

C. $P(E) = \frac{1}{2}, P(F) = \frac{1}{6}$

D. $P(E) = \frac{1}{4}, P(F) = \frac{1}{3}$

Answer: (a,d)

Watch Video Solution

5. If $\overline{E}$ and $\overline{F}$ are the complementary events of E and F respectively and if $0 < P(F) < 1$, then

A. $P\left(\frac{\overline{E}}{F}\right) + P\left(\frac{\overline{E}}{F}\right) = 1$

B. $P\left(\frac{E}{F}\right) + P\left(\frac{E}{\overline{F}}\right) = 1$

C. $P\left(\frac{\overline{E}}{F}\right) + P\left(\frac{E}{\overline{F}}\right) = 1$

D. $P\left(\frac{E}{\overline{F}}\right) + P\left(\frac{\overline{E}}{\overline{F}}\right) = 1$

Answer: (a,b)

6. If $0 < P(A) < 1, 0 < P(B) < 1$ and $P(A \cup B) = P(A) + P(B) - P(A)P(B)$, then

A. $P(B - A) = P(A) - P(A)$

B. $P(A' \cup B') = P(A') + P(B')$

C. $P((A \cup B)') = P(A')P(B')$

D. $P\left(\frac{A}{B}\right) = P(A)$

Answer: (c,d)

Watch Video Solution

7. If A and B are two events, the probability that exactly one of them occurs is given by

A. $P(A) + P(B) - 2P(A \cap B)$

B. $P(A \cap B') + P(A' \cap B)$

C. $P(A \cup B) - P(A \cap B)$

D. $P(A') + P(B') - 2P(A' \cap B')$

Answer: (a,b,c,d)

Watch Video Solution

8. If A and B are two independent events such that $P(A) = \frac{1}{2}$ and $P(B) = \frac{1}{5}$, then which of the following is incorrect ?

A. $P(A \cup B) = \frac{3}{5}$

B. $P\left(\frac{A}{B}\right) = \frac{1}{2}$

C. $P\left(\frac{A}{A \cup B}\right) = \frac{5}{6}$

D. $P\left(\frac{A \cap B}{A' \cup B'}\right) = 0$

Answer: (a,b,c,d)

Watch Video Solution

9. A student appears for tests 1, 2 and 3. The studentis successful if he passes either in tests 1 and 2 or tests 1 and 3. The probabilities of the student passing in tests 1, 2 and 3 are p, q and $\frac{1}{2}$, respectively. If the probability that the student is successful is $\frac{1}{2}$, then

A. $p = 1, q = 0$

B. $p=\frac{2}{3}, q=\frac{1}{2}$

C. $p=\frac{3}{5}, q=\frac{2}{3}$

D. infinitely values of p and q

Answer: (a,b,c)

Watch Video Solution

10. Let X be a set containing n elements. If two subsets A and B of X are picked at random, the probability that A and B have the same number of elements is

A. $\frac{.^2 nC_n}{2^n}$

B. $\frac{1}{.^2 nC_n}$

C. $\frac{1\cdot3\cdot5...(2n-1)}{2^n\cdot n!}$

D. $\frac{3^n}{4^n}$

Answer: (a,c)

Watch Video Solution

11. Suppose m boys and m girls take their seats randomly around a circle. The probability of their sitting is $\left(.^{2m+1}C_n\right)^{-1}$, when

A. no two boys sit together

B. no two girls sit together

C. boys and girls sit alternately

D. all the boys sit together

Answer: (a,b,c)

Watch Video Solution

12. The probabilities that a student passes in Mathematics,Physics and Chemistry are m, p and c, respectively. Of these subjects, the student has a 75% chance of passing in at least one, a 50% chance of passing in at least two and a 40% chance of passing in exactly two. Which of the following relations are true?

A. $P + m + c = \frac{19}{20}$

B. $p + m + c = \frac{27}{20}$

C. $\pm c = \frac{1}{10}$

D. $\pm c = \frac{1}{4}$

Answer: (b,c)

Watch Video Solution

13. $(n \geq 5)$ persons are sitting in a row. Three of these are selected at random. The probability that no two of the selected persons sit together is

A. $\frac{.^{n-3}P_2}{.^{n}P_2}$

B. $\frac{.^{n-3}C_2}{.^{n}C_2}$

C. $\frac{(n-3)(n-4)}{n(n-1)}$

D. $\frac{.^{n-3}C_2}{.^nP_2}$

Answer: (a,b,c,d)

Watch Video Solution

14. Given that $x \in [0, 1]$ and $y \in [0, 1]$. Let A be the event of selecting a point (x, y) satisfying $y^2 \geq x$ and B be the event selecting a point (x, y) satisfying $x^2 \geq y$, then

A. $P(A \cap B) = \frac{1}{3}$

B. A and B are exhuastive

C. A and B are mutually

D. A and B are independent

Answer: (b,c,d)

Watch Video Solution

15. If the probability of choosing an integer 'k' out of 2n integers 1, 2, 3, ..., 2n is inversely proportional to $k^4(1 \leq k \leq 2n)$. If α is the probability that chosen number is odd and β is the probability that chosen number is even, then (A) $\alpha > \frac{1}{2}$ (B) $\alpha > \frac{2}{3}$ (C) $\beta < \frac{1}{2}$ (D) $\beta < \frac{2}{3}$

A. $\alpha > \frac{1}{2}$

B. $\alpha > \frac{2}{3}$

C. $\beta \leq \frac{1}{2}$

D. $\left(\beta < \frac{2}{3}\right)$

Answer: (a,c)

Watch Video Solution

Exercise Passage Based Questions

1. If $pandq$ are chosen randomly from the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ with replacement, determine the probability that the roots of the equation $x^2 + px + q = 0$ are real.

A. 0.38

B. 0.03

C. 0.59

D. 0.89

Answer: (c)

Watch Video Solution

2. If $pandq$ are chosen randomly from the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ with replacement, determine the probability that the roots of the equation $x^2 + px + q = 0$ are real.

A. 0.58

B. 0.55

C. 0.38

D. 0.03

Answer: (d)

Watch Video Solution

3. If $p and q$ are chosen randomly from the set $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ with replacement, determine the probability that the roots of the equation $x^2 + px + q = 0$ are real.

A. 0.62

B. 0.38

C. 0.59

D. 0.89

Answer: (b)

Watch Video Solution

4. A chess game between two grandmasters X and Y is won by whoever first wins a total of two games. X's chances of winning or loosing any perticular game are a, b and c, respectively. The games are independent and a+b+c=1.

The probability that X wins the match after (n+1)th game $(n \geq 1)$, is

A. na^2b^{n-1}

B. $na^2b^{n-2}(b+(n-1)c)$

C. na^2bc^{n-1}

D. $nab^{n-1}(b+nc)$

Answer: (b)

View Text Solution

5. A chess game between two grandmasters X and Y is won by whoever first wins a total of two games. X's chances of winning or loosing any perticular game are a, b and c, respectively. The games are independent and a+b+c=1.

The probability that Y wins the match after the 4th game, is

A. $abc(2a + 3b)$

B. $bc^2(a + 3b)$

C. $2ac^2(b + c)$

D. $3bc^2(2a + b)$

Answer: (d)

Watch Video Solution

6. A chess game between two grandmasters X and Y is won by whoever first wins a total of two games. X's chances of winning or loosing any perticular game are a, b and c, respectively. The games are independent and a+b+c=1.

The probability that X wins the match, is

A. $\frac{a^{a+2c}}{(a+c)^3}$

B. $\dfrac{a^3}{(a+c)^3}$

C. $\dfrac{a^2(a+3c)}{(a+c)^3}$

D. $\dfrac{c^3}{(a+c)^3}$

Answer: (c)

Watch Video Solution

7. There are n students in a class. Ler $P(E_\lambda)$ be the probability that exactly λ out of n pass the examination. If $P(E_\lambda)$ is directly proportional to $\lambda^2 (0 \leq \lambda \leq n)$.

Proportional constant k is equal to

A. $\dfrac{1}{\sum n}$

B. $\dfrac{1}{\sum n^2}$

C. $\dfrac{1}{\sum n^3}$

D. $\dfrac{1}{\sum n^4}$

Answer: (b)

Watch Video Solution

8. There are n students in a class. Ler $P(E_\lambda)$ be the probability that exactly λ out of n pass the examination. If $P(E_\lambda)$ is directly proportional to $\lambda^2(0 \leq \lambda \leq n)$.

Proportional constant k is equal to

A. 0.25

B. 0.5

C. 0.75

D. 0.35

Answer: (c)

Watch Video Solution

9. There are n students in a class. Ler $P(E_\lambda)$ be the probability that exactly λ out of n pass the examination. If $P(E_\lambda)$ is directly proportional to $\lambda^2 (0 \leq \lambda \leq n)$.

If a selected student has been found to pass the examination, then the probability that he is the only student to have passed the examination, is

A. $\frac{1}{\sum n}$

B. $\frac{1}{\sum n^2}$

C. $\frac{1}{\sum n^3}$

D. $\frac{1}{\sum n^4}$

Answer: (c)

Watch Video Solution

10. A cube having all of its sides painted is cut by two horizontal, two vertical, and other two planes so as to form 27 cubes all having the same dimensions. Of these cubes, a cube is selected at random.

The total number of cubes having at least one of its sides painted is

A. 14

B. 18

C. 22

D. 26

Answer: (d)

Watch Video Solution

11. A cube having all of its sides painted is cut to be two horizontal , two vertical and other two planes, so as to form 27 cubes all having the same dimesions of these cubes, a cube is selected at random.

If P_3 be the probability that the cube selected has none of its sides painted, then the value of $27P_3$, is

A. 3

B. 8

C. 12

D. 17

Answer: (c)

Watch Video Solution

12. A cube having all of its sides painted is cut to be two horizontal , two vertical and other two planes, so as to form 27 cubes all having the same dimesions of these cubes, a cube is selected at random.

If P_3 be the probability that the cube selected has none of its sides painted, then the value of $27P_3$, is

A. 1

B. 2

C. 3

D. 5

Answer: (a)

Watch Video Solution

13. A JEE aspirant estimates that she will be successful with an 80 percent chance if she studies 10 hours per day, with a 60 percent chance if she studies 7 hours per day and with 40 percent chance if she studies 4 hours per day. She further believes that she will study 10 hours, 7 hours and 4 hours per day with probabilities 0.1, 0.2 and 0.7 respectively.

A. 0.28

B. 0.38

C. 0.48

D. 0.58

Answer: (c)

Watch Video Solution

14. A JEE aspirant estimates that she will be successful with an 80 percent chance if she studies 10 hours per day, with a 60 percent chance if she studies 7 hours per day and with 40 percent chance if she studies 4 hours per day. She further believes that she will study 10 hours, 7 hours and 4 hours per day with probabilities 0.1, 0.2 and 0.7 respectively.

A. $\frac{1}{12}$

B. $\frac{5}{12}$

C. $\frac{7}{12}$

D. $\frac{11}{12}$

Answer: (c)

Watch Video Solution

15. A JEE aspirant estimates that she will be successful with an 80 percent chance if she studies 10 hours per day, with a 60 percent chance if she studies 7 hours per day and with 40 percent chance if she studies 4 hours per day. She further believes that she will study 10 hours, 7 hours and 4 hours per day with probabilities 0.1, 0.2 and 0.7 respectively.

A. $\frac{15}{26}$

B. $\frac{17}{26}$

C. $\frac{19}{26}$

D. $\frac{21}{26}$

Answer: (d)

Watch Video Solution

16. Suppose E_1, E_2 and E_3 be three mutually exclusive events such that $P(E_i) = p_i$ for $i = 1, 2, 3.$

If p_1, p_2 and p_3 are the roots of $27x^3 - 27x^2 + ax - 1 = 0$ the value of a is

A. 3

B. 6

C. 9

D. 12

Answer: (c)

Watch Video Solution

17. Suppose E_1, E_2 and E_3 be three mutually exclusive events such that $P(E_i) = p_i$ for $i = 1, 2, 3$.

P(none of E_1, E_2, E_3) equals

A. 0

B. 1-$(p_1 + p_2 + p_3)$

C. $(1 - p_1)(1 - p_2)(1 - P_3)$

D. None of these

Answer: (b)

Watch Video Solution

18. Suppose E_1, E_2 and E_3 be three mutually exclusive events such that

$P(E_i) = p_i$ for $i = 1, 2, 3.$

$P\left(E_1 \cap \overline{E_2}\right) + P\left(E_2 \cap \overline{E_3}\right) + P\left(E_3 \cap \overline{E_1}\right)$ equals

A. $p_1(1 - p_2) + p_2(1 - P_3) + p_3(1 - p_1)$

B. $p_1p_2 + p_2p_3 + p_3p_1$

C. 0

D. None of these

Answer: (c)

Watch Video Solution

19. Let $A = \{1, 2, 3\}$ and $B = \{-2, -1, 0, 1, 2, 3\}$. The probability of increasing functions from A to B, is

A. $\frac{1}{27}$

B. $\frac{1}{18}$

C. $\frac{5}{54}$

D. $\frac{7}{54}$

Answer: (c)

Watch Video Solution

20. Let $A = \{1, , 2, 3\}$ and $B = \{-2, -1, 0, 1, 2, 3\}$.

The probability of non decreasing functions from A to B, is

A. $\frac{5}{27}$

B. $\frac{7}{27}$

C. $\frac{1}{3}$

D. $\frac{11}{27}$

Answer: (b)

Watch Video Solution

21. Let $A = \{1, , 2, 3\}$ and $B = \{-2, -1, 0, 1, 2, 3\}$.

The probability of increasing functions from A to b, is

A. $\frac{53}{144}$

B. $\frac{35}{144}$

C. $\frac{29}{72}$

D. $\frac{25}{72}$

Answer: (a)

Watch Video Solution

22. A random variable X takes the values $0, 1, 2, 3, \ldots,$ with prbability $PX(= x) = k(x+1)\left(\frac{1}{5}\right)^x$, where k is a constant, then $P(X = 0)$ is.

A. $\frac{2}{25}$

B. $\frac{4}{25}$

C. $\frac{9}{25}$

D. $\frac{16}{25}$

Answer: (d)

Watch Video Solution

23. A random variable X takes values 0, 1, 2, 3,... with probability proportional to $(x+1)\left(\frac{1}{5}\right)^{x}$.

$P(X \geq 2)$ equals

A. $\frac{11}{25}$

B. $\frac{13}{25}$

C. $\frac{11}{125}$

D. $\frac{13}{125}$

Answer: (d)

Watch Video Solution

24. A random variable X takes values $0, 1, 2, \ldots\ldots$ with probability proportional to (x with proba bility proportional to $(x+1)\left(\frac{1}{5}\right)^{x}$, , then $5 \cdot \left[P(x \leq 1)^{\frac{1}{2}}\right]$ equals

A. $\frac{1}{4}$

B. 2

C. $\frac{1}{2}$

D. 4

Answer: (c)

Watch Video Solution

25. Let $n = 10\lambda + r, \text{ where } \lambda, r \in N, 0 \leq r \leq 9.$ A number a is chosen at random from the set {1, 2, 3,..., n} and let p_n denote the probability that $(a^2 - 1)$ is divisible by 10.

If r=0, then np_n equals

A. 2λ

B. $(\lambda + 1)$

C. $(2\lambda + 1)$

D. λ

Answer: (a)

View Text Solution

26. Let $n = 10\lambda + r, where \lambda, r \in N, 0 \leq r \leq 9.$ A number a is chosen at random from the set {1, 2, 3,...., n} and let p_n denote the probability that $(a^2 - 1)$ is divisible by 10.

If r=9, then np_n equals

A. 2λ

B. $2(\lambda + 1)$

C. $2\lambda + 1$

D. λ

Answer: (b)

View Text Solution

27. Let $n = 10\lambda + r, where\lambda, r \in N, 0 \leq r \leq 9.$ A number a is chosen at random from the set {1, 2, 3,...., n} and let p_n denote the probability that $(a^2 - 1)$ is divisible by 10.

If $1 \leq r \leq 8,$ then `np_n equals

A. $2\lambda - 1$

B. 2λ

C. $(2\lambda + 1)$

D. λ

Answer: (c)

View Text Solution

Exercise Single Integer Answer Type Questions

1. A bag contains $n+1$ coins. If is known that one of these coins shows heads on both sides, whereas the other coins are fair. One coin is selected at random and tossed. If the probability that toss results in heads is 7/12, then find the value of n.

Watch Video Solution

2. A determinant of the second order is made with the elements 0 and 1. If $\frac{m}{n}$ be the probability that the determinant made is non negative, where m and n are relative primes, then the value of n-m is

Watch Video Solution

3. Three students appear at an examination of mathematics. The probability of their success are $\frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ respectively. Find the probability of success of at least two.

Watch Video Solution

4. A die is rolled thrice, find the probability of getting a larger number each time than the previous number.

Watch Video Solution

5. In a multiple choice question, there are five alternative answers of which one or more than one are correct. A candidate will get marks on the question, if he ticks all the correct answers. If he decides to tick answer all random, then the least number of choices should he be allowed, so that the probability of his getting marks on the question exceeds $\frac{1}{8}$ is

Watch Video Solution

6. There are n different objects 1, 2, 3, ..., n distributed at random in n places marked 1, 2, 3,..., n. If p be the probability that atleast three of the object occupy places corresponding to their number, then the value of 6p is

Watch Video Solution

7. A sum of money is rounded off to the nearest rupee, if $\left(\frac{m}{n}\right)^2$ be the probability that the round off error is atleast ten prizes, where m and n are positive relative primes, then value of (n-m) is

Watch Video Solution

8. A special die is so constructed that the probabilities of throwing 1, 2, 3, 4, 5 and 6 are $\frac{1-k}{6}, \frac{1+2k}{6}, \frac{1-k}{6}, \frac{1+k}{6}, \frac{1-2k}{6}$ and $\frac{1+k}{6}$, respectively. If two such thrown and the probability of getting a sum equal to lies between $\frac{1}{9}$ and $\frac{2}{9}$, then the integral value of k is

View Text Solution

9. Seven digits from the numbers 1 to 9 are written in random order. If the probability that this seven digit number divisible by 9 is p, then the value of 18p is

Watch Video Solution

10. 8 players $P_1, P_2, P_3, \ldots, P_8$ play a knock out tournament. It is known that all the players are of equal strength. The tournament is held in three rounds where the players are paired at random in each round. If it is given that P_1 wins in the third round. If p be the probability that P_2 loses in second round, then the value of 7p is

Watch Video Solution

Exercise Statement I And Ii Type Questions

1. Statement-1 If 10 coins are thrown simultaneously, then the probability of appearing exactly foour heads is equal to probability of apppearing exactly six heads.

Statement-2 $.^{n} C_{r} = .^{n} C_{s} \Rightarrow$ either r=s or r+s=n and P(H)=P(T) in a single trial.

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: a

Watch Video Solution

2. Statement-1 If A is any event and $P(B) = 1$, then A and B are independent

Statement-2 $P(A \cap B) = P(A) \cdot P(B)$, if A and B are independent

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: a

Watch Video Solution

3. Statement-1 If A and B be the event in a sample space, such that $P(A) = 0.3 \text{ and } P(B) = 0.2,$ then $P\left(A \cap \overline{B}\right)$ cannot be found. Statement-2 $P\left(A \cap \overline{B}\right) = P(A) + P\left(\overline{B}\right) - P\left(A \cap \overline{B}\right)$

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: a

Watch Video Solution

4. Statement-1 Let A and B be the two events, such that $P(A \cup B) = P(A \cap B)$, then $P(A \cap B') = P(A' \cap B) = 0$

Statement-2 Let A and B be the two events, such that $P(A \cup B) = P(A \cap B)$, then $P(A) + P(B) = 1$

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: c

Watch Video Solution

5. A fair die is rolled once. Statement 1: the probability of getting a composite number is 1/3. Statement2: There are three possibilities for the obtained number (i) the number is a prime number, (ii) the number is a composite number, and (iii) the number is 1. Hence, probability of getting a prime number is 1/3.

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: c

Watch Video Solution

6. From a well shuffled pack of 52 playing cards, a card is drawn at random. Two events A and B are defined as

A: Red card is drawn

B: Card drawn is either a diamond or heart.

Statement: $P(A+B)=P(AB)$

Statement-2: $A \subseteq B$ and $B \subseteq A$

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: a

Watch Video Solution

7. Statement-1: The probability that A and B can solve a problem is $\frac{1}{2}$ and $\frac{1}{3}$ respectively, then the probability that problem will be solved $\frac{5}{6}$.

Statement-2: Above mentioned events are independent events.

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: d

Watch Video Solution

8. Statement-1: Out of 21 tickets with number 1 to 21, 3 tickets are drawn at random, the chance that the numbers on them are in AP is $\frac{10}{133}$.

Statement-2: Out of (2n+1) tickets consecutively numbered three are drawn at ranodm, the chance that the number on them are in AP is (4n-10)/$\left(4n^2 - 1\right)$.

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: c

Watch Video Solution

9. Statement-1: if A and B are two events, such that $0 < P(A), P(B) < 1$, then $P\left(\frac{A}{\overline{B}}\right) + P\left(\frac{\overline{A}}{\overline{B}}\right) = \frac{3}{2}$

Statement-2: If A and B are two events, such that $0 < P(A), P(B) < 1$, then

$$P(A/B) = \frac{P(A \cap B)}{P(B)} \text{ and } P(\overline{B}) = P(A \cap \overline{B}) + P(\overline{A} \cap \overline{B})$$

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: d

View Text Solution

10. In a T-20 tournament, there are five teams. Each teams plays one match against every other team.

Each team has 50% chance of winning any game it plays. No match ends in a tie.

Statement-1: The Probability that there is an undefeated team in the tournament is $\frac{5}{16}$.

Statment-2: The probability that there is a winless team is the tournament is $\frac{3}{16}$.

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: c

Watch Video Solution

11. Statement-1: If p is chosen at random in the closed interval [0,5], then the probability that the equation

$x^2 + px + \frac{1}{4}(+ 2) = 0$ has real is $\frac{3}{5}$.

Statement-2: If discriminant ≥ 0, then roots of the quadratic equation are always real.

A. Statement-1 is true, Statement-2 is true: Statement-2 is a correct explanation for Statement-1

B. Statement-1 is true, Statement-2 is true: Statement-2 is not a correct explanation for Statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: d

Watch Video Solution

12. A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5red balls. One ball is drawn at random from one of the bags and is found to be red. Find the probability that it was drawn as red.

Watch Video Solution

Exercise Subjective Type Questions

1. A five digit number is formed by the digit 1,2,3,4 and 5 without repetition. Find the probability that the number formed is divisible by 4.

Watch Video Solution

2. A die is rolled thrice, find the probability of getting a larger number each time than the previous number.

Watch Video Solution

3. A car is parked among N cars standing in a row but not at either end. On his return, the owner finds that exactly r of the N places are still occupied. What is the probability that both the places neighbouring his car are empty?

Watch Video Solution

4. Two teams A and B play a tournament. The first one to win (n+1) games win the series. The probability that A wins a game is p and that B wins a game is q (no ties). Find the probability that A wins the series. Hence or otherwise prove that $\sum (r=0)(n)^{n+1}C_r \cdot \frac{1}{2^{n+r}} = 1.$

View Text Solution

5. An artillery target may be either at point I with probability 8/9 or at point II with probability 1/9 we have 55 shells, each of which can be fired either rat point I or II. Each shell may hit the target, independent of the other shells, with probability 1/2. Maximum number of shells must be fired a point I to have maximum probability is 20 b. 25 c. 29 d. 35

Watch Video Solution

6. There are 6 red and 8 green balls in a bag. 5 balls are drawn at random and placed in a red box. The remaining balls are placed in a green box. What is the probability that the number of red balls in the green box plus the number of green balls in the red box is not a prime number?

Watch Video Solution

7. An urn contains 'a' green and 'b'pink balls $k(< , a, b)$ balls are drawn and laid a side, their colour being ignored. Then , one more ball is drawn. Find the probability that it is green.

Watch Video Solution

8. A fair coin is tossed 12 times. Find the probability that two heads do not occur consectively.

Watch Video Solution

9. Given that $x + y = 2a$, where a is constant and that all values of x between 0 and 2a are equally likely, then show that the chance that $xy > \frac{3}{4}a^2, , is \frac{1}{2}$.

Watch Video Solution

10. A chess game between two grandmasters X and Y is won by whoever first wins a total of two games. X's chances of winning or loosing any perticular game are a, b and c, respectively. The games are independent and a+b+c=1.

The probability that X wins the match, is

Watch Video Solution

11. Of three independent events, the chance that only the first occurs is a, the chance that only the second occurs is b and the chance of only third is c. if x is a root of the equation $(a+x)(b+x)(c+x)=x^2$, then chance of three events are respectively :

Watch Video Solution

12. A is a set containg n elements. A subset P of A is chosen at random and the set A is reconstructed by replacing the random. Fond the probability that $P \cup Q$ contains exactoly r elements with $1 \leq r \leq n$.

View Text Solution

13. An electric component manufactured by$'RASU$ electronics' is tested for its defectiveness by asophisticated testing device. Let A denote the event the device is defective and B the event thetesting device reveals the component to be defective. Suppose $P\left(\frac{B}{A}\right)=a.$ and $P\left(\frac{B'}{A'}\right)=1-\alpha,$ where $0<\alpha<1.$ If the probability that the component is not defective is λ. then the value of 4λ is

Watch Video Solution

14. A bag contains n white and n red balls. Pairs of balls are drawn without replacement until the bag is empty. Show that the probability that each pair consists of one white and one red ball is $\frac{2^n}{\hat{} (2n) C_n}$

Watch Video Solution

15. m balls are distributed among a boys and b girls. Prove that the probability that odd numbers of balls are distributed to boys is $\frac{(b+a)^m - (b+a)^m}{2(a+b)^m}$.

Watch Video Solution

Exercise Questions Asked In Previous 13 Years Exam

1. A person goes to office either by car, scooter, bus or train probability of which being $\frac{1}{7}, \frac{3}{7}, \frac{2}{7}$ and $\frac{1}{7}$ respectively. Probability that he reaches office late, if he takes car, scooter, bus or train is $\frac{2}{9}, \frac{1}{9}, \frac{4}{9}$ and $\frac{1}{9}$ respectively. Given that he reached office in time, then what is the probability that he travelled by a car?

Watch Video Solution

2. A six faced fair die is thrown until 1 comes. Then , the probability that 1 comes in even number is trials, is

A. $\frac{5}{11}$

B. $\frac{5}{6}$

C. $\frac{6}{11}$

D. $\frac{1}{6}$

Answer: A

Watch Video Solution

3. Let A and B be two events such that $P\left(\overline{A \cup B}\right) = \frac{1}{6}, P(A \cap B) = \frac{1}{4}$ and $P\overline{A} = \frac{1}{4}$,where $\overline{A}$ stands for complement of event A. then , events A and B are

A. independent but not equally likely

B. mutually exculusive and independent

C. equally likely and mutually exclusive

D. equally likely but not independent

Answer: A

Watch Video Solution

4. Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that all the three apply for the same house , is

A. $\frac{8}{9}$

B. $\frac{7}{9}$

C. $\frac{2}{9}$

D. $\frac{1}{9}$

Answer: D

Watch Video Solution

5. A randam variable X has Poisson's distribution with mean 2. Then , $P(X) > 1.5)$ is equal to

A. $1 - \frac{3}{e^2}$

B. $\frac{3}{e^2}$

C. $\frac{2}{e^2}$

D. 0

Answer: A

Watch Video Solution

6. There are n urns each containing (n+1) balls such that ith urn contains i white balls and (n+1-i) red balls.

Watch Video Solution

7. In a telephone enquiry system, the number of phone calls regarding relevant enquiry follow poisson distribution with an average of five phone calls during 10-minute time intervals. The probability that there is at the most one phone call during a 10-minute time period is

A. $\frac{6}{5^e}$

B. $\frac{5}{6}$

C. $\frac{6}{55}$

D. $\frac{6}{e^5}$

Answer: D

Watch Video Solution

8. One Indian and four American men and their wives are to be seated randomly around a circular table. Then the conditional probability that the Indian man is seated adjacent to his wife given that each American man is seated adjacent to his wife is

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{2}{3}$

D. $\frac{1}{5}$

Answer: C

Watch Video Solution

9. Let $H_1, H_2, \ldots, H_n$ be mutually exclusive events with $P(H_i) > 0, i = 1, 2, \ldots\ldots\ldots n$. Let E be any other event with $0 < P(E)$

Statement I $P(H_i \mid E) > P(E \mid H_i . P(H_i)$ for $i = 1, 2, ..., n$

statement II $\sum_{i=1}^{n} P(H_i) = 1$

A. Statement -1 is true , Statement -2 is true, Statement -2 is a correct explanation for Statement -1

B. Statement -1 is true , Statement -2 is true, Statement -2 is not a correct explanation for Statement -1

C. Statement -1 is true , Statement -2 is false

D. Statement-1 is false, Statement-2 is true

Answer: D

Watch Video Solution

10. Let E^c denote the complement of an event E. Let E, F, G be pairwise independent events with $P(G) > 0$ and $P(E \cap F \cap G) = 0$ Then $P(E^c \cap F^c \cap G)$ equals (A) $P(E^c) + P(F^c)$ (B) $P(E^c) - P(F^c)$ (C) $P(E^c) - P(F)$ (D) $P(E) - P(F^c)$

A. $P(E^c) + P(F^c)$

B. $P(E^c) - P(F^c)$

C. $P(E^c) - P(F)$

D. $P€ - P(F^c)$

Answer: C

Watch Video Solution

11. A pair of fair dice is thrown independently three times. The probability of getting a score of exactly 9 twice is (1) 1/729 (2) 8/9 (3) 8/729 (4) 8/243

A. $\frac{1}{729}$

B. $\frac{8}{9}$

C. $\frac{8}{729}$

D. $\frac{8}{243}$

Answer: D

Watch Video Solution

12. Two aeroplanes I and II bomb a target in succession. The probabilities of I and II scoring a hit correctly are 0.3 and 0.2, respectively. The second plane will bomb only if the first misses the target. The probability that the target is hit by the second plane is (1) 0.06 (2) 0.14 (3) 0.2 (3) 0.7

A. 0.06

B. 0.14

C. 0.2

D. 0.7

Answer: B

Watch Video Solution

13. An experiment has 10 equally likely outcomes. Let A and B be two non-empty events of the experiment. If A consists of 4 outcomes, the number of outcomes that B must have so that A and B are independent, is (A) 2, 4 or 8 (B) 3, 6 or 9

A. 2,4 or 8

B. 3,6 or 9

C. 4 or 8

D. 5 or 10

Answer: D

Watch Video Solution

14. Consider the system of equations ax + by = 0; cx + dy = 0, where $a, b, c, d \in \{0, 1\}$)STATEMENT-1: The probability that the system of equations has a unique solution is 3/8 STATEMENT-2: The probability that the system of equations has a solution is 1

A. Statement -1 is true , Statement -2 is true, Statement -2 is a correct explanation for Statement -1.

B. Statement -1 is true , Statement -2 is true, Statement -2 is not a correct explanation for Statement -1.

C. Statement -1 is true , Statement -2 is false.

D. Statement-1 is false, Statement-2 is true

Answer: B

Watch Video Solution

15. A die is thrown. Let A be the event that the number obtained is greater than 3. Let B be the event that the number obtained is less than 5. Then $P(A \cup B)$ is (1) $\frac{3}{5}$ (2) 0 (3) 1 (4) $\frac{2}{5}$

A. 0

B. 1

C. `(2)/(5)

D. $\frac{3}{5}$

Answer: B

Watch Video Solution

16. It is given that the events A and B are such that $P(A)=\frac{1}{4}, P\left(\frac{A}{B}\right)=\frac{1}{2}$ and $P\left(\frac{B}{A}\right)=\frac{2}{3}$. Then $P(B)$ is

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{1}{2}$

D. $\frac{1}{6}$

Answer: A

Watch Video Solution

17. A fair die is tossed repeatedly until a six is obtained Let X denote the number of tosses required The probability that $X=3$ equals

A. $\frac{25}{216}$

B. $\frac{25}{36}$

C. $\frac{5}{36}$

D. $\frac{125}{216}$

Answer: A

Watch Video Solution

18. A fair die is tossed repeated until a six is obtained. Let X denote the number of tosses required.

The probability that $X \geq 3$ is

A. $\frac{125}{216}$

B. $\frac{25}{36}$

C. $\frac{5}{36}$

D. $\frac{25}{216}$

Answer: B

Watch Video Solution

19. A fair die is tossed repeatedly until a six obtained. Let X denote the number of tosses required.

The conditional probability that $X \geq 6$ given $X > 3$ equals

A. $\frac{125}{216}$

B. $\frac{25}{216}$

C. $\frac{5}{36}$

D. $\frac{25}{216}$

Answer: D

Watch Video Solution

20. In a binomial distribution $B\left(n, p=\frac{1}{4}\right)$, if the probability of at least one success is greater than or equal to $\frac{9}{10}$, then n is greater than (1) $\frac{1}{(\log)_{10}^{4}-(\log)_{10}^{3}}$ (2) $\frac{1}{(\log)_{10}^{4}+(\log)_{10}^{3}}$ (3) $\frac{9}{(\log)_{10}^{4}-(\log)_{10}^{3}}$ (4) $\frac{4}{(\log)_{10}^{4}-(\log)_{10}^{3}}$

A. $\frac{4}{\log_{10}4-\log_{10}3}$

B. $\frac{4}{\log_{10}4-\log_{10}3}$

C. $\frac{1}{\log_{10}4+\log_{10}3}$

D. $\frac{9}{\log_{10}4-\log_{10}3}$

Answer: B

Watch Video Solution

21. One ticket is selected at random from 50 tickets numbered 00, 01, 02, ... , 49. Then the probability that the sum of the digits on the selected ticket is 8, given that the product of these digits is zero, equals (1) 1/14 (2) 1/7 (3) 5/14 (4) 1/50

A. $\frac{1}{50}$

B. $\frac{1}{14}$

C. $\frac{1}{7}$

D. $\frac{5}{14}$

Answer: B

Watch Video Solution

22. Let ω be a complex cube root unity with $\omega \neq 1$. A fair die is thrown three times. If $r_1, r_2 and r_3$ are the numbers obtained on the die, then the probability that $\omega^{r1} + \omega^{r2} + \omega^{r3} = 0$ is $1/18$ b. $1/9$ c. $2/9$ d. $1/36$

A. $\frac{1}{18}$

B. $\frac{1}{9}$

C. $\frac{2}{9}$

D. $\frac{1}{36}$

Answer: C

Watch Video Solution

23. A signal which can be green or red with probability $\frac{4}{5}$ and $\frac{1}{5}$ respectively, is received by station A and then and 3 transmitted to station B. The probability of each station receiving the signal correctly is $\frac{3}{4}$ If the signal received at station B is green, then the probability that the original signal was green is (a) $\frac{3}{5}$ (b) $\frac{6}{7}$ (d) $\frac{20}{23}$ (d) $\frac{9}{20}$

A. $\frac{3}{5}$

B. $\frac{6}{7}$

C. $\frac{20}{23}$

D. $\frac{9}{20}$

Answer: C

Watch Video Solution

24. Four numbers are chosen at random (without replacement) from the set {1, 2, 3, ..., 20}. Statement-1: The probability that the chosen numbers when arranged in some order will form an AP Is $\frac{1}{85}$. Statement-2: If the four chosen numbers from an AP, then the set of all possible values of common difference is {1, 2, 3, 4, 5}. (1) Statement-1 is true, Statement-2 is true; Statement-2 is not the correct explanation for Statement-1 (2) Statement-1 is true, Statement-2 is false (3) Statement-1 is false, Statement-2 is true (4) Statement-1 is true, Statement-2 is true; Statement-2 is the correct explanation for Statement-1

A. Statement -1 is true , Statement -2 is true, Statement-2 is a correct explanation for Statement -1.

B. Statement -1 is true, Statement -2 is false

C. Statement -1 is false , Statement -2 is true

D. Statement-1 is true, Statement-2 is true, Statement-2 is not a correct explanation for Staement-1.

Answer: B

Watch Video Solution

25. An urn contains nine balls of which three are red, four are blue and two are green. Three balls are drawn at random without replacement from the urn. The probability that the three balls have different colour, is

A. $\frac{2}{7}$

B. $\frac{1}{21}$

C. $\frac{2}{23}$

D. $\frac{1}{3}$

Answer: A

Watch Video Solution

26. Let U_1 , and U_2, be two urns such that U_1, contains 3 white and 2 red balls, and U_2, contains only1 white ball. A fair coin is tossed. If head appears then 1 ball is drawn at random from U_1, and put into U_2, . However, if tail appears then 2 balls are drawn at random from U_1, and put into U_2. . Now 1 ball is drawn at random from U_2, .61 . The probability of the drawn ball from U_2, being white is

A. $\frac{13}{30}$

B. $\frac{23}{30}$

C. $\frac{19}{30}$

D. $\frac{11}{30}$

Answer: B

Watch Video Solution

27. Given that the drawn ball from U2 is white, the probability that head appeared on the coin

A. $\frac{17}{23}$

B. $\frac{11}{23}$

C. $\frac{15}{23}$

D. $\frac{12}{23}$

Answer: D

Watch Video Solution

28. Let $EandF$ be tow independent events. The probability that exactly one of them occurs is 11/25 and the probability if none of them occurring is 2/25. If $P(T)$ deontes the probability of occurrence of the event T, then $P(E) = \frac{4}{5}, P(F) = \frac{3}{5}$ $P(E) = \frac{1}{5}, P(F) = \frac{2}{5}$ $P(E) = \frac{2}{5}, P(F) = \frac{1}{5}$ $P(E) = \frac{3}{5}, P(F) = \frac{4}{5}$

A. $P€ = \frac{4}{5}, P(F) = \frac{3}{5}$

B. $P€ = \frac{1}{5}, P(F) = \frac{2}{5}$

C. $P€ = \frac{2}{5}, P(F) = \frac{1}{5}$

D. $P€ = \frac{3}{5}, P(F) = \frac{4}{5}$

Answer: A::D

Watch Video Solution

29. Consider 5 independent Bernoulli.s trials each with probability of success p. If the probability of at least one failure is greater than or equal to $\frac{31}{32}$, then p lies in the interval : (1) $\left(\frac{1}{2}, \frac{3}{4}\right]$ (2) $\left(\frac{3}{4}, \frac{11}{12}\right]$ (3) $\left[0, \frac{1}{2}\right]$ (4) $\left(\frac{11}{12}, 1\right]$

A. $\left(\frac{3}{4}, \frac{11}{12}\right]$

B. $\left[0, \frac{1}{2}\right]$

C. $\left(\frac{11}{12}, 1\right]$

D. $\left(\frac{1}{2}, \frac{3}{4}\right]$

Answer: B

Watch Video Solution

30. If C and D are two events such that $C \subset D and P(D) \neq 0$, then the correct statement among the following is : (1) $P(C \mid D) = P(C)$ (2) $P(C \mid D) \geq P(C)$ (3) $P(C \mid D) < P(C)$ (4) $P(C \mid D) = \left(P\frac{D}{P(C)}\right.$

A. $P\left(\frac{C}{D}\right) \geq P(C)$

B. $P\left(\frac{C}{D}\right) < P(C)$

C. $P\left(\frac{C}{D}\right) = \frac{P(D)}{P(C)}$

D. $P\left(\frac{C}{D}\right) = P(C)$

Answer: A

Watch Video Solution

31. Let A, B, C be pariwise independent events with $P(C) > 0$ and $P(A \cap B \cap C) = 0$. Then $P\left(A^c \cap \frac{B^c}{C}\right)$.

A. $P(A^c) - P(B)$

B. $P(A) - P(B^c)$

C. $P(A^c) + P(B^c)$

D. $P(A^c) - P(B^c)$

Answer: A

Watch Video Solution

32. A ship is fitted with three engines E_1, E_2, and E_3,. The engines function independently of each other with respective probabilities $\frac{1}{2}$. $\frac{1}{4}$ and $\frac{1}{4}$,and For the ship to be operational at least two of its engines must function. Let X denote the event that the ship is operational and let X_1, X_2, and X_3 denote respectively the events that the engines E_1, E_2 and E_3,are functioning. Which of the following is (are) true?

A. $P\left[X_1^c / X\right] = (3)\frac{e}{16}$

B. $P[\text{exactly two engines of the ship are functioning} / X] = \frac{7}{8}$

C. $P[X / X_2] = \frac{5}{16}$

D. $P[X / X_1] = \frac{7}{16}$

Answer: B::D

Watch Video Solution

33. four fair dice D_1, D_2, D_3 and D_4 each having six faces numbered 1,2,3,4,5 and 6 are rolled simultaneously. The probability that D_4 shows a number appearing on one of D_1, D_2, D_3 is

A. $\frac{91}{216}$

B. $\frac{108}{216}$

C. `(25)/(216)

D. $\frac{127}{216}$

Answer: A

Watch Video Solution

34. If X and Y are two events such that $PX/Y\Big) = \frac{1}{2}, P(Y/X) = \frac{1}{3}$ and $P(X \cap Y)\frac{1}{6}$. Then, which of the following is/are correct ?

A. $P(X \cup Y) = \frac{2}{3}$

B. X and Y are independent

C. X and Y are not independent

D. $P(X^c \cap Y) = \frac{1}{3}$

Answer: A::B

Watch Video Solution

35. Three numbers are chosen at random without replacement from {1, 2, 3, ... 8}. The probability that their minimum is 3, given that their maximum is 6, is (1) $\frac{3}{8}$ (2) $\frac{1}{5}$ (3) $\frac{1}{4}$ (4) $\frac{2}{5}$

A. $\frac{1}{4}$

B. $\frac{2}{5}$

C. $\frac{3}{8}$

D. $\frac{1}{5}$

Answer: D

Watch Video Solution

36. A multuple choice examination has 5 questions. Each questions has three alternative answers of which exactly one is correct. The probability that a student will get 4 or more correct answers just be guessing, is

A. $\frac{13}{3^5}$

B. $\frac{11}{3^5}$

C. $\frac{10}{3^5}$

D. $\frac{17}{3^5}$

Answer: B

Watch Video Solution

37. Four person independently solve a certain problem correctly with probabilities $\frac{1}{2}, \frac{3}{4}, \frac{1}{4}, \frac{1}{8}$. Then the probability that he problem is solve correctly by at least one of them is $\frac{235}{256}$ b. $\frac{21}{256}$ c. $\frac{3}{256}$ d. $\frac{253}{256}$

A. $\frac{235}{256}$

B. $\frac{21}{256}$

C. $\frac{3}{256}$

D. $\frac{253}{256}$

Answer: A

Watch Video Solution

38. Of the three independent events E_1, E_2 and E_3, the probability that only E_1 occurs is α, only E_2 occurs is β and only E_3 occurs is γ. Let the probability p that none of events E_1, E_2 and E_3 occurs satisfy the equations $(\alpha - 2\beta), p = \alpha\beta$ and $(\beta - 3\gamma)p = 2\beta\gamma$. All the given probabilities are assumed to lie in the interval $(0, 1)$. Then, $\frac{probabilityofourrenceofE_1}{probabilityofourrenceofE_3}$ is equal to

Watch Video Solution

39. A box B_1 contains 1 white ball, 3 red balls, and 2 black balls. An- other box B_2 contains 2 white balls, 3 red balls and 4 black balls. A third box B_3 contains 3 white balls, 4 red balls, and 5 black balls.

If 2 balls are drawn (without replecement) from a randomly selected box and one of the balls is white and the other ball is red the probability that these 2 balls are drawn from box B_2 is

A. $\frac{116}{181}$

B. $\frac{126}{181}$

C. $\frac{65}{181}$

D. $\frac{55}{181}$

Answer: D

Watch Video Solution

Watch Video Solution

40. A box B_1 contains 1 white ball, 3 red balls and 2 black balls. Another box B_2 contains 2 white balls, 3 red balls and 4 black balls. A third box B_3 contains 3 white balls, 4 red balls and 5 black balls.If 1 ball is drawn from each of the boxes B_1, B_2 and B_3, then the probability that all 3 drawn balls are of the same colour , is

A. $\frac{82}{648}$

B. $\frac{90}{648}$

C. $\frac{558}{648}$

D. $\frac{566}{648}$

Answer: A

Watch Video Solution

41. Let A and B be two events such that $P(\overline{A \cup B}) = \frac{1}{6}, P(A \cap B) = \frac{1}{4}$ and $P(\overline{A}) = \frac{1}{4}$,where $\overline{A}$ stands for complement of event A. then , events A and B are

A. independent but not equally likely

B. independent and equally likely

C. mutually exclusive and independent

D. equally likely but not independent

Answer: A

Watch Video Solution

42. Three boys and two girls stand in a queue. The probability, that the number of boys ahead is at least one more than the number of girls ahead of her, is (A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{2}{3}$

D. $\frac{3}{4}$

Answer: A

Watch Video Solution

43. Box 1 contains three cards bearing numbers 1, 2, 3; box 2 contains five cards bearing numbers 1, 2, 3,4, 5; and box 3 contains seven cards bearing numbers 1, 2, 3, 4, 5, 6, 7. A card is drawn from each of the boxes. Let x_i be the number on the card drawn from the ith box, i = 1, 2, 3. The probability that $x_1 + x_2 + x_3$ is odd is The probability that x_1, x_2, x_3 are in an aritmetic progression is

A. $\frac{29}{105}$

B. $\frac{53}{105}$

C. $\frac{57}{105}$

D. $\frac{1}{2}$

Answer: B

Watch Video Solution

44. Box 1 contains three cards bearing numbers 1, 2, 3; box 2 contains five cards bearing numbers 1, 2, 3,4, 5; and box 3 contains seven cards bearing numbers 1, 2, 3, 4, 5, 6, 7. A card is drawn from each of the boxes. Let x_i be the number on the card drawn from the ith box, i = 1, 2, 3. The probability that $x_1 + x_2 + x_3$ is odd is The probability that x_1, x_2, x_3 are in an aritmetic progression is

A. $\frac{9}{105}$

B. $\frac{10}{105}$

C. $\frac{11}{105}$

D. $\frac{7}{105}$

Answer: B

Watch Video Solution

45. If 12 identical balls are to be placed in 3 identical boxes, then the probability that one of the boxes contains exactly 3 balls is : (1) $\frac{55}{3}\left(\frac{2}{3}\right)^{11}$ (2) $55\left(\frac{2}{3}\right)^{10}$ (3) $220\left(\frac{1}{3}\right)^{12}$ (4) $22\left(\frac{1}{3}\right)^{11}$

A. $220\left(\frac{1}{3}\right)^{12}$

B. $22\left(\frac{1}{3}\right)^{11}$

C. $\frac{55}{3}\left(\frac{2}{3}\right)^{11}$

D. $55\left(\frac{2}{3}\right)^{10}$

Answer: C

Watch Video Solution

46. The minimum number of times a fair coin needs to be tossed, so that the probability of getting at least two heads is at least 0.96 is :

Watch Video Solution

47. Let n_1, and n_2, be the number of red and black balls, respectively, in box I. Let n_3 and n_4,be the number one red and b of red and black balls, respectively, in box II. One of the two boxes, box I and box II, was selected at random and a ball was drawn randomly out of this box. The ball was found to be red. If the probablity that this red ball was drawn from box II is $\frac{1}{3}$ then the correct option(s) with the possible values of n_1, n_2, n_3, and n_4, is(are)

A. $n_1 = 3, n_2 = 3, n_3 = 5, n_4 = 15$

B. $n_1 = 3, n_2 = 6, n_3 = 10, n_4 = 50$

C. $n_1 = 8, n_2 = 6, n_3 = 5, n_4 = 20$

D. $n_1 = 6, n_2 = 12, n_3 = 5, n_4 = 20$

Answer: B

Watch Video Solution

48. Let n_1, and n_2, be the number of red and black balls, respectively, in box I. Let n_3 and n_4,be the number one red and b of red and black balls, respectively, in box II. A ball is drawn at random from box 1 and transferred to box II. If the probability of drawing a red ball from box I, after this transfer, is $\frac{1}{3}$ then the correct option(s) with the possible values of n_1 and n_2, is(are)

A. $n_1 = 4$ and $n_2 = 6$

B. $n_1 = 2$ and $n_2 = 3$

C. $n_1 = 10$ and $n_2 = 20$

D. $n_1 = 3$ and $n_2 = 6$

Answer: C::D

Watch Video Solution

49. Let two fair six-faced dice A and B be thrown simultaneously. If E_1 is the event that die A shows up four, E_2 is the event that die B shows up two and E_3 is the event that the sum of numbers on both dice is odd, then which of the following statements is NOT true ? (1) E_1 and E_2 are independent. (2) E_2 and E_3 are independent. (3) E_1 and E_3 are independent. (4) E_1 , E_2 and E_3 are independent.

A. E_2 and E_3 are independent

B. E_1 and E_3 are independent

C. E_1 and E_3 are independent

D. E_1 and E_2 are independent

Answer: C

Watch Video Solution

50. A computer producing factory has only two plants T_1 and T_2. Plant T_1 produces 20% and plant T_2 produces 80% of the total computers produced. 7% of computers produced in the factory turn out to be defective. It is known that P(computer turns out to bedefective, given that it is produced in plant T_1)=10P (computer turns out to be defective, given that it is produced in plant T_2), where P(E) denotes the probability of an event E.A computer produced in the factory is randomly selected and it does not turn out to be defective. Then, the probability that it is produced in plant T_2, is

A. $\frac{36}{73}$

B. $\frac{47}{79}$

C. $\frac{78}{93}$

D. $\frac{75}{83}$

Answer: C

Watch Video Solution

51. Football teams T_1 and T_2 have to play two games against each other. It is assumed that the outcomes of the two games are independent. The probabilities of T_1 winning. Drawing and losing a game against T_2 are $\frac{1}{2}, \frac{1}{6}$ and $\frac{1}{3}$ respectively. Each team gets 3 points for a win. 1 point for a draw and 10 pont for a loss in a game.

Let X and Y denote the total points scored by teams T_1 and T_2 respectively. after two games.

A. $\frac{1}{4}$

B. $\frac{5}{12}$

C. $\frac{1}{2}$

D. $\frac{7}{12}$

Answer: B

View Text Solution

52. Football teams T_1 and T_2 have to play two games against each other. It is assumed that the outcomes of the two games are independent. The probabilities of T_1 winning, drawing and losing a game against T_2 are $\frac{1}{2}, \frac{1}{6}$ and $\frac{1}{3}$ respectively. Each team gets 3 points for a win. 1 point for a draw and 0 point for a loss in a game. Let X and Y denote the total points scored by teams T_1 and T_2 respectively. after two games. $P(X = Y)$ is

A. $\frac{11}{36}$

B. $\frac{1}{3}$

C. $\frac{13}{36}$

D. $\frac{1}{2}$

Answer: C

Watch Video Solution

53. A box contains 15 green and 10 yellow balls. If 10 balls are randomly drawn, one-by-one, with replacement, then the variance of the number of green balls drawn is : (a) $\frac{12}{5}$ (b) 6 (c) 4 (d) $\frac{6}{25}$

A. $\frac{6}{25}$

B. $\frac{12}{5}$

C. 6

D. 4

Answer: B

Watch Video Solution

54. If two different numbers are taken from the set $\{0, 1, 2, 3, , 10\};$ then the probability that their sum as well absolute difference are both multiple of $4,$ is: $\frac{14}{45}$ (2) $\frac{7}{55}$ (3) $\frac{6}{55}$ (4) $\frac{12}{55}$

A. $\frac{7}{55}$

B. $\frac{6}{55}$

C. $\frac{12}{55}$

D. $\frac{14}{45}$

Answer: C

Watch Video Solution

55. For three events A, B and C, P (Exactly one of A or B occurs) $= P$ (Exactly one of B or C occurs) $= P$ (Exactly one of C or A occurs) $= \frac{1}{4}$ and P (All the three events occur simultaneously) $= \frac{1}{6}$. Then the probability that at least one of the events occurs, is : $\frac{7}{64}$ (2) $\frac{3}{16}$ (3) $\frac{7}{32}$ (4) $\frac{7}{16}$

A. $\frac{3}{16}$

B. $\frac{7}{32}$

C. $\frac{7}{16}$

D. $\frac{7}{64}$

Answer: C

Watch Video Solution