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India's Number 1 Education App

MATHS

BOOKS - CENGAGE MATHS (ENGLISH)

PROBABILITY I

Illustration

1. A coin is tossed three times, consider the following events. A : No head appears, B: Exactly one head appears and C: Atleast two appear. Do they form a set of mutually exclusive and exhaustive events?

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2. Find the probability of getting more than 7 when two dice are rolled.

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3. A die is loaded so that the probability of a face i is proportional to $i, i = 1, 2, 6$. Then find the probability of an even number occurring when the die in rolled.

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4. Consider the experiment of tossing a coin. If the coin shows head, toss it again but if it shows tail then throw a die. Find the conditional probability of the event that the die shows a number greater than 4 given that 'there is at least one tail'.

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

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

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

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

Answer: A

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5. Four candidates A, B, C, D have applied for the assignment ot coach a school cricket team. If A is twice as likely to be selected as B, and B and C are given about the same chance of being selected, while C is twice as likely to be selected as D, what are the probability that (i) C will be selected ? (ii) A will not be selected?

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6. 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.

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7. A determinant is chosen at random from the set of all determinant of order 2 with elements 0 or 1 only. Find the probability that the determinant chosen is nonzero.

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8. A die is rolled 4 times. The probability of getting a larger number than the previous number each time is $17/216$ b. $5/432$ c. $15/432$ d. none of these

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9. If a coin is tossed n times, then find the probability that the head appears odd number of times.

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10. A card is drawn at random from a pack of cards. What ist the probability that the drawn card is neither a heart nor a king?

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11. Card is drawn from a pack of 52 cards. A persons bets that it is a spade or an ace. What are the odds against him of winning this bet?

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12. A fair dice is thrown three times. If p, q and r are the numbers obtained on the dice, then find the probability that $i^p + i^q + i^r = 1$, where $I = \sqrt{-1}$.

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13. One mapping is selected at random from all the mappings of the set $A = \{1, 2, 3. . n\}$ into itself. The probability that eh mapping selected is one to one is a. $\frac{1}{n^n}$ b. $\frac{1}{n!}$ c. $\frac{(n-1)!}{n^{n-1}}$ d. none of these

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14. Two integers $xandy$ are chosen with replacement out of the set $\{0, 1, , 2, 3, 10\}$. Then find the probability that $|x - y| > 5$.

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15. Find the probability that the 3Ns come consecutively in the arrangement of the letters of the word CONSTANTINOPLE.

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

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17. Find the probability that a randomly chosen three-digit number has exactly three factors.

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18. 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.

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19. An integer is chosen at random and squared. Find the probability that the last digit of the square is 1 or 5.

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20. Four fair dices are thrown simultaneously. Find the probability that the highest number obtained is 4.

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21. An unbiased dice, with faces numbered 1, 2, 3, 4, 5, 6, is thrown n times and the list of n numbers shown up is noted. Then find the probability that among the numbers 1, 2, 3, 4, 5, 6 only three numbers appear in this list and each number appears at least once.

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22. Six points are there on a circle from which two triangles drawn with no vertex common. Find the probability that none of the sides of the triangles intersect.

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23. Balls are drawn one-by-one without replacement from a box containing 2 black, 4 white and 3 red balls till all the balls are drawn. Find the probability that the balls drawn are in the order 2 black, 4 white and 3 red.

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24. In how many ways, can three girls can three girls and nine boys be seated in two vans, each having numbered seats, 3 in the and 4 at the back? How many seating arrangements are possible if 3 girls should sit together in a back row on adjacent seats? Now, if all the seating arrangements are equally likely, what is the probability of 3 girls sitting together in a back row on adjacent seats?

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25. Find the probability that the birth days of six different persons will fall in exactly two calendar months.

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26. If 10 objects are distributed at random among 10 persons, then find the probability that at least one of them will not get anything.

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27. 2^n players of equal strength are playing a knock out tournament. If they are paired at randomly in all rounds, find out the probability that out of two particular players $S_1 and S_2,$ exactly one will reach in semi-final $(n \in N, n \geq 2)$.

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28. Fourteen numbered balls (1, 2, 3, ..., 14) are divided in 3 groups randomly. Find the probability that the sum of the numbers on the balls, in each group, is odd.

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29. Five different digits from the set of numbers {1, 2, 3, 4, 5, 6, 7} are written in random order. Find the probability that five-digit number thus formed is divisible by 9.

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30. Three married couples sit in a row. Find the probability that no husband sits with his wife.

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31. A box contains 6 nails and 10 nuts. Half of the nails and half of the nuts are rusted. If one item is chosen at random, then find the probability that it is rusted or is a nail.

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32. The probability that at least one of the events $AandB$ occurs is 0.6. If $AandB$ occur simultaneously with probability 0.2, then find $P(A)+P(B)$.

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33. If $P(A \cup B) = 3/4 and P(A) = 2/3$, then find the value of $P(A \cap B)$.

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34. Let A, B, C be three events. If the probability of occurring exactly one event out of $A and B is 1 - x$, out of $B and C is 1 - 2x$, out of $C and A is 1 - x$, 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 .

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35. Let A and B be any two events such that P(A) = $\frac{1}{2}$ and P(B) = $\frac{1}{3}$. Then find the value of $P(A' \cap B')' + P(A' \cup B')'$.

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36. If A and B are events such that $P(A' \cup B') = \frac{3}{4}, P(A' \cap B') = \frac{1}{4}$ and $P(A) = \frac{1}{3}$, then find the value of $P(A' \cap B)$

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37. A sample space consists of 9 elementary event $E_1, E_2, E_3 \ldots . E_8, E_9$ whose probabilities are $P(E_1) = P(E_2) = 0.08$, $P(E_3) = P(E_4) = P(E_5) = 0.1$, $P(E_6) = P(E_7) = 0.2$, $P(E_8) = P(E_9) = 0.07$. Suppose $A = \{E_1, E_5, E_8\}$, $B = \{E_2, E_5, E_8, E_9\}$. Compute $P(A)$, $P(B)$ and $P(A \cap B)$. Using the addition law of probability, find $P(A \cup B)$. List the composition of the event $A \cup B$, and calculate, $P(A \cup B)$ by adding the probabilities of the elementary events. Calculate $P(\overline{B})$ from $P(B)$, also calculate $P(\overline{B})$ directly from the elementary events of $\overline{B}$.

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38. The following Venn diagram shows three events, A, B, and C, and also the probabilities of the various intersections.

Determine

(a) P(A)

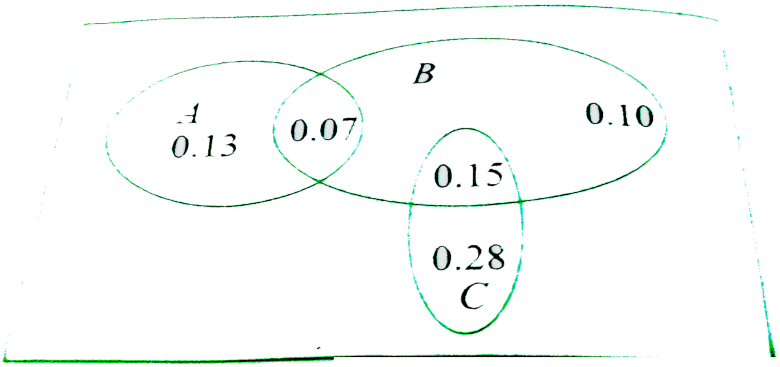
(b) $P\left(B \cap \overline{C}\right)$

(c) $P(A \cup B)$

(d) $P\left(A \cap \overline{B}\right)$

(e) $P(B \cap C)$

(f) Probability of the event that exactly one of A, B, and C occurs.



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39. 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:

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40. If A and B are two events such that P(A) = $\frac{1}{2}$ and P(B) = $\frac{2}{3}$, then show that

(a) $P(A \cup B) \geq \frac{2}{3}(b)\frac{1}{6} \leq P(A \cap B) \leq \frac{1}{2}$

(c) $P\left(A \cap \overline{B}\right) \leq \frac{1}{3}(d)\frac{1}{6} \leq P\left(\overline{A} \cap B\right) \leq \frac{1}{2}$

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41. Given two events $AandB$. If odds against A are as 2:1 and those in favour of $A \cup B$ are 3:1, then find the range of $P(B)$.

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42. The probabilities of three events $A, B, andC$ are $P(A) = 0.6, P(B) = 0.4, andP(C)$If $P(A \cap B) = 0.8, P(A \cap C) = 0.3, P(A \cap B \cap C) = 0.2P(A \cup B \cup C) >$ then find the range of $P(B \cap C)$.

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43. Two dice are thrown. What is the probability that the sum of the numbers appearing on the two dice is 11, it 5 appears on the first?

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44. If $P(A) = 0.8, P(B) = 0.5$and $P(B \mid A) = 0.4$, find (i) $P(A \cap B)$ (ii) $P(A \mid B)$ (iii) $P(A \cup B)$

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45. If two events A and B are such that P(A) =0.3, P(B)=0.4 and $P(A' \cap B') = 0.5$. then find the value of $P(B/A \cup B'))$.

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46. A coin is tossed three times, where

(i) A : head on third toss,B: heads on first two tosses

(ii) A: at least two heads, B : at most two heads

(iii) A : at most two tails,B at least one tail

In each case find P(A/B).

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47. 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

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48. Assume that each child born is equally likely to be a boy or a girl. If a family has two children, what is the conditional probability that both are girls given that i. the youngest is a girl, ii. at least one is a girl?

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49. एक सिक्के को उछालने के परीक्षण पर विचार कीजिए। यदि सिक्के पर चित प्रकट हो तो सिक्के का पुनः उछालें परंतु यदि सिक्के पर पट प्रकट हो तो एक पासे को फेंकें। यदि घटना कम से कम एक पट प्रकट होना का घटित होना दिया गया है तो घटना पासे पर 4 से बड़ी संख्या प्रकट होना की सप्रतिबंध प्रायिकता ज्ञात कीजिए।

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50. A box contains 10 mangoes out of which 4 are rotten. Two mangoes are taken out together. If one of them is found to be good, then find the probability that the other is also good.

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51. An urn contains 10 black and 5 white balls. Two balls are drawn from the run one after the other without replacement. What is the probability that first ball is black and second ball is black and second ball is white ?

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52. Three cards are drawn successively, without replacement from a pack of 52 well shuffied cards. What is the probability that first, second and third cards are jack, queen and kind, respectively ?

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53. One of the ten available keys opens the door. If we try the keys one after another, then find the following

(i) the probability that the door is opened in the first attemt.

(ii) the probability tht the door is opened in the second attempt.

(iii) the probability that the door is opened in the third attempt.

(iv) the probability that the door is opened in the tenth attempt.

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54. A bag contains W white and 3 black balls. Balls are drawn one by one without replacement till all the black balls are drawn. Then find the probability that this procedure for drawing the balls will come to an end at the rth draw.

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55. A fair coin is tossed repeatedly. If tail appears on first four tosses, then find the probability of head appearing on fifth toss.

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56. If $P(A/B) = P(A/B')$, then prove that A and B are independent.

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57. A die marked 1, 2, 3 in red and 4, 5, 6 in green is tossed. Let A be the event, the number is even, and B be the event, the number is red. Are A and B independent?

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58. Three persons work independently on a problem. If the respective probabilities that they will solve it are 1/3, 1/4 and 1/5, then find the probability that not can solve it.

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59. The probability of hitting a target by three marksmen are 1/2, 1/3 and 1/4. Then find the probabi9lity that one and only one of them will hit the target when they fire simultaneously.

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60. An electrical system has open-closed switches $S_1, S_2 and S_3$ as shown in fig. The switches operate independently of one another and the current will flow from $A \to B$ either if S_1 is closed or if both $S_2 and S_3$ are closed. If $P(S_1) = P(S_2) = P(S_3) = 1/2,$ then find the probability that the circuit will work. fig

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62. If four whole numbers taken art random are multiplied together, then find the probability that the last digit in the product is 1,3,7, or 9.

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63. If A and B are two independent events, the probability that both A and B occur is 1/8 are the probability that neither of them occours is 3/8. Find the probaility of the occurrence of A.

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64. The unbiased dice is tossed until a number greater than 4 appear. What is the probability that an even number of tosses is needed?

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65. 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.

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66. An unbiased normal coin is tossed n times. Let E_1 : event that both heads and tails are present n tosses. E_2 : event that the coin shows up heads at most once. The value of n for which $E_1 and E_2$ are independent is _____.

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67. X speaks truth in 60% and Y in 50% of the cases. Find the probability that they contradict each other narrating the same incident.

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68. A person has undertaken a construction job. The probabilities are 0.80 that there will be a strike, 0.70 that the construction job will be completed on time if there is no strike, and 0.4 that the construction job will be completed on time if there is a strike. Determine the probability that the construction job will be completed on time.

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69. 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.

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71. 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....

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72. An urn contains 6 white and 4 black balls. A fair die is rolled and that number of balls we chosen from the urn. Find the probability that the balls selected are white.

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73. Suppose families always have one, two, or three children, with probabilities 1/4, 1/2, and 1/4, respectively. Assume everyone eventually gets married and has children, then find the probability of a couple having exactly four grandchildren.

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74. On a normal standard die one of the 21 dots from any one of the six faces is removed at random with each dot equally likely to the chosen. If

the die is then rolled, then find the probability that the odd number appears.

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75. 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 :-

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76. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 track drivers. The probabilities of an accident involving a scooter driver, car driver and a truck driver are 0.01, 0.03 and 0.15 respectively. One of the insured person meets with an accident. What is the probability that he is a scooter driver?

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77. A laboratory blood test is 99% effective in detecting a certain disease when its infection is present. However, the test also yields a false positive result for 0.5% of the healthy person tested (i.e. if a healthy person is tested, then, with probability 0.005, the test will imply he has the disease). If 0.1% of the population actually has the disease, what is the probability that a person has the disease given that his test result is positive?

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78. In an entrance test, there are multiple choice questions. There are four possible answers to each question, of which one is correct. The probability that a student knows the answer to a question is 90%. If the gets the correct answer to a question, then find the probability that he was guessing.

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79. 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 .

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80. Die A has 4 red and 2 white faces, whereas die B has 2 red and 4 white faces. A coins is flipped once. If it shows a head, the game continues by throwing die A: if it shows tail, then die B is to be used. If the probability that die A is used is 32/33 when it is given that red turns up every time in first n throws, then find the value of n.

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81. A bag contain n ball out of which some balls are white. If probability that a bag contains exactly i white ball is pro0portional to i^2. A ball is

drawn at random from the bag and found to be white, then find the probability that bag contains exactly 2 white balls.

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82. A die is thrown 7 times. What is the chance that an odd number turns up (i) exactly 4 times (ii) at least 4 times

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83. Suppose that 90% of people are right-handed. What is the probability that at most 6 of a random sample of 10 people are right-handed?

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84. An experiment succeeds twice as often as it fails. Find the probability that in the next six trials, there will be atleast 4 successes.

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85. What is the probability of guessing correctly at least 8 out of 10 answer on true-false examination?

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86. A rifleman is firing at a distance target and hence has only 10% chance of hitting it. Find the number of rounds; he must fire in order to have more than 50% chance of hitting it at least once.

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87. $AandB$ play a series of games which cannot be drawn and p, q are their respective chance of winning a single game. What is the chance that A wins m games before B wins n games?

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Solved Example

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2. The sum of two positive quantities is equal to $2n$. the probability that their product is not less than 3/4 times their greatest product is $3/4$ b. $1/4$ c. $1/2$ d. none of these

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3. There are two bags each containing 10 books all having different titles but of the same size. A student draws out books from the first bag as well as from the second bag. Find the probability that the different between the books drawn from the two bags does not exceed 2.

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4. Two natural numbers $x and y$ are chosen at random. What is the probability that $x^2 + y^2$ is divisible by 5?

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5. If a fair coin is tossed 5 times, the porbability that heads does not occur two or more times in a row is

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6. Let $P(x)$ denote the probability of the occurrence of event x. Plot all those point $(x, y) = (P(A), P(B))$ in a plane which satisfies the conditions, $P(A \cup B) \geq 3/4 and 1/8 \leq P(A \cap B) \leq 3/8$

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7. In a certain city only two newspapers A and B are published, it is known that 25% of the city population reads A and 20% reads B, while 8% reads both A and B. It is also known that 30% of those who read A but not B look int advertisements and 40% of those who read B bu not A look into advertisements while 50% of those who read both A and B look into advertisements What is the percentage of the population reads an advertisement? [1984]

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8. A box contains two 50 paise coins, five 25 paise coins and a certain fixed number $N(\geq 2)$ of 10 and 5-paise coins. Five coins are taken out of the box at random. Find the probability that the total value of these 5 coins is less than 1 rupee and 50 paise.

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9. Eight players $P_1, P_2, , P_8$ play a knock-out tournament. It is known that whenever the players P_i will win if `i

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Exercise 9.1

1. Which of the following cannot be valid assignment of probabilities for outcomes of sample space $S = \{W_1, W_2, W_3, W_4, W_5, W_6, W_7\}$

Assignment	W_1	W_2	W_3	W_4	W_5	W_6	W_7
(a)	0.1	0.01	0.05	0.03	0.01	0.2	0.6
(b)	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$
(c)	0.1	0.2	0.3	0.4	0.5	0.6	0.7
(d)	-0.1	0.2	0.3	0.4	-0.2	0.1	0.3
(e)	$\frac{1}{14}$	$\frac{2}{14}$	$\frac{3}{14}$	$\frac{4}{14}$	$\frac{5}{14}$	$\frac{6}{14}$	$\frac{15}{14}$

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2. Consider the following assignments of probabilities for outcomes of sample space S = {1, 2, 3, 4, 5, 6, 7, 8}.

Number (X)	1	2	3	4	5	6	7	8
Probability, P(X)	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

Find the probability that

X is a prime number

(b) X is a number greater than 4.

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3. Find the probability that a leap year will have 53 Friday or 53 Saturdays.

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4. A die is loaded so that the probability of a face i is proportional to $i, i = 1, 2, ...6$. Then find the probability of an even number occurring when the die in rolled.

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5. Statement 1: The probability of drawing either an ace or a king from a pack of card in a single draw is 2/13. Statement 2: for two events $AandB$ which are not mutually exclusive, $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

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6. Three faces of a fair dice are yellow, two are red and one is blue. Find the probability that the dice shows (a) yellow, (b) red and (c) blue face.

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Exercise 9.2

1. If two fair dices are thrown and digits on dices are a and b, then find the probability for which $\omega^{ab} = 1$, (where ω is a cube root of unity).

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2. There are n letters and n addressed envelopes. Find the probability that all the letters are not kept in the right envelope.

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3. Find the probability of getting total of 5 or 6 in a single throw of two dice.

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4. Two integers are chosen at random and multiplied. Find the probability that the product is an even integer.

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5. If out of 20 consecutive whole numbers two are chosen at random, then find the probability that their sum is odd.

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6. A bag contains 3 red, 7 white, and 4 black balls. If three balls are drawn from the bag, then find the probability that all of them are of the same color.

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7. An ordinary cube has 4 blank faces, one face mark 2 and another marked 3, then the probability of obtaining 12 in 5 throws is

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8. If the letters of the word REGULATIONS be arranged at random, find the probability that there will be exactly four letters between the R and the E.

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

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10. Five persons entered the lift cabin on the ground floor of an 8-floor house. Suppose that each of them independently and with equal probability can leave the cabin at any floor beginning with the first. Find out the probability of all five persons leaving at different floors.

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11. Two friends $AandB$ have equal number of daughters. There are three cinema tickets which are to be distributed among the daughters of $AandB$. The probability that all the tickets go to the daughters of A is 1/20. Find the number of daughters each of them have.

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13. There are eight girls among whom two are sisters, all of them are to sit on a round table. Find the probability that the two sisters do not sit together.

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14. 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

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15. A pack of 52 cards is divided at random into two equals parts. Find the probability that both parts will have an equal number of black and red cards.

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16. If a digit is chosen at random from the digits $1,\ 2,\ 3,\ 4,\ 5,\ 6,\ 7,\ 8,\ 9$, then the probability that the digit is even, is

(a) $\frac{4}{9}$

(b) $\frac{5}{9}$

(c) $\frac{1}{9}$

(d) $\frac{2}{3}$

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17. If two distinct numbers m and n are chosen at random form the set {1, 2, 3, ..., 100}, then find the probability that $2^m + 2^n + 1$ is divisible by 3.

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18. Two number $aandb$ aer chosen at random from the set of first 30 natural numbers. Find the probability that $a^2 - b^2$ is divisible by 3.

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19. Twelve balls are distributed among three boxes, find the probability that the first box will contains three balls.

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Exercise 9.3

1. $AandB$ are two candidates seeking admission in ITT. The probability that A is selected is 0.5 and the probability that $AandB$ are selected is at most 0.3. Is it possible that the probability of B getting selected is 0.9?

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2. If A and B are events such that $P(A \cup B) = (3)/(4), P(A \cap B) = (1)/(4)$ and $P(A^c) = (2)/(3)$, then find

(a) P(A) (b) P(B)

(c) $P(A \cap B^c)(d)P(A^c \cap B)$

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3. If $P(A \cap B) = \frac{1}{2}, P(A \cap B) = \frac{1}{3}, P(A) = p, P(B) = 2p,$ then find the value of p.

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4. In a class of 125 students 70 passed in Mathematics, 55 in statistics, and 30 in both. Then find the probability that a student selected at random from the class has passes in only one subject.

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5. In a certain population, 10% of the people are rich, 5% are famous, and 3% are rich and famous. Then find the probability that a person picked at random from the population is either famous or rich but not both.

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6. Three students $AandBandC$ are in a swimming race. $AandB$ have the same probability of winning and each is twice as likely to win as C. Find the probability that the B or C wins. Assume no two reach the winning point simultaneously.

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7. Let A, B, C be three events such that $P(A) = 0.3, P(B) = 0.4, P(C) = 0.8, P(A \cap B) = 0.88, P(A \cap C) = 0$

If $P(A \cup B \cup C) \geq 0.75$, then show that $0.23 \leq P(B \cap C) \leq 0.48$.

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MCQ

1. A sample space consists of 3 sample points with associated probabilities given as $2p, p^2, 4p - 1$. Then the value of p is

A. $p = \sqrt{11} - 3$

B. $\sqrt{10} - 3$

C. $\frac{1}{4} < p < \frac{1}{2}$

D. none of these

Answer: A

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2. Let E be an event which is neither a certainty nor an impossibility. If probability is such that $P(E) = 1 + \lambda + \lambda^2$ and $P\left(E'\right) = (1 + \lambda)^2$ in terms of an unknown λ. Then $P(E)$ is equal to

A. 1

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

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

D. none of these

Answer: B

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3. Three balls marked with 1, 2 and 3 are placed in an urn. One ball is drawn, its number is noted, then the ball is returned to the urn. This process is repeated and then repeated once more. Each ball is equally likely to be drawn on each occasion. If the sum of the number noted is 6,

then the probability that the ball numbered with 2 is drawn at all the three occassion, is

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

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

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

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

Answer: B

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4. A draws a card from a pack of n cards marked $1, 2, ;\cdot n\cdot$ The card is replaced in the pack and B draws a card. Then the probability that A draws a higher card than B is $(n+1)/2n$ b. $1/2$ c. $(n-1)/2n$ d. none of these

A. $(n+1)/2n$

B. $1/2$

C. $(n-1)/2n$

D. none of these

Answer: C

Watch Video Solution

5. South African cricket captain lost toss of a coin 13 times out of 14. The chance of this happening was $7/2^{13}$ b. $1/2^{13}$ c. $13/2^{14}$ d. none

A. $7/2^{13}$

B. $1/2^{13}$

C. $13/2^{14}$

D. $13/2^{13}$

Answer: A

Watch Video Solution

6. The probability that in a family of 5 members,exactly two members have birthday on sunday is:-

A. $\left(12 \times 5^3\right) / 7^5$

B. $\left(10 \times 6^2\right) / 7^5$

C. $2 / 5$

D. $\left(10 \times 6^3\right) / 7^5$

Answer: D

Watch Video Solution

7. Three houses are available in a locality. Three persons apply for the houses. Each applies for one houses without consulting others. The probability that all three apply for the same houses is $1 / 9$ b. $2 / 9$ c. $7 / 9$ d. $8 / 9$

A. $1 / 9$

B. $2/9$

C. $7/9$

D. $8/9$

Answer: A

Watch Video Solution

8. The numbers 1, 2, 3, ..., n are arrange in a random order. The probability that the digits 1, 2, 3, .., $k(k < n)$ appear as neighbours in that order is

A. $1/n!$

B. $k!/n!$

C. $(n-k)!/n!$

D. $(n-k+1)!/n!$

Answer: D

Watch Video Solution

9. Words from the letters of the word PROBABILITY are formed by taking all letters at a time. The probability that both $B's$ are not together and both $I's$ are not together is $52/55$ b. $53/55$ c. $54/55$ d. none of these

A. $52/55$

B. $53/55$

C. $54/55$

D. none of these

Answer: B

Watch Video Solution

10. There are only two women among 20 persons taking part in a pleasure trip. The 20 persons are divided into two groups, each group consisting of 10 person. Then the probability that the two women will be in the same group is $9/19$ b. $9/38$ c. $9/35$ d. none

A. $9/19$

B. $9/38$

C. $9/35$

D. none of these

Answer: A

Watch Video Solution

11. Five different games are to be distributed among four children randomly. The probability that each child get at least one game is p, then the value of $[1/p]$ is, where [.] represents the greatest integer function, _____.

A. $1/4$

B. $15/64$

C. $21/64$

D. none of these

Answer: B

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12. A drawer contains 5 brown socks and 4 blue socks well mixed a man reaches the drawer and pulls out socks at random. What is the probability that they match? $4/9$ b. $5/8$ c. $5/9$ d. $7/12$

A. $4/9$

B. $5/8$

C. $5/9$

D. $7/12$

Answer: A

Watch Video Solution

13. A four figure number is formed of the figures 1, 2, 3, 4, 5 with no repetitions. The probability that the number is divisible by 5 is $3/4$ b. $1/4$ c. $1/8$ d. none of these

A. $3/4$

B. $1/4$

C. $1/8$

D. none of these

Answer: B

Watch Video Solution

14. Twelve balls are distribute among three boxes. The probability that the first box contains three balls is $\frac{110}{9}\left(\frac{2}{3}\right)^{10}$ b. $\frac{110}{9}\left(\frac{2}{3}\right)^{10}$ c. $\frac{\hat{}(12)C_3}{12^3} \times 2^9$ d. $\frac{\hat{}(12)C_3}{3^{12}}$

A. $\frac{110}{9}\left(\frac{2}{3}\right)^{10}$

B. $\frac{9}{110}\left(\frac{2}{3}\right)^{10}$

C. $\frac{.^{12}C_3}{12^3} \times 2^9$

D. $\frac{.^{12}C_3}{3^{12}}$

Answer: A

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15. A cricket club has 15 members, of them of whom only 5 can bowl. If the names of 15 members are put into a box and 11 are drawn at random, then the probability of getting an eleven containing at least 3 bowlers is $7/13$ b. $6/13$ c. $11/158$ d. $12/13$

A. $7/13$

B. $6/13$

C. $11/15$

D. $12/13$

Answer: D

Watch Video Solution

16. Seven girls G_1, G_2, G_3, ..., G_7 are such that their ages are in order $G_1 < G_2 < G_3 < \ldots < G_7$. Five girls are selected at random and arranged in increasing order of their ages. The probability that G_5 and G_7 are not consecutive is

A. $\frac{20}{21}$

B. $\frac{19}{21}$

C. $\frac{17}{21}$

D. $\frac{13}{21}$

Answer: C

Watch Video Solution

17. A local post office is to send M telegrams which are distributed at random over N communication channels, $(N > M)$. Each telegram is sent over any channel with equal probability. Chance that not more than one telegram will be sent over each channel is:

A. $\frac{.^N C_M \times N!}{M^N}$

B. $\frac{.^N C_M \times M!}{N^M}$

C. $1 - \frac{.^N C_M \times M!}{M^N}$

D. $1 - \frac{.^N C_M \times N!}{N^M}$

Answer: B

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18. Dialling a telephone number an old man forgets the last two digits remembering only that these are different dialled at random. The probability that the number is dialled correctly is $1/45$ b. $1/90$ c. $1/100$ d. none of these

A. $1/45$

B. $1/90$

C. $1/100$

D. none of these

Answer: B

Watch Video Solution

19. If A and B each toss three coins. The probability that both get the same number of heads is

A. $(3/4)^{50}$

B. $(2/7)^{50}$

C. $(1/8)^{50}$

D. $(7/8)^{50}$

Answer: A

Watch Video Solution

20. In a game called odd man out $m(m > 2)$ persons toss a coin to determine who will but refreshments for the entire group. A person who gets an outcome different from that of the rest of the members of the group is called the odd man out. The probability that there is a loser in any game is $1/2m$ b. $m/2^{m-1}$ c. $2/m$ d. none of these

A. $1/2m$

B. $m/2^{m-1}$

C. $2/m$

D. none of these

Answer: B

Watch Video Solution

21. $2n$ boys are randomly divided into two subgroups containint n boys each. The probability that eh two tallest boys are in different groups is $n/(2n-1)$ b. $(n-1)/(2n-1)$ c. $(n-1)/4n^2$ d. none of these

A. $n/(2n-1)$

B. $(n-1)(2n-1)$

C. $(n-1)/4n^2$

D. none of these

Answer: A

Watch Video Solution

22. If the papers of 4 students can be checked by any one of the 7 teachers, then the probability that all the 4 papers are checked by exactly 2 teachers is $2/7$ b. $12/49$ c. $32/343$ d. none of these

A. $2/7$

B. $12/49$

C. $32/343$

D. $6/49$

Answer: D

Watch Video Solution

23. If A and B are mutually exclusive events, then

A. [0, 1]

B. $\left[-\frac{1}{3}, \frac{5}{9}\right]$

C. $\left[-\frac{7}{9}, \frac{4}{9}\right]$

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

Answer: B

Watch Video Solution

24. A natural number is chosen at random from the first 100 natural numbers. The probability that $x + \frac{100}{x} > 50$ is $1/10$ b. $11/50$ c. $11/20$ d. none of these

A. $1/10$

B. $\frac{11}{50}$

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

D. none of these

Answer: C

Watch Video Solution

25. A dice is thrown six times, it being known that each time a different digit is shown. The probability that a sum of 12 will b e obtained in the first three throws is $5/24$ b. $25/216$ c. $3/20$ d. $1/12$

A. $\frac{5}{24}$

B. $\frac{25}{216}$

C. $\frac{3}{20}$

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

Answer: C

Watch Video Solution

26. If a is an integer lying in $[-5, 30]$, then the probability that the probability the graph of $y = x^2 + 2(a+4)x - 5a + 64$ is strictly above the x-axis is a. $1/6$ b. $7/36$ c. $2/9$ d. $3/5$

A. $1/6$

B. $7/36$

C. $2/9$

D. $3/5$

Answer: C

Watch Video Solution

27. Four die are thrown simultaneously. The probability that 4 and 3 appear on two of the die given that 5 and 6 have appeared on other two die is a) 1/6 b) 1/36 c) 12/151 d) none of these

A. $1/6$

B. $1/36$

C. $12/151$

D. none of these

Answer: C

Watch Video Solution

28. A $2n$ digit number starts with 2 and all its digits are prime, then the probability that eh sum of al 2 consecutive digits of the number is prime is 4×2^{3n} b. 4×2^{-3n} c. 2^{3n} d. none of these

A. 4×2^{-3n}

B. 4×2^{-3n}

C. 2^{-3n}

D. none of these

Answer: B

Watch Video Solution

29. In a $n-$ sided regular polygon, the probability that the two diagonal chosen at random will intersect inside the polygon is $\frac{2^n C_2}{\hat{}(\hat{}(nC_{2-n}))C_2}$ b. $\frac{\hat{}(n(n-1))C_2}{\hat{}(\hat{}(nC_{2-n}))C_2}$ c. $\frac{\hat{}nC_4}{\hat{}(\hat{}(nC_{2-n}))C_2}$ d. none of these

A. $\frac{2^n C_2}{.^{(.^n C_{2-n})} C_2}$

B. $\frac{.^{n(n-1)} C_2}{.^{(.^n C_2-n)} C_2}$

C. $\frac{.^n C_4}{.^{(.^n C_2-n)} C_2}$

D. none of these

Answer: C

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30. A three-digit number is selected at random from the set of all three-digit numbers. The probability that the number selected has all the three digits same is $1/9$ b. $1/10$ c. $1/50$ d. $1/100$

A. $1/9$

B. $1/10$

C. $1/50$

D. $1/100$

Answer: D

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31. Two numbers a, b are chosen from the set of integers 1, ,2 3, ..., 39. Then probability that he equation $7a - 9b = 0$ is satisfied is $1/247$ b. $2/247$ c. $4/741$ d. $5/741$

A. $1/247$

B. $2/247$

C. $4/741$

D. $5/741$

Answer: C

Watch Video Solution

32. One mapping is selected at random from all mappings of the set $S = \{1, 2, 3, ... n\}$ into itself. If the probability that the mapping is one-one is 3/32, then the value of n is 2 b. 3 c. 4 d. none of these

A. 2

B. 3

C. 4

D. none of these

Answer: C

Watch Video Solution

33. A composite number is selected at random from the first 30 natural numbers and it is divided by 5. The probability that there will be remainder is $14/19$ b. $5/19$ c. $5/6$ d. $7/15$

A. $14/19$

B. $5/19$

C. $5/6$

D. $7/15$

Answer: A

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34. Forty team play a tournament. Each team plays every other team just once. Each game results in a win for one team. If each team has a 50% chance of winning each game, the probability that he end of the tournament, every team has won a different number of games is $1/780$ b. $40!/2^{780}$ c. $40!/2^{780}$ d. none of these

A. $1/780$

B. $40!/2^{780}$

C. $36/.^{64}C_3$

D. $98/.^{64}C_3$

Answer: B

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35. about to only mathematics

A. $196/.^{64}C_3$

B. $49/.^{64}C_3$

C. $36/.^{64}C_3$

D. $98/.^{64}C_3$

Answer: A

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36. A bag has 10 balls. Six ball are drawn in an attempt and replaced. Then another draw of 5 balls is made from the bag. The probability that exactly two balls are common to both the draw is a.$5/21$ b. $2/21$ c. $7/21$ d. $3/21$

A. $5/21$

B. $2/21$

C. $7/21$

D. $3/21$

Answer: A

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37. Find the probability that a randomly chosen three-digit number has exactly three factors.

A. $2/225$

B. $7/900$

C. $1/800$

D. none of these

Answer: B

Watch Video Solution

38. Let p,q be chosen one by one from the set $\{1, \sqrt{2}, \sqrt{3}, 2, e, \pi\}$ with replacement. Now a circle is drawn taking (p,q) as its centre. Then the

probability that at the most two rational points exist on the circle is (rational points are those points whose both the coordinates are rational)

A. $2/3$

B. $7/8$

C. $8/9$

D. none of these

Answer: C

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39. 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. $194/285$

B. $1/57$

C. $13/19$

D. $3/4$

Answer: A

Watch Video Solution

40. 5 different balls are placed in 5 different boxes randomly. Find the probability that exactly two boxes remain empty. Given each box can hold any number of balls.

A. $2/5$

B. $12/25$

C. $3/5$

D. none of these

Answer: C

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41. There are 10 prizes, five As, there Bs and two Cs, placed in identical sealed envelopes for the top 10 contestants in a mathematics contest. The prizes are awarded by allowing winners to select an envelope at random from those remaining. Then the 8th contestant goes to select the prize, the probability that the remaining three prizes are once $AandB$ and one C is $1/4$ b. $1/3$ c. $1/12$ d. $1/10$

A. $1/4$

B. $1/3$

C. $1/12$

D. $1/10$

Answer: A

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42. 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. The probability that the places neighboring his car are empty is

$\frac{(r-1)!}{(N-1)!}$ b. $\frac{(r-1)!(N-r)!}{(N-1)!}$ c. $\frac{(N-r)(N-r-1)}{(N-1)(N+2)}$ d. $\frac{\hat{}(N-r)C_2}{\hat{}(N-1)C_2}$

A. $\frac{(r-1)!}{(N-1)!}$

B. $\frac{(r-1)!(N-r)!}{(N-1)!}$

C. $\frac{(N-r)(N-r-1)}{(N+1)(N+2)}$

D. $\frac{.^{N-r}C_2}{.^{N-1}C_2}$

Answer: D

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43. Let A be a set containing elements. A subset P of the set A is chosen at random. The set A is reconstructed by replacing the elements of P, and

another subset Q of A is chosen at random. The probability that $P \cap Q$ contains exactly $m(m < n)$ elements, is

A. $\frac{3^{n-m}}{4^n}$

B. $\frac{.^n C_m . 3^m}{4^n}$

C. $\frac{.^n C_m . 3^{n-m}}{4^n}$

D. none of these

Answer: C

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44. about to only mathematics

A. $5/36$

B. $8/36$

C. $4/9$

D. $1/3$

Answer: C

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45. If a and b are chosen randomly from the set consisting of number 1, 2, 3, 4, 5, 6 with replacement. Then the probability that $\lim_{x \to 0} [(a^x + b^x)/2]^{2/x} = 6$ is

A. $1/3$

B. $1/4$

C. $1/9$

D. $2/9$

Answer: C

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46. Mr. A lives at origin on the Cartesian plane and has his office at $(4, 5)$. His friend lives at $(2, 3)$ on the same plane. Mrs. A can go to his office travelling one block at a time either in the $+y$ or $+x$ idrectin. If all possible paths are equally likely then the probability that Mr. A passed his friends house is (shortest path for any event must be consider4ed) $1/2$ b. $10/21$ c. $1/4$ d. $11/21$

A. $1/2$

B. $10/21$

C. $1/4$

D. $11/21$

Answer: B

Watch Video Solution

47. 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. $P\left(A \cap \overline{B}\right) + P\left(\overline{A} \cap B\right)$

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

D. $P\left(\overline{A}\right) + P\left(\overline{B}\right) - 2P\left(\overline{A} \cap \overline{B}\right)$

Answer: A::B::C::D

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48. 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. are real is 33/50

B. are imaginary is 19/50

C. are real and equal is 3/50

D. are real and distinct is 3/5

Answer: B::C::D

Watch Video Solution

49. If A and B are two events such that P(A) = 3/4 and P(B) = 5/8, then

A. $P(A \cup B) \geq 3/4$

B. $P(A' \cap B) \leq 1/4$

C. $1/8 \leq P(A \cap B') \leq 3/8$

D. $3/8 \leq P(A \cap B) \leq 5/8$

Answer: A::B::C::D

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50. If A and B are mutually exclusive events, then

A. $P(A) \leq P(\overline{B})$

B. $P(A) > P(B)$

C. $P(B) \leq P(\overline{A})$

D. $P(A) > P(B)$

Answer: A::C

Watch Video Solution

51. The gravitational field in a region is given by $\vec{g} = \left(2\hat{i} + 3\hat{j}\right)$ N/kg. The work done in moving a particle of mass 1 kg from (1, 1) to $\left(2, \frac{1}{3}\right)$ along the line 3y + 2x = 5 is

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52. The chance of an event happening is the square of the chance of a second event but the odds against the first are the cube of the odds against the second.

A. $P_1 = 1/9$

B. $P_1 = 1/16$

C. $P_2 = 1/3$

D. $P_2 = 1/4$

Answer: A::C

Watch Video Solution

53. A bag contains b blue balls and r red balls. If two balls are drawn at random, the probability drawing two red balls is five times the probability of drawing two blue balls. Furthermore, the probability of drawing one ball of each color is six times the probability of drawing two blue balls. Then

A. b + r = 9

B. br = 18

C. $|b - r| = 4$

D. $b/r = 2$

Answer: A::B

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54. 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. the smallest value of two is less than 3 is $13/28$

B. the bigger value of two is more than 5 is $9/14$

C. product of two number is even is $11/14$

D. none of these

Answer: A::B::C

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Comprehension

1. A shoping mall is running a scheme: Each packet of detergent SURF contains a coupon which bears letter of the word SURF, if a person buys at least four packets of detergent SURF, and produce all the letters of the word SURF, then he gets one free packet of detergent.

If a person buys 8 such packets at a time, then the number of different combinations of coupon he has is

A. 4^8

B. 8^4

C. $.^{11}C_3$

D. $.^{12}C_4$

Answer: C

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2. A shoping mall is running a scheme: Each packet of detergent SURF contains a coupon which bears letter of the word SURF, if a person buys at least four packets of detergent SURF, and produce all the letters of the word SURF, then he gets one free packet of detergent.

If person buys 8 such packets, then the probability that he gets exactly one free packets is

A. $7/33$

B. $102/495$

C. $13/55$

D. $34/165$

Answer: D

Watch Video Solution

3. A shoping mall is running a scheme: Each packet of detergent SURF contains a coupon which bears letter of the word SURF, if a person buys

at least four packets of detergent SURF, and produce all the letters of the word SURF, then he gets one free packet of detergent.

If a person buys 8 such packets, then the probability that he gets two free packets is

A. $1/7$

B. $1/5$

C. $1/42$

D. $1/165$

Answer: D

Watch Video Solution

4. There are two die A and B both having six faces. Die A has three faces marked with 1, two faces marked with 2, and one face marked with 1, two faces marked with 2, and one face marked with 3. Die B has one face marked with 1, two faces marked with 2, and three faces marked with 3. Both dices are thrown randomly once. If E be the event of getting sum of

the numbers appearing on top faces equal to x and let P(E) be the probability of event E, then

P(E) is minimum when x equals to

A. 5

B. 3

C. 4

D. 6

Answer: C

Watch Video Solution

5. There are two die A and B both having six faces. Die A has three faces marked with 1, two faces marked with 2, and one face marked with 3. Die B has one face marked with 1, two faces marked with 2, and three faces marked with 3. Both dices are thrown randomly once. If E be the event of getting sum of the numbers appearing on top faces equal to x and let P(E) be the probability of event E, then P(E) is minimum when x equals to

A. 3

B. 4

C. 5

D. 6

Answer: B

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6. There are two die A and B both having six faces. Die A has three faces marked with 1, two faces marked with 2, and one face marked with 1, two faces marked with 2, and one face marked with 3. Die B has one face marked with 1, two faces marked with 2, and three faces marked with 3. Both dices are thrown randomly once. If E be the event of getting sum of the numbers appearing on top faces equal to x and let P(E) be the probability of event E, then

P(E) is maximum when x equal to

A. $5/9$

B. $6/7$

C. $7/18$

D. $8/19$

Answer: C

Watch Video Solution

7. 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 probability that the cube selected has two sides painted is

A. $1/9$

B. $1/27$

C. $1/18$

D. $5/54$

Answer: B

Watch Video Solution

8. 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 probability that the cube selected has none of its sides painted is

A. $1/9$

B. $4/9$

C. $8/27$

D. none of these

Answer: B

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9. 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_1 be the probability that the cube selected having atleast one of its sides painted, then the value of $27P_1$, is

A. 18

B. 20

C. 22

D. 26

Answer: D

Watch Video Solution

10. There are some experiment in which the outcomes cannot be identified discretely. For example, an ellipse of eccentricity $2\sqrt{2}/3$ is inscribed in a circle and a point within the circle is chosen at random.

Now, we want to find the probability that this point lies outside the ellipse. Then, the point must lie in the shaded region shown in Figure. Let the radius of the circle be a and length of minor axis of the ellipse be 2b.

Given that

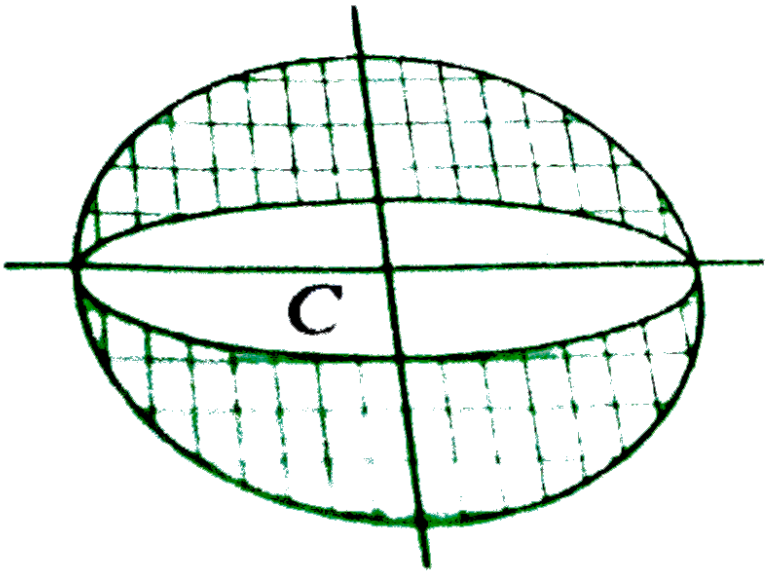
$$1-\frac{b^2}{a^2}=\frac{8}{9} \text{ or } \frac{b^2}{a^2}=\frac{1}{9}$$

Then, the area of circle serves as sample space and area of the shaded region represents the area for favorable cases. Then, required probability is

$$p=\frac{\text{Area of shaded region}}{\text{Area of circle}}$$

$$=\frac{\pi a^2-\pi ab}{\pi a^2}=1-\frac{b}{a}=1-\frac{1}{3}=\frac{2}{3}$$

Now, answer the following questions.



Two persons A and B agree to meet at a place between 5 and 6 pm. The first one to arrive waits for 20 min and then leave. If the time of their arrival be independant and at random, then the probability that A and B meet is

A. $1/4$

B. $1/2$

C. $1/3$

D. $1/\sqrt{2}$

Answer: A

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11. There are some experiment in which the outcomes cannot be identified discretely. For example, an ellipse of eccentricity $2\sqrt{2}/3$ is inscribed in a circle and a point within the circle is chosen at random. Now, we want to find the probability that this point lies outside the ellipse. Then, the point must lie in the shaded region shown in Figure. Let

the radius of the circle be a and length of minor axis of the ellipse be 2b.

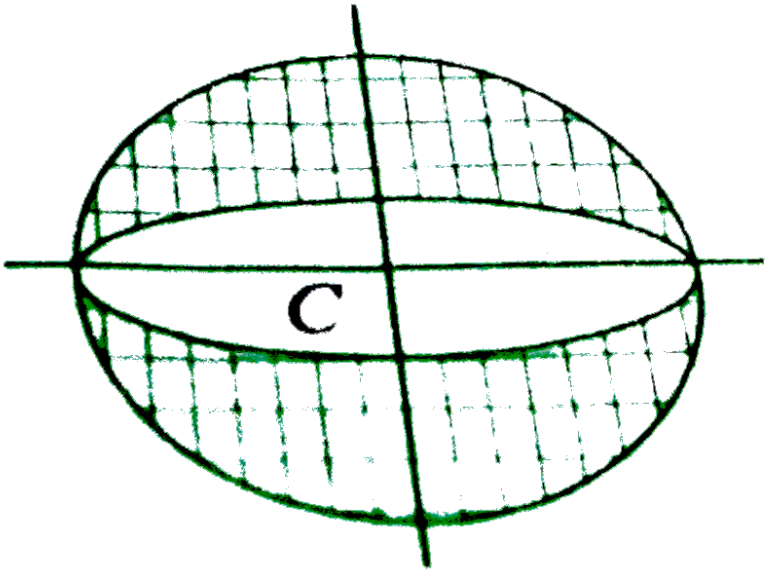
Given that

$$1-\frac{b^2}{a^2}=\frac{8}{9} \text{ or } \frac{b^2}{a^2}=\frac{1}{9}$$

Then, the area of circle serves as sample space and area of the shaded region represents the area for favorable cases. Then, required probability is

$$p=\frac{\text{Area of shaded region}}{\text{Area of circle}}$$
$$=\frac{\pi a^2-\pi ab}{\pi a^2}=1-\frac{b}{a}=1-\frac{1}{3}=\frac{2}{3}$$

Now, answer the following questions.



Two persons A and B agree to meet at a place between 5 and 6 pm. The first one to arrive waits for 20 min and then leave. If the time of their

arrival be independant and at random, then the probability that A and B meet is

A. $1/4$

B. $1/3$

C. $2/3$

D. $5/9$

Answer: D

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12. If the squares of a 8×8 chessboard are painted either red or black at random.

The probability that all the squares in any column are of same order and that of a row are of alternating color is

A. $\left(1 - 1/2^7\right)^8$

B. $1/2^{56}$

C. $1 - 1/2^7$

D. none of these

Answer: A

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13. If the squares of a 8×8 chessboard are painted either red or black at random.

The probability that all the squares in any column are of same order and that of a row are of alternating color is

A. $\frac{.^{64}C_{32}}{2^{64}}$

B. $\frac{64!}{32!.2^{64}}$

C. $\frac{2^{32} - 1}{2^{64}}$

D. none of these

Answer: A

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14. If the squares of a 8×8 chess board are painted either red and black at random .The probability that not all squares is any alternating in colour is

A. $1/2^{64}$

B. 1-$1/2^{63}$

C. $1/2$

D. none of these

Answer: B

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Match

1. n whole are randomly chosen and multiplied

Column I, Column II

The probability that the last digit is 1,3,7, or 9 is, p. $\frac{8^n - 4^n}{10^n}$

The probability that the last digit is 2,4,6, or 8 is, q. $\frac{5^n - 4^n}{10^n}$

The probability that the last digit is 5 is, r. $\frac{4^n}{10^n}$

The probability that the last digit is zero is, s. $\frac{10^n - 8^n - 5^n + 4^n}{10^n}$

A.
a	b	c	d
q	s	s	r

B.
a	b	c	d
r	q	q	p

C.
a	b	c	d
q	p	p	s

D.
a	b	c	d
q	s	p	r

Answer: A::B::C::D

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2. Three distinct numbers a, b and c are chosen at random from the numbers 1, 2, ..., 100. The probability that

List I	List II
a. a, b, c are in AP is	p. $\frac{53}{161700}$
b. a, b, c are in GP is	q. $\frac{1}{66}$
c. $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in GP is	r. $\frac{1}{22}$
d. $a+b+c$ is divisible by 2 is	s. $\frac{1}{2}$

A.

a	b	c	d
q	s	s	r

B.

a	b	c	d
r	q	q	p

C.

a	b	c	d
q	p	p	s

D.

a	b	c	d
q	s	p	r

Answer: C

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Numerical Value Type

1. If the probability of a six digit number N whose six digit sare 1,2,3,4,5,6 written as random order is divisible by 6 is p, then the value of $1/p$ is_____.

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2. If the probability that the product of the outcomes of three rolls of a fair dice is a prime number is p, then the value of $1/(4p)$ is____.

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3. There are two red, two blue, two white, and certain number (greater than 0) of green socks n a drawer. If two socks are taken at random from the drawer4 without replacement, the probability that they are of the same color is 1/5, then the number of green socks are _____.

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4. A dice is weighted such that the probability of rolling the face numbered n is proportional to n^2 (n = 1, 2, 3, 4, 5, 6). The dice is rolled twice, yielding the number a and b. The probability that $a > b$ is p then

the value of $[2/p]$ (where [.] represents greatest integer function) is _____.

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5. In a knockout tournament 2^n equally skilled players, $S_1, S_2, \ldots . S_{2n},$ are participatingl. In each round, players are divided in pair at random and winner from each pair moves in the next round. If S_2 reaches the semi-final, then the probability that S_1 wins the tournament is 1/84. The value of n equals _____.

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6. Five different games are to be distributed among 4 children randomly. The probability that each child get at least one game is $1/4$ b. $15/64$ c. $5/9$ d. $7/12$

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7. A bag contains 10 different balls. Five balls are drawn simultaneously and then replaced and then seven balls are drawn. The probability that exactly three balls are common to the tow draw on is p, then the value of $12p$ is _____.

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ARCHIVES

1. 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 form 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 false, statement 2 is true.

B. Statement 1 is true, statement 2 is true, statement 2 is a correct explanation for statement 1.

C. Statement 1 is true, statement 2 is true, statement 2 is not a correct explanation for statement 2.

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

Answer: D

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2. 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. $\frac{2}{23}$

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

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

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

Answer: C

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3. 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: B

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4. 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) $= \frac{1}{16}$. Then the probability that at least one of the events occurs, is :

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

B. $\frac{7}{32}$

C. $\frac{7}{16}$

D. $\frac{7}{64}$

Answer: C

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JEE Advanced

1. 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. $1/18$

B. $1/9$

C. $2/9$

D. $1/36$

Answer: C

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

Answer: A

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3. Three randomly chosen nonnegative integers $x, yandz$ are found to satisfy the equation $x+y+z=10$. Then the probability that z is even, is: $\frac{5}{12}$ (b) $\frac{1}{2}$ (c) $\frac{6}{11}$ (d) $\frac{36}{55}$

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

B. $\frac{36}{55}$

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

D. $\frac{5}{11}$

Answer: C

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4. 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

A. $\frac{29}{105}$

B. $\frac{53}{105}$

C. $\frac{57}{105}$

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

Answer: B

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5. 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 are in an aritmetic progression is

A. $\frac{9}{105}$

B. $\frac{10}{105}$

C. $\frac{11}{105}$

D. $\frac{7}{105}$

Answer: C

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6. Five boys and four girls sit in a row randomly. The probability that no two girls sit together

A. $\frac{3}{40}$

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

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

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

Answer: A

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7. PARAGRAPH A There are five students $S_1,\ S_2,\ S_3,\ S_4$ and S_5 in a music class and for them there are five seats $R_1,\ R_2,\ R_3,\ R_4$ and R_5 arranged in a row, where initially the seat R_i is allotted to the student $S_i,\ i=1,\ 2,\ 3,\ 4,\ 5$. But, on the examination day, the five students are randomly allotted five seats. For $i=1,\ 2,\ 3,\ 4,$ let T_i denote the event that the students S_i and S_{i+1} do NOT sit adjacent to each other on the day of the examination. Then, the probability of the event $T_1 \cap T_2 \cap T_3 \cap T_4$ is $\frac{1}{15}$ (b) $\frac{1}{10}$ (c) $\frac{7}{60}$ (d) $\frac{1}{5}$

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

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

C. $\frac{7}{60}$

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

Answer: C

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SOLVED EXAMPLES

1. 8 players $P_1, P_2, P_3, , P_8$ 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 be the probability that P_2 loses in second round ,yhen the value of 7p is

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2. Suppose A and B shoot independently until each hits his target. They have probabilities $\frac{3}{5}$ and $\frac{5}{7}$ of hitting the target at each shot. The

probability that B will require more shots than A is

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3. A tennis match of best of 5 sets is played by two players A and B. The probability that first set is won by A is 1/2 and if he losed the first, then probability of his winning the next set is 1/4, otherwise it remains same. Find the probability that A wins the match.

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4. A coin has probability p of showing head when tossed. It is tossed n times. Let P_n denote the probability that no two (or more) consecutive heads occur. Prove that $P_1 = 1, P_2 = 1 - p^2$ and $P_n = (1-p)P_{n-1} + p(1-p)P_{n-2}$ for all $n \geq 3$.

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5. The probability of hitting a target by thre marksemen A, B and C are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$, respectively. Find the probability that one and only one of them will hit the target when they fire simultaneously

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7. If A and B are two independent events, prove that $P(A \cup B).P(A' \cap B') \leq P(C)$, where C is an event defined that exactly one of A and B occurs.

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8. Two players P_1, and P_2, are playing the final of a chase championship, which consists of a series of match Probability of P_1, winning a match is

2/3 and that of P_2 is 1/3. The winner will be the one who is ahead by 2 games as compared to the other player and wins at least 6 games. Now, if the player P_2, wins the first four matches find the probability of P_1, wining the championship.

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9. Consider a game played by 10 prople in which each flips a fair coin at the same time. If all but one of the coins comes up the same, then the add persons wing (e.g., if there are nine tails and one head then person having lead wins.) If such a situation does not occur, the players flips again. Find the probability that game is settled on or after nth toss.

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10. A coin is tossed (m+n) times with m>n. Show that the probability of getting m consecutive heads is $\frac{n+2}{2^{m+1}}$

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11. about to only mathematics

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12. 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 proccess is repeated, find the probability that the third ball drawn is black.

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13. An unbiased coin is tossed. If the result is a head, a pair of unbiased dice is rolled and the number obtained by adding the numbers on two faces is noted. If the result is a tail, a card from a well-shuffled pack of 11 cards numbered 2, 3, 4, ..., 12 is picked and the number on the card is noted. What is the probability that the noted number is either 7 or 8?

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14. If m things are distributed among a men and b women, show that the chance that the number of things received by man is $\frac{1}{2}\left(\frac{(b+a)^m-(b-a)^m}{(b+a)^m}\right)$.

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16. From an urn containing a white and b black balls, k balls are drawn and laid aside, their color unnoted. Then one more ball is drawn. Find the probability that it is white assuming that k

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17. A bag contains n balls, one of which is white. The probability that A and B speak truth are P_1 and P_2, respectively. One ball is drwn from the bag and A and B both assert that it is white. Find the probability that drawn ball is actually white.

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18. A bag contains a total of 20 books on physics and mathematics, Any possible combination of books is equally likely. Ten books are chosen from the bag and it is found that it contains 6 books of mathematics. Find out the probability that the remaining books in the bag contains 3 books on mathematics.

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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

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20. 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?

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CONCEPT APPCICATION EXERCISE 14.1

1. Three coins are tossed. If one of them shows tail, then find the probability that all three coins show tail.

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2. If two events A and B are such that $P(A') = 0.3, P(B) = 0.4$ and $P(A \cap B') = 0.5$, then find the value of $P[B/A \cup B')]$.

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3. In a single throw of two dice what is the probability of obtaining sum of numbers greater than 7, if 4 appears on the first dice?

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4. A coin is tossed three times in succession. If E is the event that there are at least two heads and F is the event in which first throw is a head, then find $P(E/F)$.

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5. Consider a sample space S representing the adults in a small town who have completed the requirements for a college degree. They have been categorized according to sex and employment as follows: , Employed, Unemployed Male, 460, 40 Female, 140, 260 An employed person is selected at random. Find the probability that the chosen one is a male.

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CONCEPT APPCICATION EXERCISE 14.2

1. A bag contains 5 white and 3 black balls. Four balls are successively drawn out without replacement. What is the probability that they are

alternately of different colours?

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2. Cards are drawn one at random from a well shuffled full pack of 52 playing cards until 2 aces are obtained for the first time. If N is the number of cards required to the drawn, then show that `P ,{N=n}=((n-1)(52-n)(51-n))/(50xx49xx17xx13),w h e r e2

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3. In a multiple choice question, there are four alternative answers of which one or more than one is correct A candidate will get marks on the question only if he ticks the correct answer. The candidate decides to tick answers at a random. If he is allowed up to three chances to answer the question, then find the probability that he will get marks on it.

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CONCEPT APPCICATION EXERCISE 14.3

1. A coin is tossed three times.

Event A: two heads appear

Event B: last should be head

Then identify whether events A and B are independent or not.

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2. If A and B are two events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{7}{12}$ and P(not A or not B) = $\frac{1}{4}$. State whether A and B are independent?

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3. Two cards are drawn one by one randomly from a pack of 52 cards. Then find the probability that both of them are king.

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4. The probability of happening an event A in one trial is 0.4. Find the probability that the event A happens at least one in three independent trials.

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5. In a bag there are 6 balls of which 3 are white and 3 are black. They are drwn successively with replacement. What is the chance that the colours are alternate ?

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6. A man performs 10 trials of an experiment, if the probability of getting '4 sucesses' is maximum, then find the probability of failure in each trial.

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7. A man and a woman appear in an interview for two vacancies in the same post. The probability of mans selection of 1/4 and that the womans selection is 1/3. What is the probability that none of them will be selected?

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8. The probability that Krishna will be alive 10 years hence is 7/15 and that Hari will be alive is 7/10. What is t he probability that both Krishna and Hari will be dead 10 years hence?

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9. A binary number is made up to 8 digits. Suppose that the probability if an incorrect digit appearing is p and that the errors in different digits are independent of each other. Then find the probability of forming an incorrect number.

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10. The probability of India winning a test match against West Indies is 1/2. Assuming independence from match to match, find the probability that in a match series Indias second win occurs at the third test.

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11. about to only mathematics

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12. 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 $a:b$

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CONCEPT APPCICATION EXERCISE 14.4

1. An um contains 5 red and 5 black balls. A ball is drawn at random, its colour is noted and is returned to the urn. Moreover, 2 additional balls of the colour drawn are put in the um and then a ball is drawn at random. What is the probability that the second ball is black

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2. A bag contains 3 white, 3 black and 2 red balls. One by one, three balls are drawn without replacing them. Find the probability that the third ball is red.

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3. Two thirds of eth students in a class are boys and the rest girls. It is known that eh probability of a girl getting a first class is 0.25 and that of

a boy getting a first class is 0.28. find the probability that a student chosen at random will get first class marks in the subject.

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4. 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.

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5. A real estate man has eight master keys to open several new homes. Only in master key will open any given hour. If 40% of these homes are usually left unlocked, what is the probability that the real estate man can get into a specific home if he selects three master keys at random before leaving the office?

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6. An urn contains m white and n black balls. A ball is drawn at random and is put back into the urn along with k balls of the same colour as that of the ball drawn. a ball is again drawn at random. Show that the probability of drawing a white ball now does not depend on k.

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7. A bag contains 12 red balls 6 white balls. Six balls are drawn one by one without replacement of which at least 4 balls are white. Find the probability that in the next two drawn exactly one white ball is drawn. (Leave the answer in ${}^{n}C_{r}$).

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CONCEPT APPCICATION EXERCISE 14.5

1. A card from a pack of 52 cards is lost. From the remaining cards of the pack; two cards are drawn and are found to be hearts. Find the probability of the missing card to be a heart.

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2. There are three coins. One is a two headed coin (having head on both faces), another is a biased coin that comes up heads 75% of the time and third is an unbiased coin. One of the three coins is chosen at random and tossed, it shows heads, what is the probability that it is a two headed coin.

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3. Probability that A speaks truth is $\frac{4}{5}$. A coin is tossed. A reports that a head appears. The probability that actually there was head is (A) $\frac{4}{5}$ (B) $\frac{1}{2}$ (C) $\frac{1}{5}$ (D) $\frac{2}{5}$

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Watch Video Solution

4. A bag contains 5 balls. Two balls are drawn and are found to be white. What is the probability that all the balls are white?

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5. The chance of defective screws in three boxes $A, B, Care 1/5, 1/6, 1/7,$ respectively. A box is selected at random and a screw draw in from it at random is found to be defective. Then find the probability that it came from box A.

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6. Assume that the chances of a patient having a heart attack is 40%. It is also assumed that a meditation and yoga course reduce the risk of heart attack by 30% and prescription of certain drug reduces its chances by 25%. At a time a patient can choose any one of the two options with

equal probabilities. It is given that after going through one of the two options the patient selected at random suffers a heart attack. Find the probability that the patient followed a course of meditation and yoga?

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7. The probability that a particular day in the month of July is a rainy day is $\frac{3}{4}$. Two person whose credibility and $\frac{4}{5}$ and $\frac{2}{3}$, respectively, claim that 15th July was a rainy day. Find the probability that it was really a rainy day.

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CONCEPT APPCICATION EXERCISE 14.6

1. A fair coin is tossed n times. if the probability that head occurs 6 times is equal to the probability that head occurs 8 times, then find the value of n.

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2. A die is thrown 4 times. Find the probability of getting at most two 6.

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3. The probability that a student is not a swimmer is 1/5. Then find the probability that out of 5 students exactly 4 are swimmer.

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4. Suppose the probability for A to win a game against B is 0.4. If A has an option of playing either a “best of 3 games" or a “best of 5 games match against B, which option should be chosen so that the probability of his winning the match is higher? (No game ends in a draw.)

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5. Numbers are selected at randm, one at time, from the two-digit numbers $00, 01, 02 \ldots, 99$ with replacement. An event E occurs if the only product of the two digits of a selected number is 18. If four members are selected, find the probability that the event E occurs at least 3 times.

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EXERCISE

1. A man has 3 pairs of black socks and 2 pair of brown socks kept together in a box. If he dressed hurriedly in the dark, the probability that after he has put on a black sock, he will then put on another black sock is $1/3$ b. $2/3$ c. $3/5$ d. $2/15$

A. $1/3$

B. $2/3$

C. $3/5$

D. $2/15$

Answer: A

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2. There are 20 cards. Ten of these cards have the letter I printed on them and the other 10 have the letter I printed on them. If three cards picked up at random and kept in the same order, the probability of making word IIT is $1/9, 1/3$ b. $1/16, 1/4$ c. $1/4, 1/2$ d. none of these

A. $4/27$

B. $5/38$

C. $1/8$

D. $9/80$

Answer: B

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3. One ticket is selected at random from 100 tickets numbered 00,01,02,...,98,99. If $x_1, and x_2$ denotes the sum and product of the digits on the tickets, then $P(x_1 = 9 / x_2 = 0)$ is equal to $2/19$ b. $19/100$ c. $1/50$ d. none of these

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4. Let A and B be two events such that $P(A \cap B') = 0.20, P(A' \cap B) = 0.15, P(A' \cap B') = 0.1$thenP(A//B)` is equal to

A. $11/14$

B. $2/11$

C. $2/7$

D. $1/7$

Answer: A

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5. A father has 3 children with at least one boy. The probability that he has 2 boys and 1 girl is $1/4$ b. $1/3$ c. $2/3$ d. none of these

A. $1/4$

B. $1/3$

C. $2/3$

D. None of these

Answer: B

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6. Ina certain town, 40% of the people have brown hair, 25% have brown eyes, and 15% have both brown hair and brown eyes. If a person selected at random from the town has brown hair, the probability that he also has brown eyes is $1/5$ b. $3/8$ c. $1/3$ d. $2/3$

A. $1/5$

B. $3/8$

C. $1/3$

D. $2/3$

Answer: B

Watch Video Solution

7. Let $AandB$ are events of an experiment and $P(A) = 1/4, P(A \cup B) = 1/2,$ then value of $P(B/A^c)$ is $2/3$ b. $1/3$ c. $5/6$ d. $1/2$

A. $2/3$

B. $1/3$

C. $5/6$

D. $1/2$

Answer: B

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8. The probability that an automobile will be stolen and found within one week is 0.0006. Then probability that an automobile will be stolen is 0.0015. the probability that a stolen automobile will be found in the week is 0.3 b. 0.4 c. 0.5 d. 0.6

A. 0.3

B. 0.4

C. 0.5

D. 0.6

Answer: B

Watch Video Solution

9. A pair of numbers is picked up randomly (without replacement) from the set {1,2,3,5,7,11,12,13,17,19}. The probability that the number 11 was picked given that the sum of the numbers was even is nearly 0.1 b. 0.125 c. 0.24 d. 0.18

Watch Video Solution

10. All the jacks, queens, kings, and aces of a regular 52 cards deck are taken out. The 16 cards are throughly shuffled and may opponent, a person who always tells the truth, simultaneously draws two cards at random and says, "I hold at least one ace". The probability that he holds two aces is

A. $2/8$

B. $4/9$

C. $2/3$

D. $1/9$

Answer: D

Watch Video Solution

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

A. $2/13$

B. $2/19$

C. $1/50$

D. None of these

Answer: B

Watch Video Solution

12. Two dice are rolled one after the other.The probability that the number on the first dice is smaller than that of the number on second dice is-

A. $1/2$

B. $7/18$

C. $3/4$

D. $5/12$

Answer: D

Watch Video Solution

13. Cards are drawn one-by-one at random from a well-shuffled pack of 52 playing cards until 2 aces are obtained from the first time. The probability that 18 draws are obtained for this is $3/34$ b. $17/455$ c. $561/15925$ d. none of these

A. $3/34$

B. $17/455$

C. $561/15925$

D. None of these

Answer: C

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 $\frac{2^n}{{}^{2n}C_n}$

A. $1/{}^{2n}C_n$

B. $2n/{}^{2n}C_n$

C. $2n/n!$

D. $2n/(2n!)$

Answer: B

Watch Video Solution

15. A six-faced dice is so biased that it is twice as likely to show an even number as an odd number when thrown. It is thrown twice, the probability that the sum of two numbers thrown is even is $1/12$ b. $1/6$ c. $1/3$ d. $5/9$

A. $1/12$

B. $1/6$

C. $1/3$

D. $5/9$

Answer: D

Watch Video Solution

16. A student appears for tests I, II and III. The student is successful if he passes either in tests I and II or tests I and III. The probabilities of the student passing in tests I, II, and III are, respectively, p, q, and 1/2. then p(1+q)=

A. $1/2$

B. 1

C. $3/2$

D. $3/4$

Answer: B

Watch Video Solution

17. A problem in mathematics is given to three students A, B, C and their respective probability of solving the problem is 1/2, 1/3 and 1/4. Probability that the problem is solved is $3/4$ b. $1/2$ c. $2/3$ d. $1/3$

A. $3/4$

B. $1/2$

C. $2/3$

D. $1/3$

Answer: A

Watch Video Solution

18. Let A,B, C be three mutually independent events. Consider the two statements S_1 and S_2.

S_1 : A and $B \cap C$ are independent.
S_2 : A and $B \cap C$ are independent.

Then

A. both S_1 and S_2 are true

B. only S_1 is true

C. only S_2 is true

D. neither S_1 nor S_2 is true

Answer: A

Watch Video Solution

19. Three ships A, B, $andC$ sail from England to India. If the ratio of their arriving safely are 2:5, 3:7, and 6:11, respectively, then the probability of all the ships for arriving safely is

a) $18/595$ b) $6/17$ c) $3/10$ d) $2/7$

A. $18/595$

B. $6/17$

C. $3/10$

D. $2/7$

Answer: A

Watch Video Solution

20. Cards are drawn one by one without replacement from a pack of 52 cards. The probability that 10 cares will precede the first ace is $241/1456$ b. $18/625$ c. $451/884$ d. none of these

A. $241/1456$

B. $164/4168$

C. $451/884$

D. None of these

Answer: B

Watch Video Solution

21. Five horses are in a race. Mr. A selects two of the horses at random and bets on them. The probability that Mr. A selected the winning horse is

a) $3/5$ b) $1/5$ c) $2/5$ d) $4/5$

A. $3/5$

B. $1/5$

C. $2/5$

D. $4/5$

Answer: C

Watch Video Solution

22. 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 the complement of the event A. Then the events A and B are (1) mutually exclusive and independent (2) equally likely but not independent (3) independent but not equally likely (4) independent and equally likely

A. equally likely but not independent equally likely and mutually exclusive

B. equuually like and mutually exclusive

C. Mutually exclusive and independent

D. independent but not equally likely

Answer: D

Watch Video Solution

23. A class consists of 80 students, 25 of them are girls and 55 are boys. If 10 of them are rich and the remaining are poor and also 20 of them are intelligent, then the probability of selecting an intelligent rich girls is

a) $5/128$ b) $25/128$ c) $5/512$ d) none of these

A. $5/128$

B. $25/128$

C. $5/512$

D. None of these

Answer: C

Watch Video Solution

24. Events $AandC$ are independent. If the probabilities relating $A, B, andC$ are $P(A) = 1/5, P(B) = 1/6; P(A \cap C) = 1/20; P(B \cup C) = 3/8.$ Then events $a)BandC$ are independent events $b)BandC$ are mutually exclusive events $c)BandC$ are neither independent nor mutually exclusive events $d)BandC$ are equiprobable

A. events B and C are independent

B. events B and C are mutually exclusive

C. events B and C are neiter independent nor mutually exclusive

D. events B and C are equiprobabile

Answer: A

Watch Video Solution

25. Let A & B be two events. Suppose $P(A) = 0.4$, $P(B) = p$ and $P(A \cup B) = 0.7$ The value of p for which A and B are independent is

A. $1/3$

B. $1/4$

C. $1/2$

D. $1/5$

Answer: C

Watch Video Solution

26. 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. $1/1260$

B. $1/7560$

C. $1/126$

D. None of these

Answer: A

Watch Video Solution

27. If any four numbers are slected and they are multiplied, then the probability that the last digit will be $1, 3, 5 \text{ or } 7$ is

A. $4/625$

B. $18/625$

C. $16/625$

D. None of these

Answer: C

Watch Video Solution

28. If odds against solving a question by three students are 2:1, 5:2, and 5:3, respectively, then probability that the question is solved only by one student is $31/56$ b. $24/56$ c. $25/56$ d. none of these

A. $31/56$

B. $24/56$

C. $23/56$

D. None of these

Answer: C

Watch Video Solution

29. An unbiased coin is tossed 6 times. The probability that third head appears on the sixth trial is $5/16$ b. $5/32$ c. $5/8$ d. $5/64$

A. $5/16$

B. $2/32$

C. $5/8$

D. $5/64$

Answer: B

Watch Video Solution

30. A coin is tossed 7 times. Then the probability that at least 4 consecutive heads appear is $3/16$ b. $5/32$ c. $3/16$ d. $1/8$

A. $3/16$

B. $5/32$

C. $3/16$

D. $1/8$

Answer: B

Watch Video Solution

31. 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.

A. $35/49$

B. $125/343$

C. $164/343$

D. $209/343$

Answer: D

Watch Video Solution

32. A and B play a game of tennis. The situation of the game is as follows: if one scores two consecutive points after a deuce, he wins; if loss of a point is followed by win of a point, it is deuce. The chance of a server to

win a point is 2/3. The game is a deuce and A is serving. Probability that A will win the match is (serves are change after each game) $3/5$ b. $2/5$ c. $1/2$ d. $4/5$

A. $3/5$

B. $2/5$

C. $1/2$

D. $4/5$

Answer: C

Watch Video Solution

33. An unbiased cubic die marked with 1,2,2,3,3,3 is rolled 3 times. The probability of getting a total score of 4 or 6 is $16/216$ b. $50/216$ c. $60/216$ d. none of these

A. $16/216$

B. $50/216$

C. $60/216$

D. None of these

Answer: B

Watch Video Solution

34. A fair die is tossed repeatedly. A wins if if is 1 or 2 on two consecutive tosses and B wins if it is 3,4,5 or 6 on two consecutive tosses. The probability that A wins if the die is tossed indefinitely is $1/3$ b. $5/21$ c. $1/4$ d. $2/5$

A. $1/3$

B. $5/21$

C. $1/4$

D. $2/5$

Answer: B

Watch Video Solution

35. Whenever horses a, b, c race together, their respective probabilities of winning the race are 0.3, 0.5, and 0.2 respectively. If they race three times, the pr4obability t hat the same horse wins all the three races, and the probability that a, b, c each wins one race are, respectively. $8/50$, $9/50$ b. $16/100$, $3/100$ c. $12/50$, $15/50$ d. $10/50$, $8/50$

A. $8/50$, $9/50$

B. $16/100$, $3/100$

C. $12/50$, $15/50$

D. $10/50$, $8/50$

Answer: A

Watch Video Solution

36. A man alternately tosses a coin and throws a die beginning with the coin. The probability that he gets a head in the coin before he gets a 5 or 6 in the dice is $3/4$ b. $1/2$ c. $1/3$ d. none of these

A. $3/4$

B. $1/2$

C. $1/3$

D. None of these

Answer: A

Watch Video Solution

37. If p is the probability that a man aged x will die in a year, then the probability that out of n men A_1, A_2, A_n each aged x, A_1 will die in an year and be the first to die is $1-(1-p)^n$ b. $(1-p)^n$ c. $1/n\left[1-(1-p)^n\right]$ d. $1/n(1-p)^n$

A. $1-(1-p)^n$

B. $(1-p)^n$

C. $1/n\left[1-(1-p)^n\right]$

D. $1/n(1-p)^n$

Answer: C

Watch Video Solution

38. Thirty two players ranked 1 to 32 are playing is a knockout tournament. Assume that in every match between any two players, the better ranked player wins the probability that ranked 1 and ranked 2 players are winner and runner up, respectively, is $16/31$ b. $1/2$ c. $17/31$ d. none of these

A. $16/31$

B. $1/2$

C. $17/31$

D. None of these

Answer: A

Watch Video Solution

39. 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. `2//5

B. $3/5$

C. $4/5$

D. None of these

Answer: A

Watch Video Solution

40. A fair coin is tossed 10 times. Then the probability that two heads do not occur consecutively is $7/64$ b. $1/8$ c. $9/16$ d. $9/64$

A. $7/64$

B. $1/8$

C. $9/16$

D. $9/64$

Answer: D

Watch Video Solution

41. A die is thrown a fixed number of times. If probability of getting even number 3 times is same as the probability of getting even number 4 times, then probability of getting even number exactly once is $1/6$ b. $1/9$ c. $5/36$ d. $7/128$

A. $1/6$

B. `1//9

C. $5/36$

D. $7/128$

Answer: D

Watch Video Solution

42. 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. $8/9$

B. $7/29$

C. $8/243$

D. $1/729$

Answer: C

Watch Video Solution

43. The probability that a bulb produced in a factory will fuse after 150 days of use is 0.05 Find the probability that out of 5 such bulb :

None will fuse after 150 days of use.

A. $1-(19/20)^5$

B. $(19/20)^5$

C. $(3/4)^5$

D. $90(1/4)^5$

Answer: B

Watch Video Solution

44. The box contains tickets numbered from 1 to 20. Three tickets are drawn from the box with replacement. The probability that the largest number on the tickets is 7 is $2/19$ b. $7/20$ c. $1-(7/200)^3$ d. none of these

A. $2/19$

B. $7/20$

C. $1-(7/20)^3$

D. None of these

Answer: D

Watch Video Solution

45. Two players toss 4 coins each. The probability that they both obtain the same number of heads is $5/256$ b. $1/16$ c. $35/128$ d. none of these

A. $5/256$

B. $1/16$

C. $35/128$

D. None of these

Answer: C

Watch Video Solution

46. A coin is tossed $2n$ times. The chance that the number of times one gets head is not equal to the number of times one gets tails is $\frac{(2n!)}{(n!)^2}\left(\frac{1}{2}\right)^{2n}$ b. $1-\frac{(2n!)}{(n!)^2}$ c. $1-\frac{(2n!)}{(n!)^2}\frac{1}{(4^n)}$ d. none of these

A. $\frac{(2n!)}{(n!)^2}\left(\frac{1}{2}\right)^{2n}$

B. $1-\frac{(2n!)}{(n!)^2}$

C. $1-\frac{(2n!)}{(n!)^2}\frac{1}{4^n}$

D. None of these

Answer: C

Watch Video Solution

47. A box contains 24 identical balls of which 12 are white and 12 are black. The balls are drawn at random from the box one at a time with

replacement. The probability that a white ball is drawn for the 4th time on the 7th draw is $5/64$ b. $27/32$ c. $5/32$ d. $1/2$

A. $5/64$

B. $27/32$

C. $5/32$

D. $1/2$

Answer: C

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48. In a game a coin is tossed $2n+m$ times and a player wins if he does not get any two consecutive outcomes same for at least $2n$ times in a row. The probability that player wins the game is $\frac{m+2}{2^{2n}+1}$ b. $\frac{2n+2}{2^{2n}}$ c. $\frac{2n+2}{2^{2n+1}}$ d. $\frac{m+2}{2^{2n}}$

A. $\frac{m+2}{2^{2n}+1}$

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

C. $\frac{2n+2}{2^{2n+1}}$

D. $\frac{m+2}{2^{2n}}$

Answer: D

Watch Video Solution

49. If $AandB$ each toss three coins. The probability that both get the same number of heads is $1/9$ b. $3/16$ c. $5/16$ d. $3/8$

A. $1/9$

B. $3/16$

C. $5/16$

D. $3/8$

Answer: C

Watch Video Solution

50. A fair coin is tossed 100 times. The probability of getting tails 1, 3, .., 49 times is $1/2$ b. $1/4$ c. $1/8$ d. $1/16$

A. $1/2$

B. $1/4$

C. $1/8$

D. $1/16$

Answer: B

Watch Video Solution

51. A fair die is thrown 20 times. The probability that on the 10th throw, the fourth six appears is ^ $20C_{10} \times 5^6/6^{20}$ b. $120 \times 5^7/6^{10}$ c. $84 \times 5^6/6^{10}$ d. none of these

A. $^{20}C_{10} \times 5/^6/6^{20}$

B. $120 \times 5^7/6^{10}$

C. $84 \times 5^6 / 6^{10}$

D. None of these

Answer: C

Watch Video Solution

52. A speaks truth in 605 cases and B speaks truth in 70% cases. The probability that they will say the same thing while describing a single event is $2/19$ b. $3/29$ c. $17/19$ d. $4/29$

A. 0.56

B. 0.54

C. 0.38

D. 0.94

Answer: B

Watch Video Solution

53. The probability that a teacher will give an unannounced test during any class meeting is 1/5. If a student is absent twice, find the probability that the student will miss at least one test.

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

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

C. $\frac{7}{25}$

D. `9/25

Answer: D

Watch Video Solution

54. There are two urns $AandB$. Urn A contains 5 red, 3 blue and 2 white balls, urn B contains 4 re3d, 3 blue, and 3 white balls. An urn is chosen at random and a ball is drawn. Probability that the ball drawn is red is $9/10$ b. $1/2$ c. $11/20$ d. $9/20$

A. $9/10$

B. $1/2$

C. $11/20$

D. $9/20$

Answer: D

Watch Video Solution

55. A bag contains 20 coins. If the probability that bag contains exactly 4 biased coin is $1/3$ and that of exactly 5 biased coin is $2/3,$ then the probability that all the biased coin are sorted out from the bag in exactly 10 draws is

A. $\frac{5}{10}\frac{{}^{16}C_6}{{}^{20}C_9}+\frac{1}{11}\frac{{}^{15}C_5}{{}^{20}C_9}$

B.

C. $\frac{5}{33}\frac{{}^{16}C_7}{{}^{20}C_9}+\frac{1}{11}\frac{{}^{15}C_6}{{}^{20}C_9}$

D. None of these

Answer: B

Watch Video Solution

56. A bag contains 3 red and 3 green balls and a person draws out 3 at random. He then drops 3 blue balls into the bag and again draws out 3 at random. The chance that the 3 later balls being all of different colors is $15\ \%$ b. $20\ \%$ c. $27\ \%$ d. $40\ \%$

A. $15\ \%$

B. $20\ \%$

C. $27\ \%$

D. $40\ \%$

Answer: C

Watch Video Solution

57. A bag contains 20 coins. If the probability that the bag contains exactly 4 biased coin is 3/4 and that of exactly 5 biased coin is 2/3, then the probability that all the biased coin are sorted out from bag is exactly 10 draws is $\frac{5}{10}\frac{\hat{}(16)C_6}{\hat{}(20)C_9}+\frac{1}{11}\frac{\hat{}(15)C_5}{\hat{}(20)C_9}$ b. $\frac{2}{33}\left[\frac{\hat{}(16)C_6+5^{15}C_5}{\hat{}(20)C_9}\right]$ c. $\frac{5}{33}\frac{\hat{}(16)C_7}{\hat{}(20)C_9}+\frac{1}{11}\frac{\hat{}(15)C_6}{\hat{}(20)C_9}$ d. none of these

A. $\frac{5}{33}\frac{{}^{16}C_6}{{}^{20}C_9}+\frac{1}{11}\frac{{}^{15}C_5}{{}^{20}C_9}$

B. $\frac{2}{33}\left[\frac{{}^{16}C_6+5^{{}^{15}C_5}}{{}^{20}C_6}\right]$

C. $\frac{5}{33}\frac{{}^{16}C_7}{{}^{20}C_9}+\frac{1}{11}\frac{{}^{15}C_6}{{}^{20}C_9}$

D. None of these

Answer: C

Watch Video Solution

58. An urn contains three red balls and n white balls. Mr. A draws two balls together from the urn. The probability that they have the same

color is $1/2$. Mr.B draws one ball from the urn, notes its color and rplaces it. He then draws a second ball from the urn and finds that both balls have the same color is $5/8$. The value of n is ___.

A. 9

B. 6

C. 5

D. 1

Answer: D

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59. A student can solve 2 out of 4 problems of mathematics, 3 out of 5 problem of physics, and 4 out of 5 problems of chemistry. There are equal number of books of math, physics, and chemistry in his shelf. He selects one book randomly and attempts 10 problems from it. If he solves the first problem, then the probability that he will be able to solve the second problem is $2/3$ b. $25/38$ c. $13/21$ d. $14/23$

A. $2/3$

B. $25/38$

C. $13/21$

D. $14/23$

Answer: B

Watch Video Solution

60. An event X can take place in conjuction with any one of the mutually exclusive and exhaustive events $A, BandC$. If A, B, C are equiprobable and the probability of X is 5/12, and the probability of X taking place when A has happened is 3/8, while it is 1/4 when B has taken place, then the probabililty of X taking place in conjuction with C is $5/8$ b. $3/8$ c. $5/24$ d. none of these

A. $5/8$

B. $3/8$

C. $5/24$

D. None of these

Answer: A

Watch Video Solution

61. 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

A. 20

B. 25

C. 29

D. 35

Answer: C

Watch Video Solution

62. A bag contains some white and some black balls, all combinations of balls being equally likely. The total number of balls in the bag is 10. If there ball are drawn at random without replacement and all of them are found to be black, the probability that eh bag contains 1 white and 9 black balls is $14/55$ b. $12/55$ c. $2/11$ d. $8/55$

A. $14/55$

B. $15/55$

C. $2/11$

D. $8/55$

Answer: A

Watch Video Solution

63. A letter is known to have come either from LONDON or CLIFTON. On the envelope just two consecutive letters ON are visible. What is the probability that the letter has come from (i) LONDON (ii) CLIFTON?

A. $1/7$

B. $12/17$

C. $17/30$

D. $3/5$

Answer: B

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64. 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. $91/165$

B. $90/163$

C. $82/161$

D. $95/167$

Answer: D

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65. On a Saturday night, 20%of all drivers in U.S.A. are under the influence of alcohol. The probability that a drive under the influence of alcohol will have an accident is 0.001. The probability that a sober drive will have an accident is 0.00. if a car on a Saturday night smashed into a tree, the

probability that the driver was under the influence of alcohol is $3/7$ b. $4/7$ c. $5/7$ d. $6/7$

A. $3/7$

B. $4/7$

C. $5/7$

D. $6/7$

Answer: C

Watch Video Solution

66. A purse contains 2 six-sided dice. One is normal fair die, while the other has two 1's, and two 5's. A die is picked up and rolled. Because of some secret magnetic attraction of the unfair die, there is 75% chance of picking the unfair die and a 25% chance of picking a fair die. The die is rolled and shows up the face 3. The probability that a fair die was picked up is

A. $1/7$

B. $1/4$

C. $1/6$

D. $1/24$

Answer: A

Watch Video Solution

67. There are 3 bags which are known to contain 2 white and 3 black, 4 white and 1 black, and 3 white and 7 black ball, respectively. A ball is drawn at random from one of the bags and found to the black ball. Then the probability that it was drawn from the bag containing the most black ball is $7/15$ b. $5/19$ c. $3/4$ d. none of these

A. $7/15$

B. $5/19$

C. $3/4$

D. None of these

Answer: A

Watch Video Solution

68. A hat contains a number of cards with 30% white on both sides, 50% black on one side and whit e on the other side, 20% black on both sides. The cards are mixed up, and a single card is drawn at random and placed on the table. Its upper side shows up black. The probability that its other side is also black is $2/9$ b. $4/9$ c. $2/3$ d. $2/7$

A. $2/9$

B. $4/9$

C. $2/3$

D. $2/7$

Answer: B

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MULTIPLE CHOICE ANSWER TYPE

1. If A and B are two independent events such that P (A) = $1/2, P(B) = 1/5,$ then

A. $P(A \cup B) = 3/5$

B. $P(A \mid B) = 1/4$

C. $P(A/A \cup B) = 5/6$

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

Answer: A::C::D

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2. Let $AandB$ be two events such that $P\left(A \cap B'\right) = 0.20, P\left(A' \cap B\right) = 0.15, P\left(A' \cap B'\right) = 0.1, thenP(A/B$

is equal to $11/14$ b. $2/11$ c. $2/7$ d. $1/7$

A. $P(A \mid B) = 2/7$

B. $P(A \mid B) = 2/7$

C. $P(A \cup B) = 0.55$

D. $P(A \mid B) = 1/2$

Answer: A::B::C

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3. The probability that a married man watches certain TV show is 0.4 and the probability that a married woman watches the show is 0.5. The probability that a man watches the show, given that his wife does, is 0.7. Then

A. the probability that married couple watches the show is 0.35

B. the probability that a wife watches the show given that her husband does is $7/8$

C. the probability that at least one person of a married couple will watch the show is 0.55

D. None of these

Answer: A::B::C

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4. A and B are two events defined as follows:

A: It rains today with $P(A) = 40\,\%$

B: It rains tomorrwo with $P(B) = 50\,\%$

Also, P(it rains today and tomorrow) $= 30\,\%$

Also

$E_1 : P((A \cap B)/(A \cup B))$ and $E_2 : P(\{A \cap \overline{B})$ or $(B \cup \overline{A})\}/(A \cup B))$.

Then which of the following is/are true ?

A. $P(A/B) < P(B/A)$

B. $P(A/B) < P(B/A)$

C. E_1 and E_2 are equiprobable

D. $P(A/(A \cup B)) = P(B/(A \cup B))$

Answer: B::C

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5. Two whole numbers are randomly selected and multiplied. Consider two events E_1 and E_2 defined as E_1 : Their product is divisible by 5 and E_2 Unit's place in their product is 5 Which of the following statement(s) is/are correct?

A. E_1 is twice as likely to occur as E_2

B. E_1 and E_2 are disjoint

C. $P\left(E_2/E^1\right) = 1/4$

D. $P(E_1/E_2) = 1$

Answer: C::D

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6. The probability that a 50-years-old man will be alive at 60 is 0.83 and the probability that a 45-years-old women will be alive at 55 is 0.87. Then

A. the probability that both will be alive is 0.7221

B. at least one of them will alive is 0.9779

C. at least one of them will alive is 0.8230

D. the probability that both will be alive is 0.6320

Answer: A::B

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7. Which of the following statement is/are correct?

A. Three coins are tossed once. At least two of them must land the same way. No matter whether they land heads or tails, the third

coin is equally likely to land either the same ways or oppositely. So, the chance that all the three coins land the same ways is $1/2$.

B. $Let 0 < P(B) < 1$ and $P(A \mid B) = P\left(A / B^{C}\right)$. Then A and B are independent.

C. Suppose an urn contains "w" white and "b" black balls and a ball is drawn from it and is replaced along with "d" additional balls of the same color. Now a second ball is drawn from it. The proability that the second drawn ball is ehite in independent of the value of "d"

D. A,B,C simultaneously satisfy

$$P(ABC) = P(A)P(B)P(C)$$

$$P\left(AB\overline{C}\right) = P(A)P(B)P\left(\overline{C}\right)$$

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

$$P(A - BC) = P\left(\overline{A}\right)P(B)P(C)$$

Then A, B C are independent.

Answer: B::C::D

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8. A bag initially contains 1 red and 2 blue balls. An experiment consisting of selecting a ball at random, noting its color and replacing it together with an additional ball of the same colour. If three such trials are made, then

A. probability that at least one blue balls is drawn is 0.9

B. probability that exactly one blue all is drawn is 0.2

C. probability that all the drawn balls are red given that all the drawn balls are of same color is 0.2

D. probability that at least one red ball is drawn is 0.6

Answer: A::B::C::D

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9. For $P(A) = \frac{3}{8}$, $P(B) = \frac{1}{2}$, $P(A \cup B) = \frac{5}{8}$ which of the following is/are true ?

A. $P(A^C / B) = 2P(A / B^C)$

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

C. $15P(A^C / B^C) = 8P(B / A^C)$

D. $P(A / B^C) = (A \cap B)$

Answer: A::B::C::D

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10. In a precision bombing attack, there is a 50% chance that any one bomb will strike the target. Two direct hits are required to destroy the target completely. The number of bombs which should be dropped to give a 99% chance or better of completely destroying the target can be 12 b. 11 c. 10 d. 13

A. 12

B. 11

C. 10

D. 13

Answer: A::B::D

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11. If A and B are two events, then which one of the following is/are always true?

A. $P(A \cap B) \geq P(A) + P(B) - 1$

B. $P(A \cap B) \leq P(A)$

C. $P(A' \cap B') \geq P(A') + P(B') - 1$

D. $P(A \cap B) = P(A)P(B)$

Answer: A::B::C

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12. If A and B are two independent events such that P (A) = $1/2, P(B) = 1/5,$ then

A. $P(A/B) = 1/2$

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

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

D. None of these

Answer: A::B::C

Watch Video Solution

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

A. $1/5$

B. $1/6$

C. $4/5$

D. $5/6$

Answer: B::C

Watch Video Solution

14. Two buses A and B are scheduled to arrive at a town central bus station at noon. The probability A will be late is $\frac{1}{5}$. The probability that bus B will be late is $\frac{7}{25}$. The probability that the bus B is late given that bus A is late is $\frac{9}{10}$. Then the probabilities:

(a) probability that neither bus will be late on a particular date is $\frac{7}{10}$

(b) probability that bus A is late given that bus B is late is $\frac{9}{14}$

A. probability that neither bus will be late on a particular date is $7/10$

B. probability that bus A is late given that bus B is late is $18/28$

C. `

D.

Answer: A::B::C

Watch Video Solution

15. A fair coin is tossed 99 times. If X is the number of times heads occur, then $P(X = r)$ is maximum when r is $49, 50$ b. $50, 51$ c. $51, 52$ d. none of these

A. 49

B. 52

C. 51

D. 50

Answer: A::D

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16. If the probability of chossing an interger "k" out of 2m integers $1, 2, 3, \ldots., 2m$ is inversely proportional to $k^4(1 \leq k \leq m)$. $If x_1$ is the probability that chosen number is odd and x^2 is the probability that chosen number is even, then

A. $x_1 > 1/2$

B. $x_1 > 2/3$

C. $x_2 < 1/2$

D. $x_2 < 2/3$

Answer: A::C

Watch Video Solution

17. A lot contains 50 defective and 50 non-defectivebulbs. Two bulbs are drawn at random one at a time withreplacementevents A, and as first bul. The B C are defined theis defective, the second bulb is non-defective, the two banboth defective or non-defective, respectively. Then,(a) A, B and C

are pairwise independent(b) A, B and C are pairwise not independent(c) A, B and C are independent(d) None of the above

A. A and B are independent

B. B and C are independent

C. A and C are independent

D. A,B and C are pairwise independent

Answer: A::B::C

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LINKED COMPREHENSION TYPE

1. In a class of 10 student, probability of exactly I students passing an examination is directly proportional to i^2. Then answer the following questions:

The probability that exactly 5 students passing an examination is

A. $1/11$

B. $5/77$

C. $25/77$

D. $10/77$

Answer: B

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2. In a class of 10 student, probability of exactly i students passing an examination is directly proportional to i^2. If a student is selected at random, then the probability that he has passed the examination is

A. (a) $1/7$

B. (b) $11/35$

C. (c) $11/14$

D. (d) None of these

Answer: C

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3. In a class of 10 student, probability of exactly I students passing an examination is directly proportional to i^2. Then answer the following questions:

If a students selected at random is found to have passed the examination, then the probability that he was the only student who has passed the examination is

A. $1/3025$

B. $1/605$

C. $1/275$

D. $1/121$

Answer: A

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4. In an objective paper, there are two sections of 10 questions each.For "section 1", each question has 5 options and only one optionis correct and "section 2" has 4 options with multiple answers and marks for a question in this section is awarded only if he ticks all correct answers. Marks for each question in "sectionl 1" is 1 and in "section 2" is 3. (There is no negative marking.) If a candidate attempts only two questions by guessing, one from "section 1" and one from "section 2", the probability that he scores in both question is $\frac{74}{75}$

A. $74/75$

B. $1/25$

C. $1/15$

D. $1/75$

Answer: D

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5. In an objective paper, there are two sections of 10 questions each. For "section 1" , ech question has 5 options and only one option is correct and "sectin 2" has 4 option with multiple answer an marks for a question in this section is awarded only if he ticks all correct answers. Marks for each question in "section 1" is 1 and in "section 2" is 3. (therefore is no negativve marking.)

If a candidate attempts only two questions by guessing, one from "section 1" and one from "section 2", the probability that he score in both questions is

A. $1/5(1/15)^3$

B. $4/5(1/15)^3$

C. $1/5(14/15)^3$

D. None of these

Answer: D

Watch Video Solution

6. In an objective paper, there are two sections of 10 questions each. For "section 1" , ech question has 5 options and only one option is correct and "sectin 2" has 4 option with multiple answer an marks for a question in this section is awarded only if he ticks all correct answers. Marks for each question in "section 1" is 1 and in "section 2" is 3. (therefore is no negativve marking.)

If a candidate attempts only two questions by guessing, one from "section 1" and one from "section 2", the probability that he score in both questions is

A. $(1/75)^{10}$

B. $1-(1/75)^{10}$

C. $(74/75)^{10}$

D. None of these

Answer: B

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7. 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. The chance she will be successful is: a. 0.28 b. 0.38 c. 0.48 d. 0.58

A. 0.28

B. 0.38

C. 0.48

D. 0.58

Answer: C

Watch Video Solution

8. A JEE aspirant estimates that she will be successful with an 80% chance if she studies 10 hours per day, with 60% chance if she studies 7

hourse per day, and with a $40\,\%$ chance if she studies 4 hours per day. She further believes that she will study 10 houers, 7 hours, and 4 hours per day with probabilities $0.1, 0.2 \text{ and } 0.7,$ respectively.

The chance she will be successful is

A. $6/12$

B. $7/12$

C. $8/12$

D. $9/12$

Answer: B

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9. A JEE aspirant estimates that she will be successful with an $80\,\%$ chance if she studies 10 hours per day, with $60\,\%$ chance if she studies 7 hourse per day, and with a $40\,\%$ chance if she studies 4 hours per day. She further believes that she will study 10 houers, 7 hours, and 4 hours

per day with probabilities $0.1, 0.2 \text{ and } 0.7,$ respectively.

The chance she will be successful is

A. $18/26$

B. $19/26$

C. $20/26$

D. $21/26$

Answer: D

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10. Let S and T are two events difined on a sample space with probabilities

$P(S) = 0.5, P(T) = 069, P(S/T) = 0.5$

Events S and T are

A. mutually exclusive

B. independent

C. Mutually exclusive and independent

D. neither mutually exclusive nor independent

Answer: B

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11. Let S and T are two events difined on a sample space with probabilities

$P(S) = 0.5, P(T) = 069, P(S/T) = 0.5$

The value of P(S and T) is

A. 0.3450

B. 0.2500

C. 0.6900

D. 0.350

Answer: A

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12. Let S and T are two events difined on a sample space with probabilities

$P(S) = 0.5, P(T) = 069, P(S/T) = 0.5$

The value of P(S or T) is

A. 0.6900

B. 1.19

C. 0.8450

D. 0

Answer: C

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13. An amobeba either splits into two or remains the same or eventually dies out immediately after completion of evary second with probabilities, respectively, 1/2, 1/4 and 1/4. Let the initial amoeba be called as mother amoeba and after every second, the amoeba, if it is distinct from the previous one, be called as 2nd, 3rd,...generations.

The probability that after 2 s exactly 4 amoeba are alive is

A. $9/32$

B. $11/32$

C. $1/2$

D. $3/32$

Answer: D

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14. An amobeba either splits into two or remains the same or eventually dies out immediately after completion of evary second with probabilities, respectively, 1/2, 1/4 and 1/4. Let the initial amoeba be called as mother amoeba and after every second, the amoeba, if it is distinct from the previous one, be called as 2nd, 3rd,...generations.

The probability that after 2 s exactly 4 amoeba are alive is

A. $1/16$

B. $1/8$

C. $3/4$

D. $1/2$

Answer: B

Watch Video Solution

15. An amobeba either splits into two or remains the same or eventually dies out immediately after completion of evary second with probabilities, respectively, 1/2, 1/4 and 1/4. Let the initial amoeba be called as mother amoeba and after every second, the amoeba, if it is distinct from the previous one, be called as 2nd, 3rd,...generations.

The probability that amoeba population will be maximum after completion of 3 s is

A. $1/2^7$

B. $1/2^6$

C. $1/2^8$

D. None of these

Answer: A

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16. Two fair dice are rolled. Let $P(A_i) > 0$ donete the event that the sum of the faces of the dice is divisible by i.

Which one of the following events is most probable?

A. A_3

B. A_4

C. A_5

D. A_6

Answer: A

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17. Two fair dice are rolled. Let $P(A_i) > 0$ donete the event that the sum of the faces of the dice is divisible by i.

Which one of the following events is most probable?

A. $(3, 4)$

B. $(4, 6)$

C. $(2, 3)$

D. $(4, 2)$

Answer: C

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18. Two fair dice are rolled. Let $P(A_i) > 0$ donete the event that the sum of the faces of the dice is divisible by i.

The number of all possible ordered pair (I,j) for which the events A_i and a_j are independent is

A. 6

B. 12

C. 13

D. 25

Answer: D

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19. A player tosses a coin and score one point for every head and two points for every tail that turns up. He plays on until his score reaches or passes n. P_n denotes the probability of getting a score of exactly n.

The value of $P(n)$ is equal to

A. (a) $(1/2)[P_{n-1} + P_{n-2}]$

B. (b) $(1/2)[2P_{n-1} + P_{n-2}]$

C. (c) $(1/2)[P_{n-1} + 2P_{n-2}]$

D. (d) None of these

Answer: A

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20. A player tosses a coin and score one point for every head and two points for every tail that turns up. He plays on until his score reaches or passes n. P_n denotes the probability of getting a score of exactly n.

The value of $P_n + (1/2)P_{n-1}$ is equal to

A. (a) $1/2$

B. (b) $2/3$

C. (c) 1

D. (d) None of these

Answer: C

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21. A player tosses a coin and score one point for every head and two points for every tail that turns up. He plays on until his score reaches or passes n. P_n denotes the probability of getting a score of exactly n.

Which of the following is not true ?

A. $P_{100} > 2/3$

B. $P_{100} < 2/3$

C. $P_{100}, P_{101} > 2/3$

D. None of these

Answer: C

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22. A fair die is tossed repeatedly until a 6 is obtained. Let X denote the number of tosses rerquired.

The probability that $X = 3$ equals

A. $25/216$

B. $25/36$

C. $5/36$

D. $125/216$

Answer: A

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23. A fair die is tossed repeatedly until a 6 is obtained. Let X denote the number of tosses rerquired.

The probability that ≥ 3 equals

A. $125/216$

B. $25/36$

C. $5/36$

D. $25/216$

Answer: B

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24. A fair die is tossed repeatedly until a 6 is obtained. Let X denote the number of tosses rerquired.

The conditional probability that $X \geq 6$ given $X > 3$ equals

A. $125/216$

B. $25/36$

C. $5/36$

D. $25/216$

Answer: D

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25. 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

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26. A box contains 7 red balls, 8 green balls and 5 white balls. A ball is drawn at random from the box. Find the probability that the ball is white.

A. $\frac{17}{23}$

B. $\frac{11}{23}$

C. $\frac{15}{23}$

D. $\frac{12}{23}$

Answer: D

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27. 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. 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, the probability that all 3 drawn balls are of the same color is

A. $82/648$

B. $90/648$

C. $558/648$

D. $566/648$

Answer: A

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28. 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. 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. $116/182$

B. $126/181$

C. $65/181$

D. $55/181$

Answer: D

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29. 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 numbers of red and black balls, respectively, in the box II.

A ball is drawn at random from box I and transferred to box II. If the probability of drawing a red ball from box I, after this transfer, is 1/3, then the correct options (s) with the possible values of n_1 and n_2 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: A::B

Watch Video Solution

30. 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 numbers of red and black balls, respectively, in the box II.

A ball is drawn at random from box I and transferred to box II. If the probability of drawing a red ball from box I, after this transfer, is 1/3, then the correct options (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

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31. Football teams T_1 and T_2 have to play two games are independent. The probabilities of T_1 winning, drawing and lossing a game against T_2

are $\frac{1}{6}, \frac{1}{6}$ 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. $\frac{1}{4}$

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

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

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

Answer: B

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32. 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. $\frac{11}{36}$

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

C. $\frac{13}{36}$

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

Answer: C

Watch Video Solution

33. A fair die is tossed repeatedly until a 6 is obtained. Let X denote the number of tosses required.

The probability that $X = 3$ equals

A. $25/216$

B. $25/36$

C. $5/36$

D. $125/216$

Answer: A

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34. A fair die is tossed repeatedly until a 6 is obtained. Let X denote the number of tosses rerquired.

The probability that ≥ 3 equals

A. $125/216$

B. $25/36$

C. $5/36$

D. $25/216$

Answer: B

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35. A fair die is tossed repeatedly until a 6 is obtained. Let X denote the number of tosses rerquired.

The conditional probability that $X \geq 6$ given $X > 3$ equals

A. $125/216$

B. $25/36$

C. $5/36$

D. $25/216$

Answer: D

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36. 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

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37. Let U1 and U2 be two urns such that U1 contains 3 white and 2 red balls, and U2 contains only 1 white ball. A fair coin is tossed. If head appears then 1 ball is drawn at random from U1 and put into U2. However, if tail appears then 2 balls are drawn at random from U1 and put into U2. Now 1 ball is drawn at random from U2. Given that the drawn ball from U2 is white, the probability that head appeared on the coin is

A. $\frac{17}{23}$

B. $\frac{11}{23}$

C. $\frac{15}{23}$

D. $\frac{12}{23}$

Answer: D

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38. 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 1 ball is drawn from each of the boxes B_1, B_2 and B_3, the probability that all 3 drawn balls are of the same color is

A. $82/648$

B. $90/648$

C. $558/648$

D. $566/648$

Answer: A

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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. $116/182$

B. $126/181$

C. $65/181$

D. $55/181$

Answer: D

Watch Video Solution

40. 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 numbers of red and black balls, respectively, in the box II.

One of the two boxes, box I and II, was selected at random and a ball was drawn randomly our of this box. The ball was found to be red. If the probability that this red 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: A::B

Watch Video Solution

41. 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 numbers of red and black balls, respectively, in the box II.

A ball is drawn at random from box I and transferred to box II. If the probability of drawing a red ball from box I, after this transfer, is 1/3, then the correct options (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

42. Football teams T_1 and T_2 have to play two games are independent. The probabilities of T_1 winning, drawing and lossing 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. $\frac{1}{4}$

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

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

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

Answer: B

Watch Video Solution

43. Football teams T_1 and T_2 have to play two games are independent. The probabilities of T_1 winning, drawing and lossing a game against T_2 are $\frac{1}{6}, \frac{1}{6}$ 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

NUMARICAL VALUE TYPE

1. If two loaded dice each have the property yjsy 2 or 4 is there times as likely to appears as $1, 3, 5,$ or 6 on each roll. When two such dice are rolled, the probability of obtaining a total of 7 is p, then value of $[1/p]$ is, where $[x]$ represents the greatest integer less than or euqal to x.

Watch Video Solution

2. An urn contains three red balls and n white balls. Mr. A draws two balls together from the urn. The probability that they have the same color is $1/2$. Mr.B draws one ball from the urn, notes its color and rplaces it. He then draws a second ball from the urn and finds that both balls have the same color is $5/8$. The value of n is ____.

Watch Video Solution

3. Suppose A and B are two events with $P(A) = 0.5$ and P(AuuB)=0.8LetP(B)=p` if A and B are mutually exclusive and P(B)=q if A and B are independent events, then value of q/p is ____.

Watch Video Solution

4. Thirty-two players ranked 1 to 32 are playing in a knockout tournament. Assume that in every match between any two players the better ranked

player wins, the probability that ranked 1 and ranked 2 players are winner and runner up respectively is p, then the value of $[2/p]$ is, where [.] represents the greatest integer function,____.

Watch Video Solution

5. If A and B are two events such that $P(A) = 0.6$ and $P(B) = 0.8$, if the greatest value tht $P(A/B)$ can have is p, then the value of 8p is_____.

Watch Video Solution

6. A die is thrown three times. The chance that the highest number shown on the die is 4 is p, then the value of $[1/p]$ is where [.] represents greatest integer function is _____.

Watch Video Solution

7. Two cards are drawn from a will shuffled pack of 52 cards. The probability that one is a heart card and the other is a king is p, then the value of $104p$ is _____.

Watch Video Solution

8. A fair coin is flipped n times. Let E be the event "a head is obtained on the first flip" and let F_k be the event "exactly k heads are obtained". Then the value of n/k for which E and F_k are independent is ____.

Watch Video Solution

9. An unbiased normal coin is tossed n times. Let

E_1 : event that both heads and tails are present in n tosses.

E_2 : event that the coin shows up heads at most once.

The value of n for which E_1 and E_2 are independent is _____.

Watch Video Solution

10. In a knockout tournament, 2^n equally skilld players, $S_1, S_2, \ldots, S_{2^n}$ are participating. In each round, players are divided in pairs at random and winner from each pair moves to the next round. If S_2 reaches the semi-final, then the probability that S_1 wins the tournament is $\frac{1}{84}$. The value of n is_____.

Watch Video Solution

11. Of the three independent event 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. If the probavvility p that none of events E_1, E_2 or 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, $\frac{\text{probability of occurrence of } E_1}{\text{probability of occurrence of } E_3}$ is equal to

Watch Video Solution

12. 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

13. If tow loaded dice each have the property that 2 or 4 is three times as likely to appear as 1, 3, 5, or 6 on each roll. When two such dice are rolled, the probability of obtaining a total of 7 is p, then the value of $[1/p]$ is, where $[x]$ represents the greatest integer less than or equal to x.

Watch Video Solution

14. An urn contains 3 red balls and n white balls. Mr. A draws two balls together from the urn. The probability that they have the same color is 1/2 Mr. B. Draws one balls form the urn, notes its color and replaces it. He then draws a second ball from the urn and finds that both balls have the same color is 5/8. The possible value of n is 9 b. 6 c. 5 d. 1

Watch Video Solution

Watch Video Solution

15. Suppose $AandB$ are two events with $P(A) = 0.5 and P(A \cup B) = 0.8.$ Let $P(B) = p$ if $AandB$ are mutually exclusive and $P(B) = q$ if $AandB$ are independent events, then the value of q/p is_____.

Watch Video Solution

16. Thirty-two players ranked 1 to 32 are playing in a knockout tournament. Assume that in every match between any two players the better ranked player wins, the probability that ranked 1 and ranked 2 players are winner and runner up respectively is p, then the value of $[2/p]$ is, where [.] represents the greatest integer function,____.

Watch Video Solution

17. If A and B are two events such that $P(A) = 0.6$ and $P(B) = 0.8$, if the greatest value that $P(A/B)$ can have is p, then the value of 8p is_____.

Watch Video Solution

18. A die is thrown three times. The chance that the highest number shown on the die is 4 is p, then the value of $[1/p]$ is where [.] represents greatest integer function is _____.

Watch Video Solution

19. Two cards are drawn from a will shuffled pack of 52 cards. The probability that one is a heart card and the other is a king is p, then the value of $104p$ is _____.

Watch Video Solution

20. A fair coin is flipped n times. Let E be the event "a head is obtained on the first flip" and let F_k be the event "exactly k heads are obtained". Then the value of n/k for which E and F_k are independent is _____.

Watch Video Solution

21. An unbiased normal coin is tossed n times. Let

E_1 : event that both heads and tails are present in n tosses.

E_2 : event that the coin shows up heads at most once.

The value of n for which E_1 and E_2 are independent is _____.

Watch Video Solution

22. In a knockout tournament, 2^n equally skilld players, $S_1, S_2, \ldots, S_{2^n}$ are participating. In each round, players are divided in pairs at random and winner from each pair moves to the next round. If S_2 reaches the semi-final, then the probability that S_1 wins the tournament is $\frac{1}{84}$. The value of n is_____.

Watch Video Solution

23. Of the three independent event 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. If the probavvility p that none of events E_1, E_2 or 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, $\frac{\text{probability of occurrence of } E_1}{\text{probability of occurrence of } E_3}$ is equal to

Watch Video Solution

24. 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

SINGLE CORRECT ANSWER TYPE

1. One ticket is selected at ransom form 50 tickets numbered $00, 01, 02, \ldots, 49$. Then the probability that the sum of the digits on the selected ticket is 8, given that the product of these digits is zero, is

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

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

C. $\frac{5}{14}$

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

Answer: A

Watch Video Solution

2. 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. $\frac{1}{\log_{10} 4 - \log_{10} 3}$

B. $\frac{1}{\log_{10} 4 + \log_{10} 3}$

C. $\frac{9}{\log_{10} 4 - \log_{10} 3}$

D. $\frac{4}{\log_{10} 4 - \log_{10} 3}$

Answer: A

Watch Video Solution

3. 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. $\left(\frac{11}{12}, 1\right]$

B. $\left(\frac{1}{2}, \frac{3}{4}\right]$

C. $\left(\frac{3}{4}, \frac{11}{12}\right]$

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

Answer: D

Watch Video Solution

4. If C and D are two events such that $C \subset D$and P(D) ne0,` then the correct statement aomog the following is

A. $P(C \mid D) = \frac{P(D)}{P(D)}$

B. $P(C \mid D) = P(C)$

C. $P(C \mid D) \geq P(C)$

D. $P(C \mid D) < P(C)$

Answer: C

Watch Video Solution

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

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

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

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

Answer: B

Watch Video Solution

6. A multiple choice emamination has 5 questions. Each question has three alternative answers of which exactly one is correct. The probability that a student will get 4 or more correct answers just guessing is

A. $\frac{17}{3^5}$

B. $\frac{13}{3^5}$

C. $\frac{11}{3^5}$

D. $\frac{10}{3^5}$

Answer: C

Watch Video Solution

7. Let A and B be two events such that $P(\overline{A \cup B}) = 1/6, P(A \cap B) = 1/4$ and $P(\overline{A}) = 1/4 where \overline{A}$ stands for complement of event A. Then events A and B are

A. mutually exclusive and independent

B. equally likely but not independent

C. Independent but not equally likely

D. independent and equally likely

Answer: C

Watch Video Solution

8. Twelve balls are placed in three boxes. The probability that the first box contains three balls is

A. $\frac{55}{3}\left(\frac{2}{3}\right)^{11}$

B. $55\left(\frac{2}{3}\right)^{10}$

C. $220\left(\frac{1}{3}\right)^{12}$

D. $22\left(\frac{1}{3}\right)^{11}$

Answer: A

Watch Video Solution

9. Let two fari six-faced dice A and B be thrown simltaneously. 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 isodd, then which of the following statement is NOT True ?

A. E_2 and E_3 are independent

B. E_1 and E_3 are independent

C. E_1 and E_2 and E_3 are independent

D. E_1 and E_2 are independent

Answer: C

Watch Video Solution

10. 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. $\frac{6}{25}$

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

C. 6

D. 4

Answer: B

Watch Video Solution

11. A bag contains 4 red and 6 black balls. A ball is drawn at random from the bag, its colour is observed and this ball along with two additional balls of the same colour are returned to the bag. If now a ball is drawn at random from the bag, If now a ball is drawn at random from the bag, then the probability that this drawn ball is red, is

A. $3/4$

B. $3/10$

C. $2/5$

D. $1/5$

Answer: C

Watch Video Solution

12. 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

13. 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

14. 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 in the factory turn out to be defective. It is known that P (computer turns out to be defective givent that it is produced in plant T_1) = 10 P (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. $\frac{78}{96}$

D. $\frac{75}{83}$

Answer: C

Watch Video Solution

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

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

C. $\frac{5}{14}$

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

Answer: A

Watch Video Solution

16. In a binomial distribution B $\left(b, p = \frac{1}{4}\right)$, if the probability of at least one success is greater than or equal to $\frac{9}{10}$, then n is greater than

A. $\frac{1}{\log_{10} 4 - \log_{10} 3}$

B. $\frac{1}{\log_{10} 4 + \log_{10} 3}$

C. $\frac{9}{\log_{10} 4 - \log_{10} 3}$

D. $\frac{4}{\log_{10} 4 - \log_{10} 3}$

Answer: A

Watch Video Solution

17. Consider 5 independent Bernoulli's trials each with probability of at least one failure is greater than or equal to $\frac{31}{32}$, then p lies in the interval

A. $\left(\frac{11}{12}, 1\right]$

B. $\left(\frac{1}{2}, \frac{3}{4}\right]$

C. $\left(\frac{3}{4}, \frac{11}{12}\right]$

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

Answer: D

Watch Video Solution

18. If C and D are two events such that $C \subset D$and P(D) is not equal to 0,` then the correct statement among the following is

A. $P(C \mid D) = \frac{P(D)}{P(D)}$

B. $P(C \mid D) = P(C)$

C. $P(C \mid D) \geq P(C)$

D. $P(C \mid D) < P(C)$

Answer: C

Watch Video Solution

19. Three numbers are chosen at random without replacement from $\{1, 2, 3, \ldots, 8\}$. The probability that their minimum is 3, given that maximum is 6, is:

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

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

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

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

Answer: B

Watch Video Solution

20. A multiple choice examination has 5 questions. Each question has three alternative answers of which exactly one is correct. The probability that a student will get 4 or more correct answers just guessing is

A. $\frac{17}{3^5}$

B. $\frac{13}{3^5}$

C. $\frac{11}{3^5}$

D. $\frac{10}{3^5}$

Answer: C

Watch Video Solution

21. Let A and B be two events such that $P(\overline{A \cup B}) = 1/6, P(A \cap B) = 1/4$ and $P(\overline{A}) = 1/4 where \overline{A}$ stands for complement of event A. Then events A and B are

A. mutually exclusive and independent

B. equally likely but not independent

C. Independent but not equally likely

D. independent and equally likely

Answer: C

Watch Video Solution

22. 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. $\frac{55}{3}\left(\frac{2}{3}\right)^{11}$

B. $55\left(\frac{2}{3}\right)^{10}$

C. $220\left(\frac{1}{3}\right)^{12}$

D. $22\left(\frac{1}{3}\right)^{11}$

Answer: A

Watch Video Solution

23. 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_2 and E_3 are independent

D. E_1 and E_2 are independent

Answer: C

Watch Video Solution

24. 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. $\frac{6}{25}$

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

C. 6

D. 4

Answer: B

Watch Video Solution

25. A bag contains 4 red and 6 blach balls O balls is drawn at random from the bag, its colour is observed and this ball along with two addibonal balls of the same colour are returnted to the bag, then the probabilaty then the drawn ball is red, is

A. $3/4$

B. $3/10$

C. $2/5$

D. $1/5$

Answer: C

Watch Video Solution

26. A single which can can be green or red with probability $\frac{2}{3}$ and $\frac{1}{5}$ respectively, is received by station A and then transmitted to station B. The probability of each station reciving the signal correctly is $\frac{3}{4}$. If the singal received at station B is green, then the probability that original singal was green is

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

B. $\frac{6}{7}$

C. $\frac{20}{23}$

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

Answer: C

Watch Video Solution

27. 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

28. 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. $\frac{78}{96}$

D. $\frac{75}{83}$

Answer: C

Watch Video Solution

MULTIPLE CORRECT ANSWER TYPE

1. Let E and F be two independent events. The probability that exactly one of them occurs is $\frac{11}{25}$ and the probability if none of them occurring is $\frac{2}{25}$. If $P(T)$ denotes the probability of occurrence of the event T, then (a) $P(E)=\frac{4}{5}, P(F)=\frac{3}{5}$ (b) $P(E)=\frac{1}{5}, P(F)=\frac{2}{5}$ (c) $P(E)=\frac{2}{5}, P(F)=\frac{1}{5}$ (d) $P(E)=\frac{3}{5}, P(F)=\frac{4}{5}$

A. $P(E)=\frac{4}{5}, P(F)=\frac{3}{5}$

B. $P(E)=\frac{1}{5}, P(F)=\frac{2}{5}$

C. $P(E)=\frac{2}{5}, P(F)=\frac{1}{5}$

D. $P(E)=\frac{3}{5}, P(F)=\frac{4}{5}$

Answer: A::D

Watch Video Solution

2. 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 $\frac{1}{4}$. 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 function. Which of the following is/are true? (a) $P\left(X_1^c|X\right) = \frac{3}{16}$ (b)P(exactly two engines of the ship are functioning $|X$) $= \frac{7}{8}$ (c) $P(X|X_2) = \frac{5}{6}$ (d) $P(X|X_1) = \frac{7}{16}$

A. $P\left(X_1^C / X\right) = \frac{3}{16}$

B. P (exactly two engines of the ship are functioning X $= \frac{7}{8}$

C. $P(X \mid X_1) = \frac{5}{16}$

D. $P(X \mid X_1) = \frac{7}{16}$

Answer: B::D

Watch Video Solution

3. Let X and Y be two events such that $P(X) = \frac{1}{3}, P(X \mid Y) = \frac{1}{2}$ and $P(Y \mid X) = \frac{2}{5}$. Then

A. $P(Y) = \frac{4}{15}$

B. $P(X' \mid Y) = \frac{1}{2}$

C. $P(X \cup Y) = \frac{2}{5}$

D. $P(X \cap Y) = \frac{1}{5}$

Answer: A::B

Watch Video Solution

4. Let E and F be two independent events. The probability that exactly one of them occurs is $\frac{11}{25}$ and the probability if none of them occurring is $\frac{2}{25}$. If $P(T)$ denotes the probability of occurrence of the event T, then

(a) $P(E) = \frac{4}{5}, P(F) = \frac{3}{5}$ (b) $P(E) = \frac{1}{5}, P(F) = \frac{2}{5}$ (c) $P(E) = \frac{2}{5}, P(F) = \frac{1}{5}$ (d) $P(E) = \frac{3}{5}, P(F) = \frac{4}{5}$

A. $P(E) = \frac{4}{5}, P(F) = \frac{3}{5}$

B. $P(E) = \frac{1}{5}, P(F) = \frac{2}{5}$

C. $P(E) = \frac{2}{5}, P(F) = \frac{1}{5}$

D. $P(E) = \frac{3}{5}, P(F) = \frac{4}{5}$

Answer: A::D

Watch Video Solution

5. 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 $\frac{1}{4}$. 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 function. Which of the following is/are true? (a) $P\left(X_1^c|X\right) = \frac{3}{16}$ (b)P(exactly two engines of the ship are functioning $|X$) $= \frac{7}{8}$ (c) $P(X|X_2) = \frac{5}{6}$ (d) $P(X|X_1) = \frac{7}{16}$

A. $P\left(X_1^C / X\right) = \frac{3}{16}$

B. P (exactly two engines of the ship are functioning X $= \frac{7}{8}$

C. $P(X \mid X_1) = \frac{5}{16}$

D. $P(X \mid X_1) = \frac{7}{16}$

Answer: B::D

Watch Video Solution

6. Let X and Y be two events such that $P(X) = \frac{1}{3}, P(X \mid Y) = \frac{1}{2}$ and $P(Y \mid X) = \frac{2}{5}$. Then

A. $P(Y) = \frac{4}{15}$

B. $P(X' \mid Y) = \frac{1}{2}$

C. $P(X \cup Y) = \frac{2}{5}$

D. $P(X \cap Y) = \frac{1}{5}$

Answer: A::B

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MATRIX MATCH TYPE

1. An urn contains four black and eight white balls. Three balls are drawn from the urn without replacement. Three events are defined on this experiment. A: Exactly one black ball is drawn. B.: All balls are drawn are of the same color. C: Third drawn ball is black. Match the entries of column I with none, one or more entries of column II. Column I, Column II The events $AandB$ are, p. mutually exclusive The events $BandC$ are, q. independent The events $CandA$ are, r. neither independent nor mutually exclusive The events $A, BandC$ are, s. exhaustive

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2. Match the following lists:

List I	List II
a. If $f(x)$ is an integrable function for $x \in \left[\frac{\pi}{6}, \frac{\pi}{3}\right]$ and $I_1 = \int_{\pi/6}^{\pi/3} \sec^2\theta f(2\sin 2\theta)\, d\theta$, and $I_2 = \int_{\pi/6}^{\pi/3} \text{cosec}^2\theta f(2\sin 2\theta) d\theta$, then $I_1/I_2 =$	**p.** 3
b. If $f(x+1) = f(3+x)\ \forall\ x$, and the value of $\int_a^{a+b} f(x)dx$ is independent of a, then the value of b can be	**q.** 1
c. The value of $2\int_1^4 \frac{\tan^{-1}[x^2]}{\tan^{-1}[x^2] + \tan^{-1}[25 + x^2 - 10x]} dx$ (where [.]denotes the greatest integer function) is	**r.** 2
d. If $I = \int_0^2 \sqrt{x + \sqrt{x + \sqrt{x + \cdots \infty}}}\ dx$ (where $x > 0$), then [I] is equal to (where [.] denotes the greatest integer function)	**s.** 4

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3. Match the following lists:

List I	List II
a. A straight line with negative slope passing through (1, 4) meets the coordinate axes at A and B. The minimum length of $OA + OB$, O being the origin, is	**p.** $5\sqrt{2}$
b. If the point P is symmetric to the point $Q(4, -1)$ with respect to the bisector of the first quadrant, then the length of PQ is	**q.** $3\sqrt{2}$
c. On the portion of the straight line $x + y = 2$ between the axis a square is constructed away from the origin, with this portion as one of its sides. If d denotes the perpendicular distance of a side of this square from the origin then the maximum value of d is	**r.** 9/2
d. If the parametric equation of a line is given by $x = 4 + \lambda/\sqrt{2}$ and $y = -1 + \sqrt{2}\lambda$, where λ is a parameter, then the intercept made by the line on the x-axis is	**s.** 9

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4. Match the following lists:

List I	List II
a. If lines $3x + y - 4 = 0$, $x - 2y - 6 = 0$, and $\lambda x + 4y + \lambda^2 = 0$ are concurrent, then the value of λ is	**p.** -4
b. If the points $(\lambda + 1, 1)$, $(2\lambda + 1, 3)$, and $(2\lambda + 2, 2\lambda)$ are collinear, then the value of λ is	**q.** $-1/2$
c. If the line $x + y - 1 - \lvert\lambda/2\rvert = 0$, passing through the intersection of $x - y + 1 = 0$ and $3x + y - 5 = 0$, is perpendicular to one of them, then the value of λ is	**r.** 4
d. If the line $y - x - 1 + \lambda = 0$ is equidistant from the points $(1, -2)$ and $(3, 4)$, then λ is	**s.** 2

5. Match the follow[illegible] g lists:

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5. Match the following lists:

List I	List II
a. Four lines $x + 3y - 10 = 0$, $x + 3y - 20 = 0$, $3x - y + 5 = 0$, and $3x - y - 5 = 0$ form a figure which is	**p.** a quadrilateral which is neither a parallelogram nor a trapezium
b. The points $A(1, 2)$, $B(2, -3)$, $C(-1, -5)$, and $D(-2, 4)$ in order are the vertices of	**q.** a parallelogram
c. The lines $7x + 3y - 33 = 0$, $3x - 7y + 19 = 0$, $3x - 7y - 10$, and $7x + 3y - 4 = 0$ form a figure which is	**r.** a rectangle of area 10 sq. units
d. Four lines $4y - 3x - 7 = 0$, $3y - 4x + 7 = 0$, $4y - 3x - 21 = 0$, $3y - 4x + 14 = 0$ form a figure which is	**s.** a square

A. $q \quad s \quad s \quad r$

B. $q \quad r \quad s \quad r$

C. $q \quad s \quad r \quad p$

D. $r \quad s \quad p \quad q$

Answer: B

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6. A bag contains some white and some black balls, all combinations of balls being equally likely. The total number of balls in the bag is 10. If three balls are drawn at random without replacement and all ot them are found to be black, the probability that the bag contains 1 white and 9 black balls is

A. $q \quad s \quad s \quad r$

B. $r \quad s \quad q \quad p$

C. $q \quad s \quad r \quad p$

D. $q \quad p \quad r \quad q$

Answer: D

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7. Match the following lists :

List I (A, B, C are matrices)	List II
a. If $\|A\| = 2$, then $\|2A^{-1}\| =$ (where A is of order 3)	**p.** 1
b. If $\|A\| = 1/8$, then $\|\text{adj}(\text{adj}(2A))\| =$ (where A is of order 3)	**q.** 4
c. If $(A+B)^2 = A^2 + B^2$, and $\|A\| = 2$, then $\|B\| =$ (where A and B are of odd order)	**r.** 24
d. $\|A_{2\times 2}\| = 2$, $\|B_{3\times 3}\| = 3$ and $\|C_{4\times 4}\| = 4$, then $\|ABC\|$ is equal to	**s.** 0
	t. does not exist

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8. An urn contains r red balls and b black balls. Now, match the following lists:

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9. Let A and B are two independent events. Such that $P(A) = 1/3$ and $P(B) = 1/4$. Then match the following lists:

A. $q \quad s \quad s \quad r$

B. $q \quad r \quad s \quad r$

C. $q \quad s \quad r \quad p$

D. $r \quad s \quad p \quad q$

Answer: B

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10. A bag contains some white and some black balls, all combinations being equally likely. The total number of balls in the bag is 12. Four balls are drawn at random from the bag at random without replacement and all of them are found to be Black, then the probability that the bag contains 1 white and 9 black balls is

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