MATHS

BOOKS - CENGAGE PUBLICATION

PROBABILITY II

Illustration

1. Two dice are thrown. What is the probability that the sum of the numbers appearing on the two dice is 11, it 6 appears on the first?

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2. If $P(A) = 0.8$,and $P(B \mid A) = 0.4$, find $P(A \cap B)$

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

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4. A coin is tossed three times, where

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

find P(A/B).

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5. 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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6. 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 the youngest is a girl ?

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7. 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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8. 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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9. An urn contains 10 black and 5 white balls. Two balls are drawn from the urn one after the other without replacement. What is the probability that both balls are black?

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

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11. 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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12. 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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13. 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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14. If $P\left(\frac{B}{A}\right) = P\left(\frac{B}{A'}\right)$, then prove that A and B are independent.

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15. 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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16. 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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17. The probability of hitting a target by three marksmen are 1/2, 1/3 and 1/4. Then find the probability that no one will hit the target when they fire simultaneously.

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18. 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 $A \rightarrow B$ 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.

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19. Differentiate with respect to x, $y = \sin(\log x)$

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20. 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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21. 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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22. 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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23. 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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24. 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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25. 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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26. 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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27. 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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28. Factorise the following: $9x^2y^2-16$

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29. 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, then find probability that it is found to be red.

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30. An urn contains 6 white and 4 black balls. A fair die whose faces are numbered from 1 to 6 is rolled and number of balls equal to that of the number appearing on the die is drawn from the urn at random. Find the probability that the balls selected are white.

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31. 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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32. 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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34. An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of an accidents are 0.01, 0.03 and 0.15 respectively. One of the insured persons meets with an accident. What is the probability that he i

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35. A laboratory blood test is 99% effective in detecting a certain disease when it is in fact, 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 percent 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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36. 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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37. 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 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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38. 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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39. 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^3. 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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40. A die is thrown 7 times. What is the chance that an odd number turns up exactly 4 times

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41. 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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42. An experiment succeeds twice as often as it fails. Find the probability that in the next five trials, there will be atleast 3 successes.

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

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44. 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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45. $A and B$ 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 Examples

1. Eight players $P_1, P_2, P_3, \ldots\ldots\ldots. P_8$, play a knock out tournament. It is known that whenever the players P_i and P_j, play, the player P_i will win if $i < j$. Assuming that the players are paired at random in each round, what is the probability that the players P_4, reaches the final ?

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2. Suppose $A and B$ shoot independently until each hits his target. They have probabilities 3/5 and 5/7 of hitting the targets at each shot. Find probability that B will require more shots than A.

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

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6. Factorise the following: $a^4 + 2a^2b^2 + b^4$

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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 chess championship, which consists of a series of matches. Probability of P_1 winning a match is 2/3 and that of P_2 is 1/3. Thus 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 people in which each flips a fair up coin at the same time. If all but one of the coins comes up the same, then the odd persons wins (e.g., if there are nine tails and one head then head 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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11. simplify the expression: $(7m - 8n)^2 + (7m + 8n)^2$

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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. Answer the following questions : If m things are distributed among a men and women, show that the probability of receiving odd number of things by 'men is $\frac{1}{2}\left[\frac{(b+a)^m-(b-a)^m}{(b+a)^m}\right]$.

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15. Simplify the expression: $(ab+bc)^2 - 2ab^2c$

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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< a,b

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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 test, an examinee either guesses or copies or knows the answer to a multiple choice question with four choices. The probability that he makes a guess is 1/3 and the probability that he copies the answer is 1/6. The probability that his answer is correct given that he copied it is 1/8. Find the probability that he knew the answer to the question, given that he correctly answered it.

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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 $P(A^o) = 0.3, P(B) = 0.4, and P(A \cap B^o) = 0.5$, then find the value of $P[B/(A \cup B^o)]\cdot$

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3. In a single throw of two dice what is the probability of obtaining a number 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-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

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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 dependent.

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2. Events A and B are such that $P(A) = \frac{1}{2}, P(B) = \frac{7}{12}$ and $\text{P(not A or not B)} = \frac{1}{4}$. 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 Jack.

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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 drawn 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 the 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 of 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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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 urn 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 urn and then a ball is drawn at random. What is the probability that the second ball is red?

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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 one master key will open any given house. 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 box contains 12 red and 6 white balls. Balls are drawn from the bag one at a time without replacement. If in 6 draws, there are at least 4 white balls, find the probability that exactly one white ball is drawn in the next two draws. (Binomial coefficients can be left as such).

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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 two headed coin, another is a biased coin that comes up head 75% of the time and thrid is an unbaised coin. One of the three coins is chosen at random and tossed. If its hows head, what is the probability that it was the 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 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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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 $A, B, C are 1/5, 1/6, 1/7,$ 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 $\frac{1}{5}$. Then the probability that out of five students, four are swimmers is (A) $\hat{} \ 5C_4\left(\frac{4}{5}\right)^4\frac{1}{5}$ (B) $\left(\frac{4}{5}\right)^4\frac{1}{5}$ (C) $\hat{} \ 5C_1\frac{1}{5}\left(\frac{4}{5}\right)^4$ (D) None of these

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5. Numbers are selected at random, one at a time, from the two digit numbers 00,01,02...,99 with replacement. An event E occurs if the only product of the two digits of a selected number is 18. If four numbers 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

A. A. 2 / 19

B. B. 19/100

C. C. 1 / 50

D. D. none of these

Answer: A

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

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 a. $1/4$ 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

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

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

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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. $0.\ 18$

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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

A. $2/8$

B. $4/9$

C. $2/3$

D. $1/9$

Answer: D

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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. A. $2/13$

B. B. $2/19$

C. C. $1/50$

D. D. None of these

Answer: B

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A. $1/2$

B. $7/18$

C. $3/4$

D. $5/12$

Answer: D

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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

A. $3/34$

B. $17/455$

C. $561/15925$

D. None of these

Answer: C

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

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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

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A. $1/2$

B. 1

C. $3/2$

D. $3/4$

Answer: B

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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 $B \cup C$ 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

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19. Three ships $A, B, and C$ 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 $18/595$ 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 cards will precede the first ace is

A. A. $241/1456$

B. B. $164/4168$

C. C. $451/884$

D. 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 $3/5$ 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 $A and C$ are independent. If the probabilities relating $A, B, and C$ are $P(A) = 1/5, P(B) = 1/6; P(A \cap C) = 1/20; P(B \cup C) = 3/8.$ Then events $B and C$ are independent events $B and C$ are mutually exclusive events $B and C$ are neither independent nor mutually exclusive events $B and C$ 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 $A and B$ 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 $1/3$ b. $1/4$ c. $1/2$ d. $1/5$

A. $1/3$

B. $1/4$

C. $1/2$

D. $1/5$

Answer: C

Watch Video Solution

26. 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.

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 $1, 3, 5$ or 7 is

A. A. $4/625$

B. B. $18/625$

C. C. $16/625$

D. 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

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

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 $0.3, 0.5, \text{ and } 0.2,$ respectively. If they race three times, the probability that the same horse wins all the three races, and the probability that a,b,c each wins one race are, respectively

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 by a factory will fuse after 150 days if used is 0.50. what is the probability that our of 5 such bulbs none will fuse after 150 days of use? $1-(19/20)^5$ b. $(19/20)^5$ c. $(3/4)^5$ d. $90(1/4)^5$

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 a. $2/19$ b. $7/20$ c. $1-(7/20)^3$ d. none of these

Watch Video Solution

45. Two players toss 4 coins each. The probability that they both obtain the same number of heads is a. $5/256$ 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 a. $\frac{m+2}{2^{2n}+1}$ b. $\frac{2n+2}{2^{2n}}$ c. $\frac{2n+2}{2^{2n+1}}$ d. $\frac{m+2}{2^{2n}}$

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

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49. A and B toss a fair coin each simultaneously 50 times. The probability that both of them will not get tail at the same toss is

A. $1/9$

B. $3/16$

C. $5/16$

D. $3/8$

Answer: C

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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

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51. A fair die is thrown 20 times. The probability that on the 10th throw, the fourth six appears is

a. $\frac{.^{20}C_{10} \times 5^6}{6^{20}}$

b. $\frac{120 \times 5^7}{6^{10}}$

c. $\frac{84 \times 5^6}{6^{10}}$

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

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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. $\frac{9}{25}$

Answer: D

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54. There are two urns $A and B$. Urn A contains 5 red, 3 blue and 2 white balls, urn B contains 4 red, 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 a. $9/10$ 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 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. $\frac{5}{10}\frac{{}^{16}C_6}{{}^{20}C_9}+\frac{1}{11}\frac{{}^{15}C_5}{{}^{20}C_9}$

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

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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 $\frac{1}{3}$ and that of exactly 5 biased coin is $\frac{2}{3}$, then the probability that all the biased coin are sorted out from bag is 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. $\frac{2}{33}\left[\frac{.^{16}C_6+5.^{15}C_5}{.^{20}C_9}\right]$

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

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 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 (a)9 b. 6 c. 5 d. 1

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

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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 a. $5/8$ b. $3/8$ c. $5/24$ d. none of these

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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

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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 three balls are drawn at random without replacement and all of them are found to be black, the probability that the bag contains 1 white and 9 black balls is

A. $14/55$

B. $15/55$

C. $2/11$

D. $8/55$

Answer: A

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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, two 3'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. A. $1/7$

B. B. $1/4$

C. C. $1/6$

D. 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

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 find $P(A \cup B)$ and P(A|B)

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 $A and B$ be two events such that $P(A \cap B') = 0.20, P(A' \cap B) = 0.15, P(A' \cap B') = 0.1, then P(A / B$

is equal to

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 tomorrow with $P(B) = 50\%$

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

Also, $E_1 : P(A \cap B) / (A \cup B)$ and $E_2 : P(\{(A \cap \overline{B}) \text{ or } (B \cap \overline{A})\} / (A \cup B))$. Then which of the following is/are true ?

(a) A and B are independent events

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

(c)E_1 and E_2 are equiprobable

(d)$P\left(\frac{A}{A \cup B}\right) = P(B/(A \cup B))$

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. $P(E_2 / E^1) = 1/4$

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). Probability both the person are alive

(b). Probability at least a person is alive

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

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

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

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

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

Then A, B C are independent.

Answer: B::C::D

Watch Video Solution

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 color. If three such trials are made, then (A) Probability that a t least one blue ball is drawn is 0.9 (B) Probability that exactly one blue ball 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 bal is drawn is 0.6

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

Watch Video Solution

9. $P(A) = 3/8; P(B) = 1/2; P(A \cup B) = 5/8$, which of the following do/does hold good? a.$P(A^c/B) = 2P(A/B^c)$ b. $P(B) = 2P(A/B^c)$ c. $15P(A^c/B^c) = 8P(B/A^c)$ d. $P\left(A^/B^c\right) = (A \cap B)$

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

12. If $A and B$ are two independent events such that $P(A) = 1/2 and P(B) = 1/5$, 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 $P(\overline{A} \cap B) = 2/15$ and $P(A \cap \overline{B}) = 1/6$, then $P(B)$ is

A. $1/5$

B. $1/6$

C. $4/5$

D. $5/6$

Answer: B::C

Watch Video Solution

14. about to only mathematics

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. Let X be the number of times head occurs. The P(X=r) maximum when r is

A. 49

B. 52

C. 51

D. 50

Answer: A::D

Watch Video Solution

16. If the probability of choosing an integer k out of 2 m integers $1, 2, 3, ;\cdot 2m$ is inversely proportional of $k^4 (1 \leq k \leq m)\cdot$ If x_1 is the probability that chosen number is odd and x_2 is the probability that chosen number is even, then $x_1 > 1/2$ b. $x_1 > 2/3$ c. $x_2 < 1/2$ d. $x_2 < 2/3$

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-defective bulbs. Two bulbs are drawn at random one at a time with replacement. The events A, B and C are defined as the first bulb is defective, the second bulb is non-defective, the two bulbs are both defective or non-defective, respectively. Then,

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

Watch Video Solution

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:

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. $1/11$

B. $5/77$

C. $25/77$

D. $10/77$

Answer: B

Watch Video Solution

2. 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. (a) $1/7$

B. (b) $11/35$

C. (c) $11/14$

D. (d) None of these

Answer: C

Watch Video Solution

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

A. A. $74/75$

B. B. $1/25$

C. C. $1/15$

D. 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", 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

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", 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

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

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

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

D. None of these

Answer: B

Watch Video Solution

7. A JEE aspirant estimates that she will be successful with an 80% chance if she studies 10 hours per day, with a 60% chance if she studies 7 hours per day and with 40% 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

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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 $0.1, 0.2$ and 0.7, respectively.

The chance she will be successful if she studies for $4 hours$ 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 $0.1, 0.2$ and 0.7, respectively.

The chance she will not be successful if she studies for $4 hours$ 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

Watch Video Solution

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

$P(S) = 0.5, P(T) = 0.69, P(S/T) = 0.5$

The value of P(S and T) is

A. 0.3450

B. 0.2500

C. 0.6900

D. 0.350

Answer: A

Watch Video Solution

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

Watch Video Solution

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 all the amoeba population dies out is

A. $9/32$

B. $11/32$

C. $1/2$

D. $3/32$

Answer: D

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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.

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

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

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

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

D. None of these

Answer: C

Watch Video Solution

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

Watch Video Solution

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

The probability that $X \geq 3$ equals

A. $125 / 216$

B. $25 / 36$

C. $5 / 36$

D. $25/216$

Answer: B

Watch Video Solution

24. 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. $125/216$

B. $25/36$

C. $5/36$

D. $25/216$

Answer: D

Watch Video Solution

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, .Then, the probability of the drawn ball from U_2, being white is

A. $\frac{13}{30}$

B. $\frac{23}{30}$

C. $\frac{19}{30}$

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

Answer: B

Watch Video Solution

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. $\frac{1}{4}$

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

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

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

Answer: D

Watch Video Solution

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 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

Watch Video Solution

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 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. $22 / 85$

B. $126 / 181$

C. $65 / 181$

D. $55 / 181$

Answer: D

Watch Video Solution

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 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 possible values of n_1 and n_2 is (are)

A. $n_1 = 4 \text{ and } n_2 = 6$

B. $n_1 = 2 \text{ and } n_2 = 3$

C. $n_1 = 10 \text{ and } n_2 = 20$

D. $n_1 = 3 \text{ and } n_2 = 6$

Answer: C::D

Watch Video Solution

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. $\frac{5}{36}$

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

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

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 0 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

Watch Video Solution

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

The probability that $X \geq 3$ equals

A. $125 / 216$

B. $25 / 36$

C. $5 / 36$

D. $25 / 216$

Answer: B

Watch Video Solution

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. A. $125/216$

B. B. $25/36$

C. C. $5/36$

D. 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, .Then, 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 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, .Then, the probability of the drawn ball from U_2, being white is

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

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

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

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

Answer: D

Watch Video Solution

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

Watch Video Solution

39. A box B_1 contains 1 white ball, 3 red balls, and 2 black balls. An- other box B_2 contains 2 white balls, 3 red balls and 4 black balls. A third box B_3 contains 3 white balls, 4 red balls, and 5 black balls.

If 2 balls are drawn (without replecement) from a randomly selected box and one of the balls is white and the other ball is red the probability that these 2 balls are drawn from box B_2 is

A. $116/182$

B. $126/181$

C. $65/181$

D. $55/181$

Answer: D

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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.

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 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

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 possible values of n_1 and n_2 is (are)

A. $n_1 = 4 \text{ and } n_2 = 6$

B. $n_1 = 2 \text{ and } n_2 = 3$

C. $n_1 = 10 \text{ and } n_2 = 20$

D. $n_1 = 3 \text{ and } n_2 = 6$

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 $\frac{1}{6}, \frac{1}{6}$ 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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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

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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 $A and B$ are, p. mutually exclusive The events $B and C$ are, q.

independent The events $C and A$ are, r. neither independent nor mutually exclusive The events $A, B and C$ are, s. exhaustive

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2. Simplify the following : $(4m + 5n)^2 + (5m + 4n)^2$

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3. 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 followi g lists:

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4. Consider the lines represented by equation $(x^2 + xy - x) \times (x - y) = 0$ forming a triangle. Then match the following lists:

List I	List II
a. Orthocenter of triangle	**p.** (1/6, 1/2)
b. Circumcenter	**q.** $(1/(2+2\sqrt{2}), 1/2)$
c. Centroid	**r.** (0, 1/2)
d. Incenter	**s.** (1/2, 1/2)

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5. Consider the lines represented by equation $(x^2 + xy - x) \times (x - y) = 0$ forming a triangle. Then match the following lists:

List I	List II
a. Orthocenter of triangle	**p.** (1/6, 1/2)
b. Circumcenter	**q.** $(1/(2+2\sqrt{2}), 1/2)$
c. Centroid	**r.** (0, 1/2)
d. Incenter	**s.** (1/2, 1/2)

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

Watch Video Solution

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 of 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 $\lvert A\rvert = 2$, then $\lvert 2A^{-1}\rvert =$ (where A is of order 3)	**p.** 1
b. If $\lvert A\rvert = 1/8$, then $\lvert \text{adj}(\text{adj}(2A))\rvert =$ (where A is of order 3)	**q.** 4
c. If $(A+B)^2 = A^2 + B^2$, and $\lvert A\rvert = 2$, then $\lvert B\rvert =$ (where A and B are of odd order)	**r.** 24
d. $\lvert A_{2\times 2}\rvert = 2$, $\lvert B_{3\times 3}\rvert = 3$ and $\lvert C_{4\times 4}\rvert = 4$, then $\lvert ABC\rvert$ is equal to	**s.** 0
	t. does not exist

Watch Video Solution

8. An urn contains r red balls and b black balls. Now, match the following lists:

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

10. 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 of 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

Watch Video Solution

Numarical Value Type

1. If two loaded dice each have the property that 2 or 4 is three times as likely to appears as $1, 3, 5,\ \text{ or }\ 6$ 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 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 (a)9 b. 6 c. 5 d. 1

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 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

Watch Video Solution

5. If A and B are two events such that $P(A) = 0.6 \text{ and } P(B) = 0.8,$ 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 _______.

A. A. 4

B. B. 5

C. C. 6

D. D. 7

Answer: 5

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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 ______.

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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 $\frac{n}{k}$ 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 skilled players, S_1, S_2, S_{2n} are participating. In each round, players are divided in pair at random and winner form 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________.

Watch Video Solution

11. Of the three independent events $E_1, E_2,$ and $E_3,$ the probability that only E_1 occurs is α only E_2 occurs is $\beta,$ and only E_3 occurs is $\gamma.$ Let the probability 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

$$\frac{\text{Probability of occurrence of} E_1}{\text{Probability of occurence of} E_3} =$$

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12. about to only mathematics

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13. If two loaded dice each have the property that 2 or 4 is three 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.

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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 (a)9 b. 6 c. 5 d. 1

Watch Video Solution

15. Suppose $AandB$ are two events with $P(A) = 0.5andP(A \cup B) = 0.8.$ 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 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

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 $\frac{n}{k}$ 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 skilled players, S_1, S_2, S_{2n} are participating. In each round, players are divided in pair at random and winner form 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________.

Watch Video Solution

23. Of the three independent events $E_1, E_2,$ and $E_3,$ the probability that only E_1 occurs is α only E_2 occurs is $\beta,$ and only E_3 occurs is $\gamma.$ Let the probability 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

$$\frac{\text{Probability of occurrence of} E_1}{\text{Probability of occurence of} E_3} =$$

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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 _____.

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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 $P(D) \neq 0,$ 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

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

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

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

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12. A signal which can can be green or red with probability $\frac{4}{5}$ 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 signal 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

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. $\frac{78}{93}$

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

Answer: C

Watch Video Solution

15. 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

16. 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) $\dfrac{9}{(\log)_{10}^{4}-(\log)_{10}^{3}}$

(4) $\dfrac{4}{(\log)_{10}^{4}-(\log)_{10}^{3}}$

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

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

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

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

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 $P(D) \neq 0,$ 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

19. 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

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 $P(\overline{A \cup B}) = \frac{1}{6}, P(A \cap B) = \frac{1}{4}$ 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

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 :

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 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

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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 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, 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

26. A signal which can can be green or red with probability $\frac{4}{5}$ 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 signal 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 persons independently solve a certain problem correctly with proabilities $\frac{1}{2}, \frac{3}{4}, \frac{1}{4}, \frac{1}{8}$. Then the probability that the problem is solved correctly by at least one of them is

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 be defective, given that it is produced in plant T_1) = 10 $\times$ 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

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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

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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

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

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

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

C. $P(X \cup Y) = \frac{2}{3}$

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) $P(X_1^c|X) = \frac{3}{16}$ (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. $P(X_1^C/X) = \frac{3}{16}$

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

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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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