MATHS

BOOKS - KUMAR PRAKASHAN KENDRA MATHS (GUJRATI ENGLISH)

PROBABILITY

Practice Work

1. If P(A) = 0.5, P(B) = 0.6 and $P(A \cup B)$ = 0.8 then find $P(A \mid B)$ and $P(B \mid A)$.

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2. For events A and B if P(A) = 0.3, P(B) = 0.6 and $P(B \mid A) = 0.5$ then find $P(A \mid B)$ and $P(A \cup B)$.

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3. If P(A') = 0.7, P(B) = 0.7, $P(B \mid A) = 0.5$ then find $P(A \mid B)$ and $P(A \cup B)$.

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4. If $P(A) = \frac{7}{13}, P(B) = \frac{9}{13}$ and $P(A \cap B) = \frac{4}{13}$ then find $P(A' \mid B)$.

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5. If P(A) = 0.4, P(B) = 0.8, $P(B \mid A) = 0.6$ then find $P(A \mid B)$ and $P(A \cup B)$.

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6. A coin is tossed twice and following events are defined.

Event A : Both head and tail are obtained.

Event B : at most one tail is obtained.

Then find probabilities of the following.

(1) P(A) (2) P(B) (3) $P(A \mid B)$ (4) $P(B \mid A)$

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7. An electronic assembly consists of two subsystems, say, A and B. From previous testing procedures, the following probabilities are assumed to be known:

P(A fails) = 0.2

P(B fails alone) = 0.15

P(A and B fail) = 0.15

Evaluate the following probabilities

(i) P(A fails|B has failed) (ii) P(A fails alone)

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8. Consider the random experiment of tossing dice. If number obtained on it is multiple of 3 then toss dice again, and if any other number is obtained toss a coin. Find probability of an event that coin shows tail given that at least once number 2 comes up.

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9. Two numbers are selected from the numbers 1 to 11. If there sum is even find the probability of an event that both numbers are odd.

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10. In a certain town, 40 % residents have computers, 25 % have internet connections and 15 % have both computer and internet connection. A resident is selected at random from the town. Then (i) If he has a computer, then what is the probability that he has internet connection also ?

(ii) If he has an internet connection, then determine the probability that he does not have a computer.

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11. A balanced dice is thrown twice and the sum of the numbers appearing on the top face is observed to be 7. What is the conditional probability that the number 2 has appeared at least once ?

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12. In a box there are 3 green and 7 white balls. Two balls are drawn from it without replacement. Find the probability of an event that selected second ball is green when selected first ball is also green.

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13. Two dice are tossed once. If number 4 comes on first dice then find probability of an event that sum of numbers obtain on two dice is 8 or more.

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14. In a school there are 1000 students out of which 430 are girls. It is known that 10 % girls are studying in class XII. Find the probability of an event that randomly selected student studies in class XII given that selected student is girl.

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15. In a hostel, 60% of the students read Hindi newspaper, 40% read English newspaper and 20% read both Hindi and English newspapers. A student is selected at random.

(a) Find the probability that she reads neither

Hindi nor English newspapers.

(b) If she reads Hindi newspaper, find the probability that she reads English newspaper

(c) If she reads English newspaper, find the probability that she reads Hindi newspaper.

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16. For events A and B if $P(A) = \frac{1}{4}, P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{1}{2}$ then prove that A and B are independent events.

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17. If P(B not) = 0.65, $P(A \cup B) = 0.85$. A and B are independent then find P(A).

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18. A and B are independent events. $P(A' \cap B) = \frac{2}{15}$ and $P(A \cap B') = \frac{1}{6}$ then find P(B).

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19. A and B are independent events such that $P(A \cup B) = 0.60$ and $P(A) = 0.2$ then find P(B).

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20. A dice is tossed twice. Find probability of getting a number greater than 3 on each toss.

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21. A balanced coin is tossed thrice. Then following events are defined.

Event A = Head is obtained on first toss.

Event B = Tail is obtained on last toss.

Does A and B are independent ?

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22. A box contains 4 tickets with numbers 112, 121, 211 and 222. One ticket is drawn from it. Let $A_i(i = 1, 2, 3)$ be the event that its digit at the number on ticket drawn is 1. Discuss the independence of the events A_1, A_2, A_3.

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23. E and F are independent 'such that P(E) = 0.35 and $P(E \cup F) = 0.6$ then find P(F).

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24. A and B are independent events. Also $P(A \cap B) = \frac{1}{8}$ and $P(A' \cap B') = \frac{3}{8}$ then find P(A) and P(B).

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25. A balanced dice is tossed twice. Find probability on an event that on first trial we get number 4, 5 or 6 and in second trial we get number 1, 2, 3 or 4.

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26. A box contains 4 red and 7 blue balls. Two balls are drawn at randon with replacement. Find the probability of getting

(i) 2 red balls

(ii) 2 balls are of blue colour

(iii) one red and one blue ball is selected.

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27. Three persons A, B and C shot to hit a target. If

A hits target 4 times in 5 trials

B hits target 3 times in 4 trials

C hits target 2 times in 3 trials

Then find probabilities of following events.

(i) All the person A, B and C hits the target.

(ii) None of A, B and C can hits the target.

(iii) At least 2 persons from A, B and C hits the target.

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28. Problem of mathematics is given to three students and their respective probability of solving the problem is $\frac{1}{3}, \frac{1}{3}$ and $\frac{1}{3}$. Find probability of an event that exactly one student can solve problem.

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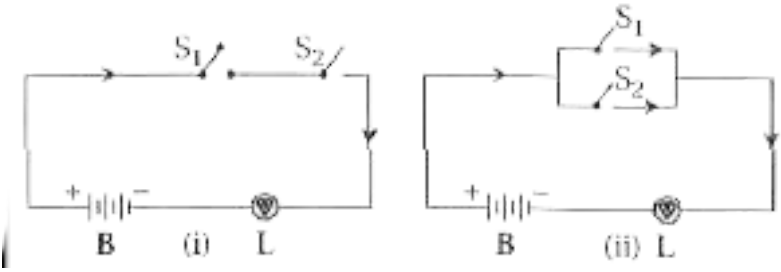
29. If two switches S_1 and S_2 have respectively 90% and 80% chances of working. Find probabilities that each of the following circuits will work.



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30. A coin is tossed thrice. In which of the following cases events are independent ?

(i) A = In first toss head is obtained.

B = In last toss tail is obtained.

(ii) A = Head obtained twice

B = Last toss result is head.

(iii) A = Head obtained in odd tossed.

B = Tail obtained in odd tossed.

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31. A balanced dice is tossed thrice. Find probability of getting an odd number at least once.

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32. Person (A) speaks truth in 70% of cases and (B) in 80 % of cases. Find the probability of an event that in what percentage of cases are they likely to contradict each other?

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33. A person has 21 tickets with numbered 1 to 21. Three tickets are selected from it at random. Find the probability of an event that numbers of selected three tickets are in A.P.

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34. A company has two plants to manufacture scooters. Plant I manufacture 70% and plant II manufacture 30% of scooters. In plant I 80% and in plant II, 90% scooters are rated as standard quality.A scooter is selected at random and found to be standard quality. What is the probability that it is manufactured in plant (II) ?

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35. There are 3 bags each containing 5 white and 3 black balls. Also there are two bags each contains 2 white and 4 black balls. A white ball is drawn at

random. Find the probability at the event that white ball is from a bag of the first group.

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36. A company has three plants at which it produces a certain item. 30% are produced at plant A, 50% at plant B and 20% at plant C. Suppose that 1%, 4% and 3% of the items produced at plants A, B and C respectively are defective. If an item is selected at random from all those produced, what is the probability that the item is defective ?

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37. In a certain college 25% boys and 10% girls are studying mathematics the girls constitute 60% of the student body. What is the probability that mathematics is being studied ?

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38. In a group at 100 men 5 persons are good lecturers and from 1000 women 5 are good lecturers. Here numbers of men and women are equal. One good lecturer is selected from the

group. Find the probability of an event that selected lecturer is man.

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39. In an competitive open exam all questions are multiple choice (MCQs) and each question has 4 options, in which one options is always true. The probability of an event that student knows the answer of question is 90%. What is the probability of an event that student gives true answer of questions by guessing ?

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40. A general insurance company insuring vehicles for a period of one year classifies its policy holders into three mutually exclusive group.

Group T_1 : Policy holders with very high risk factor

Group T_2: Policy holders with high risk factor

Group T_3 : Policy holders with less risk factor

From the past experience of the company, 30% of its policy holders belong to group T_1, 50% belong to group T_2, & the rest belong to group T_3. If the probabilities that policy holders belonging to groups T_1, T_2 and T_3 meet with an accident are 0.30, 0.15 and 0.05 respectively, find the proportion

of policy holders having a policy for one year will meet with an accident. If a randomly selected policy holder does not meet with an accident, what is the probability that he belongs to group T_2 ?

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41. In a bolt factory three machines A, B and C manufactures bolts 25%, 35% and 40% respectively. From this production 5%, 4% and 2% bolts are defective from machines respectively. A bolt is drawn at random from the product what is

the probability of the event that the selected bolt is defective ?

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42. Numbers of balls in three boxes are as follows.

Box	I	II	III
White ball :	1	2	4
Black ball :	2	1	5
Red ball :	3	1	3

One box is selected of random and two balls are drawn which are of red colour and white colour each.

What is the probability that selected ball is of from box 1 ?

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

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44. Given three identical boxes I, II and III, each containing two coins. In box I, both coins are gold

coins, in box II, both are silver coins and in the box III, there is one gold and one silver coin. A person chooses a box at random and takes out a coin. If the coin is of gold, what is the probability that the other coin in the box is also of gold?

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45. A letter is known to have come either from 'TATANAGAR' or 'CALCUTTA'. On the envelope just two consecutive letters 'TA' are visible. Find the probability that letter has come from CALCUTTA.

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46. By examining the chest X-ray probability that T.B. is detected when person is actually suffering is 0.99. The probability that doctor diagnoses incorrectly that person has T. B. on the basis of X-ray is 0.001. In certain city 1 to 1000 persons suffering from T.B. A person is selected at random is diagnosed to have a T.B. what is the chance he has actually T.B. ?

47. There are N coins in a box in which M are balanced coin and remaining are unbalanced. When balanced coin is tossed has probability $\frac{1}{2}$ and for unbalanced coin probability is $\frac{2}{3}$ Now one coin is selected from box at random and it is tossed twice, It is known that head on first toss and tail on second toss is obtained. Then prove that probability of an event that selected coin is balanced is $\frac{9M}{8N+M}$.

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48. In a railway reservation office two clerks are engaged in checking reservation form. On an average first clerk check 55% of the forms while second clerk check remaining. The first clerk has an error rate of 0.33 and second has an error rate 0.02.

The reservation form is selected at random from the total number of forms checked during day, and is found to have an error. Find the probability of an event that it was checked by second clerk.

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49. Suppose that 5% of men and 0.25% of women have grey hair. A grey haired person is selected at random. What is the probability of this person being male? Assume that there are equal number of males and females.

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50. The probability distribution of random variable X is as follows:

X :	−2	−1	0	1	2	3
P(X) :	$\frac{1}{10}$	k	$\frac{1}{5}$	$2k$	$\frac{3}{10}$	k

Find value of k.

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51. An unbiased dice is tossed. The random variable X is defined on the sample space with this experiment is as follows

$$X(w) = \begin{cases} 1, \text{If even number comes up} \\ 0, \text{If odd number comes up} \end{cases}$$

Find probability distribution of X.

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52. Three cards are drawn from the pack of 52 playing cards. Find the probability distribution of

numbers of kings.

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53. Four bad oranges are mixed accidently with 16 good oranges in box. Find probability distribution of bad oranges in a draw of two oranges.

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54. A box contains 3 green and 5 white balls. Three balls are drawn from it one after the other with replacement.

Find probability distribution of the number of green balls.

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55. Probability distribution of random variable X is as follows:

X :	0	1	2
P(X) :	$3C^2$	$4C-10C^2$	$5C-1$

Where $C > 0$

Find (i) C (ii) $P(X < 2)$ (iii) $P(1 < X \leq 2)$.

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56. Probability distribution of random variable X is as follows:

X :	0	1	2	3	4	5	6	7	8
P(X) :	a	$3a$	$5a$	$7a$	$9a$	$11a$	$13a$	$15a$	$17a$

Find $P(X < 3)$, $P(X \geq 3)$ and $P(0 < X < 5)$.

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57. Let X denote the number of hours you study during a randomly selected school day. The probability that X can take the values x, has the following form, where k is some unknown constant.

$$P(X=x)=\begin{cases}0.1 & \text{if } x=0\\ kx & \text{if } x=1 \text{ or } 2\\ k(5-x) & \text{if } x=3 \text{ or } 4\\ 0 & \text{otherwise}\end{cases}$$

(a) Find the value of k.

(b) What is the probability that you study at least two hours ? Exactly two hours? At most two hours?

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58. Three coins are tossed together. If X denotes the numbers of heads obtain on it. Then obtain mean, variance and standard deviation of distribution.

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59. Two cards are drawn from the well shuffled pack of 52 playing cards with replacement. Find mean and standard deviation of the number of queens.

60. There are 5 cards numbered 1 to 5 on it. Two cards are drawn at random without replacement. Let X denotes the sum of the numbers on two cards drawn. Find mean and variance.

61. In a game of tossing 3 coins person gets ₹ 5 if all heads or all tails obtained. He looses ₹ 3 if he gets one or two heads. Obtain mathematical expectation to win on the average per game.

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62. Obtain mathematical expectation and variance of the discrete random variable X which denotes the minimum of two numbers that appear when a pair of fair dice is tossed once.

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63. Probability distribution of random variable X is as follows:

X :	−1	0	1	2	3
P(X) :	0.2	0.1	k	$2k$	0.1

Find its standard deviation.

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64. A dice is tossed twice. Find variance if random variable X denotes the numbers of odd integers obtain on it.

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65. Random variable X takes the integral values from 1 to 100 having equal probability. Then find E(X), $E\left(X^2\right)$ and Var(X).

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66. Two pair of balanced dice is tossed four times. If random variable X denotes equal numbers obtained on dice, find mean.

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67. Find mean of the following probability distribution.

X	:	0	1	2	3	4	5
P(X)	:	0.15	0.20	0.10	0.05	0.30	0.20

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68. Nine balanced coins tossed together once. Find probability of getting at least 6 heads.

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69. In a shooting competition the probability of a man hitting a target is $\frac{3}{5}$. If he fires 4 times what is the probability of hitting the target at must twice.

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70. It has been found from an experiment that 40% of rats stimulated on administering a particular drug. If 5 rats are given drug. Find probability that exactly three rats stimulated.

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71. In a city of some western country, 70 percent of the married persons take divorce. What is the probability that at least three among four persons will take divorce ?

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72. A quality control engineer inspects a random sample of 3 calculators from a lot of 20 calculators. If such a lot contains 4 slightly defective calculators, what is the probability that the inspectors sample will contain

(i) no slightly defective calculators

(ii) one slightly defective calculators

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73. If 4 out of 12 scooter driver persons do not carry driving licence what is the probability that a traffic inspector who randomly selected 4 scooter driver person will catch at least 2 for not carrying driving licence.

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74. Find probability distribution P(X) of random variable X if sum of mean and variance is 24 and their product is 128.

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75. 6 balanced dice are tossed 729 times. At least how many times 3 dice shows number 5 or 6 ?

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76. 10% items are defective manufactured by one company. Find the probability of an event that out of 8 items 2 items are defective.

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77. A man takes a step forward with probability 0.4 and backwards with probability 0.6. Find probability that at the end of 11 steps he is just one step away from the starting point.

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78. Randomly selected one person from rural area for the following study. It is found that probability of an event that person has botanical allergy (i.e. plants allergy) is $\frac{7}{20}$ & probability by sand and plant is $\frac{3}{17}$. If person has allergy by plants then find the probability that person has allergy by sand.

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79. Two balanced dice are tossed. Find probability of the event that sum of the numbers obtain on both dice is 3 or it is multiple of 5.

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80. A bag (I) contains 4 white and 2 black balls and bag II contains 3 white and 4 black balls. One bag is selected at random and one ball is drawn from it. Then find the probability of an event that selected ball is white.

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81. An urn contains 5 white and 3 red balls. 3 red balls are drawn from box with replacement. If X

represents numbers of red balls then obtain its probability distribution.

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82. 3 ripe apples are mixed with 7 fresh apples and then 3 apples are selected at random. If random variable X denotes numbers of ripe apple. Find mean of such probability distribution.

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83. For events A and B if P(A) = 0.7, P(B) = 0.5 and $P(A \cap B) = 0.3$ then find $P(A \mid B)$.

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84. A balanced dice is tossed (2n + 1) times. Find probability of an event that number 1 OR 3 OR 4 comes up at most n times.

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85. In box one there are 10 white and 3 black balls and in box two there are 3 white and 5 black balls. Two balls are selected at random from box one and placed into box two then one ball is selected at random from box two. Find the probability of an event that selected ball is being white.

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86. A committee of 4 students is selected from a group of 8 boys and 4 girls. Given that there is at least one girl in the committee. Find probability of

an event that there are exactly 2 girls in the committee.

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87. Rajesh agrees to play the game of tossing dice. If number 1 or 2 comes up he looses ₹ 2 and if number 3 or 4 or 5 comes up he gets ₹ 5 and he loose ₹ 10 if number 6 comes up. If random variable X denotes the amount get by Rajesh then find expectation.

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Exercise 13 1

1. Given that E and F are events such that $P(E) = 0.6, P(F) = 0.3$ and $(E \cap F) = 0.2$, find P(E|F) and P(F|E)

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2. Compute P(A|B), if P(B) = 0.5 and $P(A \cap B) = 0.32$

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3. If P(A)=0.8, P(B)=0.5 and P(B|A)=0.4, find

$(i)P(A \cap B)(ii)P(A \mid B)(iii)P(A \cup B)$

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4. Evaluate $P(A \cup B)$, if $2P(A) = P(B) = \frac{5}{13}$ and $P(A \mid B) = \frac{2}{5}$

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5. If $P(A) = \frac{6}{11}, P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$,

find

$(i) P(A \cap B) (ii) P(A \mid B) (iii) P(B \mid A)$

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6. Determine P(E|F)

A coin is tossed three times, where

E : head on third toss,

F : heads on first two tosses

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7. Determine $P(E|F)$

A coin is tossed three times, where

E : at least two heads,

F : at most two heads

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8. Determine $P(E|F)$

A coin is tossed three times, where

E : at most two tails,

F : at least one tail

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9. Determine $P(E|F)$

Two coins are tossed once, where

E : tail appears on one coin,

F : one coin shows head

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10. Determine $P(E|F)$

Two coins are tossed once, where

E : no tail appears

F : no head appears

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11. Determine $P(E|F)$

A dice is thrown three times,

E : 4 appears on the third toss,

F : 6 and 5 appears respectively on first two tosses

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12. Determine $P(E|F)$

Mother, father and son line up at random for a family picture

E : son on one end, F : father in middle

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13. A black and a red dice are rolled.

(a) Find the conditional probability of obtaining a sum greater than 9, given that the black die resulted in a 5.

(b) Find the conditional probability of obtaining the sum 8, given that the red die resulted in a number less than 4.

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14. A black and a red dice are rolled.

(a) Find the conditional probability of obtaining a sum greater than 9, given that the black die

resulted in a 5.

(b) Find the conditional probability of obtaining the sum 8, given that the red die resulted in a number less than 4.

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15. A fair die is rolled. Consider events E = {1,3,5}, F = {2,3} and G = {2,3,4,5} Find

(i) P(E|F) and P(F|E) (ii) P(E|G) and P(G|E)

(iii) $P((E \cup F) \mid G)$ and $P((E \cap F) \mid G)$

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16. A fair die is rolled. Consider events E = {1,3,5}, F = {2,3} and G = {2,3,4,5} Find

(i) P(E|F) and P(F|E) (ii) P(E|G) and P(G|E)

(iii) $P((E \cup F) \mid G)$ and $P((E \cap F) \mid G)$

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17. A fair die is rolled. Consider events E = {1,3,5}, F = {2,3} and G = {2,3,4,5} Find

(i) P(E|F) and P(F|E) (ii) P(E|G) and P(G|E)

(iii) $P((E \cup F) \mid G)$ and $P((E \cap F) \mid G)$

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18. Assume that each born child is equally likely to be a boy or a girl. If a family has two children, what is the conditional probability that both are girls given that

(i) the youngest is a girl, (ii) at least one is a girl?

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19. An instructor has a question bank consisting of 300 easy $\mathrm{True/False}$ questions, 200 difficult $\mathrm{True/False}$ questions, 500 easy multiple choice questions and 400 difficult multiple choice questions. If a question is selected at random from

the question bank, what is the probability that it will be an easy question given that it is a multiple choice question?

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20. Given that the two numbers appearing on throwing two dice are different. Find the probability of the event 'the sum of numbers on the dice is 4'.

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21. Consider the experiment of throwing a die, if a multiple of 3 comes up, throw the die again and if any other number comes, toss a coin. Find the conditional probabilityof the event 'the coin shows a tail', given that at least one die shows a 3'.

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22. Choose the correct answer

If $P(A) = \frac{1}{2}$, P(B) = 0, then P(A|B) is

A. 0

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

C. not defined

D. 1

Answer: C

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23. Choose the correct answer

If A and B are events such that P(A|B) = P(B|A), then

A. $A \subset B$ but $A \neq B$

B. A = B

C. $A \cap B = \phi$

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

Answer: D

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Exercise 13 2

1. If $P(A) = \frac{3}{5}$ and $P(B) = \frac{1}{5}$ find $P(A \cap B)$ if A and B are independent events.

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2. Two cards are drawn at random and without replacement from a pack of 52 playing cards. Find the probability that both the cards are black.

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3. A box of oranges is inspected by examining three randomly selected oranges drawn without replacement. If all the three oranges are good, the box is approved for sale, otherwise, it is rejected. Find the probability that a box containing 15 oranges out of which 12 are good and 3 are bad ones will be approved for sale.

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4. A fair coin and an unbiased dice are tossed. Let A be the event 'head appears on the coin' and B be the event '3 on the dice' . Check whether A and B are independent events or not.

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5. A dice marked 1, 2, 3 in red colour and 4, 5, 6 in green colour is tossed. Let A be the event, 'the

number is even,' and B be the event, ' the number is marked with red'. Does A and B independent ?

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6. Let E and F be events with $P(E) = \frac{3}{5}, P(F) = \frac{3}{10}$ and $P(E \cap F) = \frac{1}{5}$ Are E and F independent?

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7. Given that the events A and B are such that $P(A) = \frac{1}{2}, P(A \cap B) = \frac{3}{5}$. And P(B)= p. Find p if

they are (i) mutually exclusive (ii) independent.

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8. Let A and B be independent events with $P(A) = 0.3$ and $P(B) = 0.4$. Find $P(A \cap B)$

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9. Let A and B be independent events with $P(A) = 0.3$ and $P(B) = 0.4$. Find $P(A \cup B)$

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10. Let A and B be independent events with $P(A) = 0.3$ and $P(B) = 0.4$. Find $P(A \mid B)$

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11. Let A and B be independent events with $P(A) = 0.3$ and $P(B) = 0.4$. Find $P(B \mid A)$

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12. If A and B are two events such that $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{2}$ and $P(A \cap B) = \frac{1}{8}$,

find P (not A and not B).

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

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14. Given two independent events A and B such that P(A) = 0.3, Find

(i) P(A and B) (ii) P(A and not B)

(iii) P(A or B) (iv) P(neither A nor B)

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15. Given two independent events A and B such that P(A) = 0.3, Find

(i) P(A and B) (ii) P(A and not B)

(iii) P(A or B) (iv) P(neither A nor B)

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16. Given two independent events A and B such that $P(A) = 0.3, P(B) = 0.6$. Find $P(A \text{ or } B)$

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17. Given two independent events A and B such that P(A) = 0.3, Find

(i) P(A and B) (ii) P(A and not B)

(iii) P(A or B) (iv) P(neither A nor B)

Watch Video Solution

18. A die is tossed thrice. Find the probability of getting an odd number at least once.

Watch Video Solution

19. Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that

(i) both balls are red.

(ii) first ball is black and second is red.

(iii) one of them is black and other is red.

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20. Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that

(i) both balls are red.

(ii) first ball is black and second is red.

(iii) one of them is black and other is red.

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21. Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that

(i) both balls are red.

(ii) first ball is black and second is red.

(iii) one of them is black and other is red.

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22. Probability of solving specific problem independently by A and B are $\frac{1}{2}$ and $3\frac{1}{3}$ respectively. If both try to solve the problem independently, find the probability that

(i) the problem is solved (ii) exactly one of them solves the problem.

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23. One card is drawn at random from a well shuffled deck of 52 cards. In which of the following cases are the events E and F independent ?

(i) E : 'the card drawn is a spade

F: 'the card drawn is an ace'

(ii) E : 'the card drawn is black'

F: 'the card drawn is a king'

(iii) E: 'the card drawn is a king or queen'

F: 'the card drawn is a queen or jack'.

Watch Video Solution

24. One card is drawn at random from a well shuffled deck of 52 cards. In which of the following cases are the events E and F independent ?

(i) E : 'the card drawn is a spade

F: 'the card drawn is an ace'

(ii) E : 'the card drawn is black'

F: 'the card drawn is a king'

(iii) E: 'the card drawn is a king or queen'

F: 'the card drawn is a queen or jack'.

 Watch Video Solution

25. One card is drawn at random from a well shuffled deck of 52 cards. In which of the following cases are the events E and F independent ?

(i) E : 'the card drawn is a spade

F: 'the card drawn is an ace'

(ii) E : 'the card drawn is black'

F: 'the card drawn is a king'

(iii) E: 'the card drawn is a king or queen'

F: 'the card drawn is a queen or jack'.

26. In a hostel, 60% of the students read Hindi newspaper, 40% read English newspaper and 20% read both Hindi and English newspapers. A student is selected at random.

(a) Find the probability that she reads neither Hindi nor English newspapers.

(b) If she reads Hindi newspaper, find the probability that she reads English newspaper

(c) If she reads English newspaper, find the probability that she reads Hindi newspaper.

Watch Video Solution

27. In a hostel, 60% of the students read Hindi newspaper, 40% read English newspaper and 20% read both Hindi and English newspapers. A student is selected at random.

(a) Find the probability that she reads neither Hindi nor English newspapers.

(b) If she reads Hindi newspaper, find the probability that she reads English newspaper

(c) If she reads English newspaper, find the probability that she reads Hindi newspaper.

Watch Video Solution

28. In a hostel, 60% of the students read Hindi newspaper, 40% read English newspaper and 20% read both Hindi and English newspapers. A student is selected at random.

(a) Find the probability that she reads neither Hindi nor English newspapers.

(b) If she reads Hindi newspaper, find the probability that she reads English newspaper

(c) If she reads English newspaper, find the probability that she reads Hindi newspaper.

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29. Choose the correct answer

The probability of obtaining an even prime number on each die, when a pair of dice is rolled is

A. 0

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

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

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

Answer: D

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30. Choose the correct answer

Two events A and B will be independent, if

A. A and B are mutually exclusive

B. $P(A'B') = [1 - P(A)][1 - P(B)]$

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

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

Answer: B

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Exercise 13 3

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 4 red and 4 black balls, another bag contains 2 red and 6 black balls. One of the two bags is selected at random and a ball is drawn

from the bag which is found to be red. Find the probability that the ball is drawn from the first bag.

3. Of the students in a college, it is known that 60% reside in hostel and 40% are day scholars (not residing in hostel). Previous year results report that 30% of all students who reside in hostel attain A grade and 20% of day scholars attain A grade in their annual examination. At the end of the year, one student is chosen at random from the college

and he has an A grade, what is the probability that the student is a hostlier?

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4. In answering a question on a multiple choice test, a student either knows the answer or guesses. Let $\frac{3}{4}$ be the probability that he knows the answer and $\frac{1}{4}$ be the probability that he guesses. Assuming that a student who guesses at the answer will be correct with probability $\frac{1}{4}$. What is the probability that the student knows the answer given that he answered it correctly?

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

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7. 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 is a scooter driver ?

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8. A factory has two machines A and B. Past record shows that machine A produced 60% of the items of output and machine B produced 40% of the items. Further, 2% of the items produced by machine A and 1% produced by machine B were defective. All the items are put into one stockpile

and then one item is chosen at random from this and is found to be defective. What is the probability that it was produced by machine B?

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9. Two groups are competing for the position on the Board of directors of a corporation. The probabilities that the first and the second groups will win are 0.6 and 0.4 respectively. Further, if the first group wins, the probability of introducing a new product is 0.7 and the corresponding probability is 0.3 if the second group wins. Find the

probability that the new product introduced was by the second group.

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10. Suppose a girl throws a die. If she gets a 5 or 6, she tosses a coin three times and notes the number of heads. If she gets 1, 2, 3 or 4, she tosses a coin once and notes whether a head or tail is obtained. If she obtained exactly one head, what is the probability that she threw 1, 2, 3 or 4 with the die?

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11. A manufacturer has three machine operators A, B and C. The first operator A produces 1% defective items, where as the other two operators B and C produce 5% and 7% defective items respectively. A is on the job for 50% of the time, B is on the job for 30% of the time and C is on the job for 20% of the time. A defective item is produced, what is the probability that it was produced by A?

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12. 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 both diamonds. Find the probability of the lost card being a diamond.

Watch Video Solution

13. Probability that A speaks truth is $\frac{4}{5}$. A coin is tossed. A reports that a head appears. The probability that actually there was head is

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

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

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

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

Answer: A

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14. If A and B are two events such that A $\subset$ B and P(B) $\neq$ 0, then which of the following is correct?

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

B. $P(A \mid B) < P(A)$

C. $P(A \mid B) \geq P(A)$

D. None of these

Answer: B

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Exercise 13 4

1. State which of the following are not the probability distributions of a random variable. Give

reasons for your answer.

(i)

X	0	1	2
P(X)	0.4	0.4	0.2

(ii)

X	0	1	2	3	4
P(X)	0.1	0.5	0.2	−0.1	0.3

(iii)

Y	−1	0	1
P(Y)	0.6	0.1	0.2

(iv)

Z	3	2	1	0	−1
P(Z)	0.3	0.2	0.4	0.1	0.05

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2. An urn contains 5 red and 2 black balls. Two balls are randomly drawn. Let X represent the number of black balls. What are the possible values of X? Is X a random variable ?

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3. Let X represent the difference between the number of heads and the number of tails obtained when a coin is tossed 6 times. What are possible values of X ?

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4. Find the probability distribution of

(i) number of heads in two tosses of a coin.

(ii) number of tails in the simultaneous tosses of

three coins.

(iii) number of heads in four tosses of a coin.

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5. Find the probability distribution of

(i) number of heads in two tosses of a coin.

(ii) number of tails in the simultaneous tosses of three coins.

(iii) number of heads in four tosses of a coin.

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6. Find the probability distribution of

(i) number of heads in two tosses of a coin.

(ii) number of tails in the simultaneous tosses of three coins.

(iii) number of heads in four tosses of a coin.

Watch Video Solution

7. Find the probability distribution of the number of successes in two tosses of a die, where a success is defined as

(i) number greater than 4

(ii) six appears on at least one die

Watch Video Solution

8. Find the probability distribution of the number of successes in two tosses of a die, where a success is defined as

(i) number greater than 4

(ii) six appears on at least one die

Watch Video Solution

9. From a lot of 30 bulbs which include 6 defectives, a sample of 4 bulbs is drawn at random with

replacement. Find the probability distribution of the number of defective bulbs.

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10. A coin is biased so that the head is 3 times as likely to occur as tail. If the coin is tossed twice, find the probability distribution of number of tails.

Watch Video Solution

11. A random variable X has the following probability distribution:

X	0	1	2	3	4	5	6	7
P(X)	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

Determine (i) K (ii) $P(X < 3)$ (iii) $P(X > 6)$ (iv) $P(0 < X < 3)$

Watch Video Solution

12. The random variable X has a probability distribution P(X) of the following form, where k is some number :

$$P(X) = \begin{cases} k & \text{if } x = 0 \\ 2k & \text{if } x = 1 \\ 3k & \text{if } x = 2 \\ 0 & \text{otherwise} \end{cases}$$

(a) Determine the value of k.

(b) Find $P(X < 2), P(X \leq 2), P(X \geq 2)$.

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13. Find the mean number of heads in three tosses of a fair coin.

Watch Video Solution

14. Two dice are thrown simultaneously. If X denotes the number of sixes, find the expectation of X.

Watch Video Solution

15. Two numbers are selected at random (without replacement) from the first six positive integers. Let X denote the larger of the two numbers obtained. Find E(X).

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16. Let X denote the sum of the numbers obtained when two fair dice are rolled. Find the variance and standard deviation of X.

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17. A class has 15 students whose ages are 14, 17, 15, 14, 21, 17, 19, 20, 16, 18, 20, 17, 16, 19 and 20 years. One student is selected in such a manner that each has the same chance of being chosen and the age X of the selected student is recorded. What is the probability distribution of the random variable X? Find mean, variance and standard deviation of X.

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18. In a meeting, 70% of the members favour and 30% oppose a certain proposal. A member is selected at random and we take X = 0 if he

opposed, and X = 1 if he is in favour. Find E(X) and Var (X).

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19. Choose the correct answer

The mean of the numbers obtained on throwing a die having written 1 on three faces, 2 on two faces and 5 on one face is

A. 1

B. 2

C. 5

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

Answer: B

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20. Choose the correct answer

Suppose that two cards are drawn at random from a deck of cards. Let X be the number of aces obtained. Then the value of E(X) is

A. $\frac{37}{221}$

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

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

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

Answer: D

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Exercise 13 5

1. A die is thrown 6 times. If 'getting an odd number' is a success, what is the probability of

(i) 5 successes? (ii) at least 5 successes?

(iii) at most 5 successes?

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2. A pair of dice is thrown 4 times. If getting a doublet is considered a success, find the probability of two successes.

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3. There are 5% defective items in a large bulk of items. What is the probability that a sample of 10 items will include not more than one defective item?

Watch Video Solution

4. Five cards are drawn successively with replacement from a well-shuffled deck of 52 cards. What is the probability that

(i) all the five cards are spades?

(ii) only 3 cards are spades?

(iii) none is a spade?

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5. The probability that a bulb produced by a factory will fuse after 150 days is 0.05. Find the probability

that out of 5 such bulbs

(i) none

(ii) not more than one

(iii) more than one

(iv) at least one

will fuse after 150 days of use.

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6. A bag consists of 10 balls each marked with one e digits 0 to 9. If four balls are drawn successively with replacement from the bag, what is the probability that none is marked with the digit 0?

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7. In an examination, 20 questions of true-false type are asked. Suppose a student tosses a fair coin to determine his answer to each question. If the coin falls heads, he answers 'true', if it falls tails, he answers 'false'. Find the probability that he answers at least 12 questions correctly.

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8. Suppose X has a binomial distribution $B\left(6, \frac{1}{2}\right)$. Show that X = 3 is the most likely outcome. (Hint:

P(X = 3) is the maximum among all $P(x_1), x_1 = 0, 1, 2, 3, 4, 5, 6)$

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9. On a multiple choice examination with three possible answers for each of the five questions, what is the probability that a candidate would get four or more correct answers just by guessing?

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10. A person buys a lottery ticket in 50 lotteries, in each of which his chance of winning a prize is $\frac{1}{100}$. What is the probability that he will win a prize (a) at least once (b) exactly once (c) at least twice?

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11. Find the probability of getting 5 exactly twice in 7 throws of a die.

Watch Video Solution

12. Find the probability of throwing at most 2 sixes in 6 throws of a single dice.

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13. It is known that 10% of certain articles manufactured are defective. What is the probability that in a random sample of 12 such articles, 9 are defective?

Watch Video Solution

14. Choose the correct answer:

In a box containing 100 bulbs, 10 are defective. The probability that out of a sample of 5 bulbs, none is defective is

A. 10^{-1}

B. $\left(\frac{1}{2}\right)^5$

C. $\left(\frac{9}{10}\right)^5$

D. $\frac{9}{10}$

Answer: C

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15. Choose the correct answer:

The probability that a student is not a swimmer is $\frac{1}{5}$ out of five students, four are swimmers is

A. ${}^5C_1\left(\frac{4}{5}\right)^4\frac{1}{5}$

B. $\left(\frac{4}{5}\right)^4\frac{1}{5}$

C. ${}^5C_1\left(\frac{4}{5}\right)^4\frac{1}{5}$

D. None of these

Answer: A

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Miscellaneous Exercise 13

1. A and B are two events such that $P(A) \neq 0$. Find P(B|A), if

(i) A is a subset of B (ii) $A \cap B = \phi$

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2. A couple has two children,

(i) Find the probability that both children are males, if it is known that at least one of the children is male.

(ii) Find the probability that both children are

females, if it is known that the elder child is a female.

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3. A couple has two children,

(i) Find the probability that both children are males, if it is known that at least one of the children is male.

(ii) Find the probability that both children are females, if it is known that the elder child is a female.

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4. Suppose that 5% of men and 0.25% of women have grey hair. A grey haired person is selected at random. What is the probability of this person being male? Assume that there are equal number of males and females.

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5. 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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6. An urn contains 25 balls of which 10 balls bear a mark 'X' and the remaining 15 bear a mark 'Y'. A ball is drawn at random from the urn, its mark is noted down and it is replaced. If 6 balls are drawn in this way, find the probability that

(i) all will bear 'X' mark.

(ii) not more than 2 will bear 'Y' mark.

(iii) at least one ball will bear 'Y' mark.

(iv) the number of balls with 'X' mark and 'Y' mark will be equal.

 Watch Video Solution

7. In a hurdle race, a player has to cross 10 hurdles. The probability that he will clear each hurdle is $\frac{5}{6}$. What is the probability that he will knock down fewer than 2 hurdles?

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8. A dice is thrown again and again until three sixes are obtained. Find the probability of obtaining the third six in the sixth throw of the dice.

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9. If a leap year is selected at random, what is the chance that it will contain 53 tuesdays?

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

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11. How many times must a man toss a fair coin so that the probability of having at least one head is

more than 90%?

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12. In a game, a man wins a rupee for a six and loses a rupee for any other number when a fair die is thrown. The man decided to throw a die thrice but to quit as and when he gets a six. Find the expected value of the amount he wins/loses.

Watch Video Solution

13. Suppose we have four boxes A, B, C and D containing coloured marbles as given below :

Box	Marble colour		
	Red	White	Black
A	1	6	3
B	6	2	2
C	8	1	1
D	0	6	4

One of the boxes has been selected at random and a single marble is drawn from it. If the marble is red, what is the probability that it was drawn from box A?, box B ?, box C ?

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14. 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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15. If each element of a second order determinant is either zero or one, what is the probability that the value of the determinant is positive? (Assume that the individual entries of the determinant are chosen independently, each value being assumed with probability $\frac{1}{2}$)

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16. An electronic assembly consists of two subsystems, say, A and B. From previous testing procedures, the following probabilities are assumed to be known:

P(A fails) = 0.2

P(B fails alone) = 0.15

P(A and B fail) = 0.15

Evaluate the following probabilities

(i) P(A fails|B has failed) (ii) P(A fails alone)

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17. Bag I contains 3 red and 4 black balls and Bag II contains 4 red and 5 black balls. One ball is transferred from Bag I to Bag II and then a ball is drawn from Bag II. The ball so drawn is found to be

red in colour. Find the probability that the transferred ball is black.

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18. Choose the correct answer:

If A and B are two events such that $P(A) \neq 0$ and P(B|A) = 1, then

A. $A \subset B$

B. $B \subset A$

C. $B = \phi$

D. $A = \phi$

Answer: A

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19. Choose the correct answer:

If $P(A \mid B) > P(A)$, then which of the following is correct :

A. $P(B \mid A) < P(B)$

B. $P(A \cap B) < P(A) \cdot P(B)$

C. $P(B \mid A) > P(B)$

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

Answer: C

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20. Choose the correct answer:

If A and B are any two events such that P(A) + P(B) - P(A and B) = P(A), then

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

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

C. $P(B \mid A) = 0$

D. $P(A \mid B) = 0$

Answer: B

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Textbook Illustrations For Practice Work

1. If $P(A) = \frac{7}{13}, P(B) = \frac{9}{13}$ and $P(A \cap B) = \frac{4}{13}$ evaluate $P(A \mid B)$

Watch Video Solution

2. A couple has two children,

(i) Find the probability that both children are males, if it is known that at least one of the children is male.

(ii) Find the probability that both children are females, if it is known that the elder child is a female.

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3. Ten cards numbered 1 to 10 are placed in a box, mixed up thoroughly and then one card is drawn randomly. If it is known that the number on the

drawn card is more than 3, what is the probability that it is an even number?

Watch Video Solution

4. In a school there are 1000 students out of which 430 are girls. It is known that 10 % girls are studying in class XII. Find the probability of an event that randomly selected student studies in class XII given that selected student is girl.

Watch Video Solution

5. A die is thrown three times. Events A and B are defined as below:

A : 4 on the third throw

B : 6 on the first and 5 on the second throw

Find the probability of A given that B has already occurred.

Watch Video Solution

6. A dice is thrown twice and the sum of the numbers appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once ?

Watch Video Solution

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

Watch Video Solution

8. 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 drawn balls are black ?

Watch Video Solution

9. Three cards are drawn successively, without replacement from a pack of 52 well shuffled cards. What is the probability that first two cards are kings and the third card drawn is an ace?

Watch Video Solution

10. A die is thrown. If E is the event the number appearing is a multiple of 3' and F be the event 'the number appearing is even' then find whether E and F are independent ?

Watch Video Solution

11. An unbiased die is thrown twice. Let the event A be 'odd number on the first throw' and B the event 'odd number on the second throw'. Check the independence of the events A and B.

Watch Video Solution

12. Three coins are tossed simultaneously. Consider the event E 'three heads or three tails', F 'at least two heads' and G ‘at most two heads'. Of the pairs (E,F), (E,G) and (F,G), which are independent? which are dependent?

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13. Prove that if E and F are independent events, then so are the events E and F'.

Watch Video Solution

14. If A and B are two independent events, then the probability of occurrence of at least one of A and B is given by 1- P(A') P(B').

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15. A person has undertaken a construction job. The probabilities are 0.65 that there will be strike, 0.80 that the construction job will be completed on time if there is no strike, and 0.32 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.

Watch Video Solution

16. Bag I contains 3 red and 4 black balls while another Bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from Bag II.

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17. Given three identical boxes I, II and III, each containing two coins. In box I, both coins are gold coins, in box II, both are silver coins and in the box

III, there is one gold and one silver coin. A person chooses a box at random and takes out a coin. If the coin is of gold, what is the probability that the other coin in the box is also of gold?

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18. Suppose that the reliability of a HIV test is specified as follows:

Of people having HIV, 90% of the test detect the disease but 10% go undetected. Of people free of HIV, 99% of the test are judged HIV-ive but 1% are diagnosed as showing HIV+ive. From a large

population of which only 0.1% have HIV, one person is selected at random, given the HIV test, and the pathologist reports $\mathrm{him/her}$ as HIV+ive. What is the probability that the person actually has HIV?

Watch Video Solution

19. In a factory which manufactures bolts, machines A, B and C manufacture respectively 25%, 35% and 40% of the bolts. Of their outputs, 5, 4 and 2 percent are respectively defective bolts. A bolt is drawn at random from the product and is found to

be defective. What is the probability that it is manufactured by the machine B ?

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20. A doctor is to visit a patient. From the past experience, it is known that the probabilities that he will come by train, bus, scooter or by other means of transport are respectively $\frac{3}{10}, \frac{1}{5}, \frac{1}{10}$ and $\frac{2}{5}$. The probabilities that he will be late are $\frac{1}{4}, \frac{1}{3}$ and $\frac{1}{12}$, if he comes by train, bus and scooter respectively, but if he comes by other means of transport, then he will not be late. When

he arrives, he is late. What is the probability that he comes by train?

Watch Video Solution

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

Watch Video Solution

22. A person plays a game of tossing a coin thrice. For each head, he is given Rs 2 by the organiser of

the game and for each tail, he has to give Rs 1.50 to the organiser. Let X denote the amount gained or lost by the person. Show that X is a random variable and exhibit it as a function on the sample space of the experiment.

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23. A bag contains 2 white and 1 red balls. One ball is drawn at random and then put back in the box after noting its colour. The process is repeated again. If X denotes the number of red balls recorded in the two draws, describe X.

Watch Video Solution

24. Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Find the probability distribution of the number of aces.

Watch Video Solution

25. Find the probability distribution of number of doublets in three throws of a pair of dice.

Watch Video Solution

26. Let X denote the number of hours you study during a randomly selected school day. The probability that X can take the values x, has the following form, where k is some unknown constant.

$$P(X=x)=\begin{cases}0.1 & \text{if } x=0\\ kx & \text{if } x=1 \text{ or } 2\\ k(5-x) & \text{if } x=3 \text{ or } 4\\ 0 & \text{otherwise}\end{cases}$$

(a) Find the value of k.

(b) What is the probability that you study at least two hours ? Exactly two hours? At most two hours?

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27. Let a pair of dice be thrown and the random variable X be the sum of the numbers that appear on the two dice. Find the mean or expectation of X.

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28. Find the variance of the number obtained on a throw of an unbiased die.

Watch Video Solution

29. Two cards are drawn simultaneously (or successively without replacement) from a well shuffled pack of 52 cards. Find the mean, variance and standard deviation of the number of kings.

Watch Video Solution

30. Six balls are drawn successively from an urn containing 7 red and 9 black balls. Tell whether or not the trials of drawing balls are Bernoulli trials when after each draw the ball drawn is (i) replaced (ii) not replaced in the urn.

Watch Video Solution

31. If a fair coin is tossed 10 times, find the probability of

(i) exactly six heads

(ii) at least six heads

(iii) at most six heads

Watch Video Solution

32. Ten eggs are drawn successively with replacement from a lot containing 10% defective

eggs. Find the probability that there is at least one defective egg.

Watch Video Solution

33. Coloured balls are distributed in four boxes as shown in the following table :

Box	Colour			
	Black	White	Red	Blue
I	3	4	5	6
II	2	2	2	2
III	1	2	3	1
IV	4	3	1	5

A box is selected at random and then a ball is randomly drawn from the selected box. The colour

of the ball is black, what is the probability that ball drawn is from the box III ?

Watch Video Solution

34. Find the mean of the Binomial distribution $B\left(4, \frac{1}{3}\right)$

Watch Video Solution

35. The probability of a shooter hitting a target is $\frac{3}{4}$. How many minimum number of times must

he/she fire so that the probability of hitting the target at least once is more than 0.99?

Watch Video Solution

36. A and B throw a die alternatively till one of them gets a '6' and wins the game. Find their respective probabilities of winning, if A starts first.

Watch Video Solution

37. If a machine is correctly set up, it produces 90% acceptable items. If it is incorrectly set up, it

produces only 40% acceptable items. Past experience shows that 80% of the set ups are correctly done. If after a certain set up, the machine produces 2 acceptable items, find the probability that the machine is correctly setup.

Watch Video Solution

Solutions Of Ncert Exemplar Problems Short Answer Type Questions

1. For a loaded die, the probabilities of outcomes are given as under :

$P(1) = P(2) = 0.2, P(3) = P(5) = P(6) = 0.1$

and $P(4) = 0.3$.

The die is thrown two times. Let A and B be the events, 'same number each time', and 'a total score is 10 or more', respectively. Determine whether or not A and B are independent.

Watch Video Solution

2. For a loaded die, the probabilities of outcomes are given as under :

$P(1) = P(2) = 0.2, P(3) = P(5) = P(6) = 0.1$ and $P(4) = 0.3$.

The die is thrown two times. Let A and B be the

events, 'same number each time', and 'a total score is 10 or more', respectively. Determine whether or not A and B are independent.

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3. The probability that atleast one of the two events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.3, evaluate $P(\overline{A}) + P(\overline{B})$.

Watch Video Solution

4. A bag contains 5 red marbles and 3 black marbles. Three marbles are drawn one by one without replacement. What is the probability that atleast one of the three marbles drawn be black, if the first marble is red ?

Watch Video Solution

5. Two dice are thrown together and the total score is noted. The events E, F and G are 'a total of 4', 'a total of 9 or more', and 'a total is divisible by 5', respectively. Calculate P(E), P(F) and P(G) and decide which pairs of events, if any, are independent.

Watch Video Solution

6. Explain why the experiment of tossing a coin three times is said to have binomial distribution.

Watch Video Solution

7. If A and B are two events such that $P(A) = \frac{1}{2}, P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$. Find :

(i) $P(A/B)$ (ii) $P(B/A)$ (ii)$P(A'/B)$ (iv) $P(A'/B')$

Watch Video Solution

8. Three events A, B and C have probabilities $\frac{2}{5}, \frac{1}{3}$ and $\frac{1}{2}$ respectively. Given that $P(A \cap C) = \frac{1}{5}, P(B \cap C) = \frac{1}{4}$ find the values of $P(C/B)$ and $P(A' \cap C')$.

Watch Video Solution

9. Let E_1 and E_2 be two independent events such that $P(E_1) = P_1$ and $P(E_2) = P_2$. Describe in words of the events whose probabilities are :

(i) $P_1 \cdot P_2$ (ii) $(1 - P_1) \cdot P_2$ (iii) $1 - (1 - P_1) \cdot (1 - P_2)$ (iv) $P_1 + P_2 - 2P_1 \cdot P_2$

Watch Video Solution

10. A discrete random variable X has the probability distribution given as below:

X	0.5	1	1.5	2
$p(x)$	k	k^2	$2k^2$	k

(i) Find the value of k

(ii) Determine the mean of the distribution.

Watch Video Solution

11. Prove that,

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

Watch Video Solution

12. Prove that

$$P(A \cup B) = P(A \cap B) + P\left(A \cap \overline{B}\right) + P\left(\overline{A} \cap B\right)$$

Watch Video Solution

13. If X is the number of tails in three tosses of a coin, determine the standard deviation of X.

Watch Video Solution

14. In a dice game, a player pays a stake of ₹ 1 for each throw of a die. She receives ₹ 5 if the die shows a 3, ₹ 2 if the die shows a 1 or 6 and nothing otherwise. What is the player's expected profit per throw over a long series of throws ?

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15. Three dice are thrown at the sametime. Find the probability of getting three two's, if it is known that the sum of the numbers on the dice was six.

Watch Video Solution

16. Suppose 10,000 tickets are sold in a lottery each for ₹ 1. First prize is of ₹ 3000 and the second prize is of ₹ 2000. There are three third prizes of ₹ 500 each. If you buy one ticket, what is your expectation ?

Watch Video Solution

17. A bag contains 4 white and 5 black balls. Another bag contains 9 white and 7 black balls. A ball is transferred from the first bag to the second

and then a ball is drawn at random from the second bag. Find the probability that the ball drawn is white.

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18. Bag-I contains 3 black and 2 white balls, Bag-II contains 2 black and 4 white balls. A bag and a ball is selected at random. Determine the probability of selecting a black ball.

Watch Video Solution

19. A box has 5 blue and 4 red balls. One ball is drawn at random and not replaced. Its colour is also not noted. Then, another ball is drawn at random. What is the probability of second ball being blue ?

Watch Video Solution

20. Four cards are successively drawn without replacement from a deck of 52 playing cards. What is the probability that all the four cards are kings ?

Watch Video Solution

21. If a die is thrown 5 times. Then find the probability that an odd number will come up exactly three times.

Watch Video Solution

22. Ten coins are tossed. Then what is the probability of getting atleast 8 heads ?

Watch Video Solution

23. The probability of a man hitting a target is 0.25. He shoots 7 times, then what is the probability of his hitting atleast twice ?

Watch Video Solution

24. A lot of 100 watches is known to have 10 defective watches. If 8 watches are selected (one by one with replacement) at random, then what is the probability that there will be atleast one defective watch ?

Watch Video Solution

25. Consider the probability distribution of a random variable X:

X	0	1	2	3	4
P(X)	0.1	0.25	0.3	0.2	0.15

Calculate (i) $V\left(\frac{X}{2}\right)$ (ii) Variance of X.

Watch Video Solution

26. The probability distribution of a random variable X is given below:

X	0	1	2	3
$P(X_i)$	k	$\frac{k}{2}$	$\frac{k}{4}$	$\frac{k}{8}$

(i) Determine the value of k.

(ii) Determine $P(X \leq 2)$ and $P(X > 2)$

(ii) Find $P(X \leq 2) + P(X > 2)$.

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27. For the following probability distribution determine standard deviation of the random variable X.

X	2	3	4
P(X)	0.2	0.5	0.3

Watch Video Solution

28. A biased die is such that $P(4) = \frac{1}{10}$ and other scores being equally likely. The die is tossed twice. If X is the 'number of fours seen', then find the variance of the random variable X.

Watch Video Solution

29. A dice is thrown three times. Let X be 'the number of two seen'. Find the expectation of X.

Watch Video Solution

30. Two biased dice are thrown together. For the first dice $P(6) = \frac{1}{2}$, the other scores being equally likely while for the second dice, $P(1) = \frac{2}{5}$ and the other scores are equally likely. Find the probability distribution of 'the number of ones seen'.

Watch Video Solution

31. Two probability distributions of the discrete random variables X and Y are given below.

X	0	1	2	3
P(X)	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{1}{5}$

and

Y	0	1	2	3
P(Y)	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{2}{5}$	$\frac{1}{10}$

Prove that $E(Y^2) = 2E(X)$.

Watch Video Solution

32. A factory produces bulbs. The probability that any one bulb is defective is $\frac{1}{50}$ and they are packed in 10 boxes. From a single box, find the probability that,

(i) none of the bulbs is defective

(ii) exactly two bulbs are defective

(iii) more than 8 bulbs work properly.

Watch Video Solution

33. Suppose you have two coins which appear identical in your pocket. You know that, one is fair and one is 2-headed. If you take one out, toss it and get a head, what is the probability that it was a fair coin ?

Watch Video Solution

34. Suppose that 6% of the people with blood group O are left handed and 10% of those with other blood groups are left handed 30% of the people have blood group O. If a left handed person is selected at random, what is the probability that he/she will have blood group O ?

Watch Video Solution

35. Two natural numbers r, s are drawn one at a time, without replacement from the set S = {1, 2, 3, 4, ..., n}. Find $P(r \leq p/s \leq p)$, where $p \in S$.

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Watch Video Solution

36. Find the probability distribution of the maximum of the two scores obtained when a die is thrown twice. Determine also the mean of the distribution.

Watch Video Solution

37. The random variable X can take only the values 0, 1, 2. Given that $P(X=0)=P(X=1)=p$ and that $E\left(X^2\right)=E(X)$, find the value of p.

Watch Video Solution

38. Find the variance of the distribution:

X	0	1	2	3	4	5
P(X)	$\frac{1}{6}$	$\frac{5}{18}$	$\frac{2}{9}$	$\frac{1}{6}$	$\frac{1}{9}$	$\frac{1}{18}$

Watch Video Solution

39. A and B throw a pair of dice alternately. A wins the game if he gets a total of 6 and B wins if she gets a total of 7. It A starts the game, then find the probability of winning the game by A in third throw of the pair of dice.

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40. Two dice are tossed. Find whether the following two events A and B are independent :

$A = \{(x, y) : x + y = 11\}$ and

$B = \{(x, y) : x \neq 5\}$

where (x, y) denotes a typical sample point.

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Solutions Of Ncert Exemplar Problems Long Answer Type Questions

1. 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 additional 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.

Watch Video Solution

2. Three bags contain a number of red and white balls as follows:

Bags	Red	White
i	3	0
ii	2	1
iii	0	3

The probability that bag i will be chosen and a ball is selected from it is $\frac{i}{6}$, i = 1, 2, 3. What is the probability that,

(i) a red ball will be selected ?

(ii) a white ball is selected ?

Watch Video Solution

3. Three bags contain a number of red and white balls as follows:

Bags	Red	White
i	3	0
ii	2	1
iii	0	3

If a white ball is selected, what is the probability that it came from (i) Bag II (ii) Bag III.

Watch Video Solution

4. A shopkeeper sells three types of flower seeds A_1, A_2, and A_3. They are sold as a mixture, where the proportions are 4:4:2 respectively. The germination rates of the three type of seeds are 45%, 60% and 35%. Calculate the probability

(i) Of a randomly chosen seed to germinate

(ii) That it will not germinate given that the seed is of type A_3.

(iii) That it is of the type A_2 given that a randomly chosen seed does not germinate.

Watch Video Solution

5. A letter is known to have come either from word TATA NAGAR or from CALCUTTA, On the envelope, just two consecutive letter TA are visible. What is the probability that the letter came from TATA NAGAR ?

Watch Video Solution

6. There are two bags, one of which contains 3 black and 4 white balls while the other contains 4 black and 3 white balls. A die is thrown. If it shows up 1 or 3, a ball is taken from the 1^{st} bag, but it shows up any other number, a ball is chosen from the 2^{nd} bag. Find the probability of choosing a black ball.

Watch Video Solution

7. The three urns having the numbers of white and black balls are given below :

Urn	White	Black
1	2	3
2	3	2
3	4	1

The probability of chosing every urn is equl. A ball is chosen randomly from the urn is found to be white. Then find the probability that the ball chosen was that form urn-2.

Watch Video Solution

8. By examining the chest X-ray probability that T.B. is detected when person is actually suffering is 0.99. The probability that doctor diagnoses incorrectly that person has T. B. on the basis of X-ray is 0.001. In certain city 1 to 1000 persons suffering from T.B. A person is selected at random is diagnosed to have a T.B. what is the chance he has actually T.B. ?

Watch Video Solution

9. An item is manufactured by three machines A, B and C. Out of the total number of items

manufactured during a specified period, 50% are manufactured on A, 30% on B and 20% on C. 2% of the items produced on A and 2% of items produced on B are defective, and 3% of these produced on C are defective. All the items are stored at one godown. One item is drawn at random and is found to be defective. What is the probability that it was manufactured on machine A ?

Watch Video Solution

10. Let X be a discrete random variable whose probability distribution is defined as follows:

$$P(X=x)=\begin{cases} k(x+1), & x=1,2,3,4 \\ 2kx, & x=5,6,7 \\ 0 & \text{Otherwise} \end{cases}$$

Where k is a constant. Calculate (i) the value of k (ii) E(X) (iii) Standard deviation of X.

Watch Video Solution

11. The probability distribution of a discrete random variable X is given as under :

x	1	2	4	2A	3A	5A
P(X)	$\frac{1}{2}$	$\frac{1}{5}$	$\frac{3}{25}$	$\frac{1}{10}$	$\frac{1}{25}$	$\frac{1}{25}$

Calculate :

(i) The value of A if E(X) = 2.94 (ii) Variance of X

Watch Video Solution

12. The probability distribution of a random variable X is given as under :

$$P(X=x)=\begin{cases} kx^2, & x=1,2,3 \\ 2kx, & x=4,5,6 \\ 0 & \text{Otherwise} \end{cases}$$

where k is a constant. Calculate (i) E(X), (ii) $E\left(3X^2\right)$ and (iii) $P(x \geq 4)$.

Watch Video Solution

13. A bag contains (2n + 1) coins. It is known that n of these coins have a head on both sides whereas the rest of the coins are fair. A coin is picked up at random from the bag and is tossed. If the probability that the toss results in a head is $\frac{31}{42}$, then determine the value of n.

Watch Video Solution

14. Two cards are drawn successively without replacement from a well shuffled deck of cards. Find the mean and standard variation of the random variable X, where X is the number of aces.

Watch Video Solution

15. A dice is tossed twice. A 'success' is getting an even number on a toss. Find the variance of the number of successes.

Watch Video Solution

16. There are 5 cards numbered 1 to 5, one number on one card. Two cards are drawn at random without replacement. Let X denote the sum of the numbers on two cards drawn. Find the mean and variance of X.

Watch Video Solution

Solutions Of Ncert Exemplar Problems Objective Type Questions

1. If $P(A) = \frac{4}{5}$ and $P(A \cap B) = \frac{7}{10}$ then $P(B/A)$ is equal to = ...

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

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

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

D. $\frac{17}{20}$

Answer: C

Watch Video Solution

2. If $P(A \cap B) = \frac{7}{10}$ and $P(B) = \frac{17}{20}$ then $P(A/B)$ equals = ...

A. $\frac{14}{17}$

B. $\frac{17}{20}$

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

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

Answer: A

Watch Video Solution

3. If $P(A) = \frac{3}{10}, P(B) = \frac{2}{5}$ and $P(A \cup B) = \frac{3}{5}$ then $P(A/B) + P(B/A)$ equals = ...

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

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

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

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

Answer: D

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4. If $P(A) = \frac{2}{5}, P(B) = \frac{3}{10}$ and $P(A \cap B) = \frac{1}{5}$, then $P(A'/B') \cdot P(B'/A')$ is equal to .....

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

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

C. $\frac{25}{42}$

D. 1

Answer: C

Watch Video Solution

5. If A and B are two events such that $P(A) = \frac{1}{2}, P(B) = \frac{1}{3}$ and $P(A/B) = \frac{1}{4}$ then $P(A' \cap B')$ equals .....

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

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

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

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

Answer: C

Watch Video Solution

6. If $P(A) = 0.4, P(B) = 0.8$ and $P(B/A) = 0.6$ then $P(A \cup B)$ is equal to .....

A. 0.24

B. 0.3

C. 0.48

D. 0.96

Answer: D

Watch Video Solution

7. If A and B are two events and $A \neq \phi, B \neq \phi$, then .....

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

B. $P(A/B) = \dfrac{P(A \cap B)}{P(B)}$

C. $P(A/B) \cdot P(B/A) = 1$

D. $P(A/B) = \dfrac{P(A)}{P(B)}$

Answer: B

Watch Video Solution

8. A and B are events such that $P(A) = 0.4, P(B) = 0.3$ and $P(A \cup B) = 0.5.$

Then $P(B' \cap A')$ equal = ...

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

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

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

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

Answer: B

Watch Video Solution

9. You are given that A and B are two events such that $P(B) = \frac{3}{5}, P(A/B) = \frac{1}{2}$ and $P(A \cup B) = \frac{4}{5}$ then P(A) equal .....

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

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

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

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

Answer: C

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10. You are given that A and B are two events such that $P(B) = \frac{3}{5}, P(A/B) = \frac{1}{2}$ and $P(A \cup B) = \frac{4}{5}$ then $P(B/A')$ is equal to .....

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

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

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

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

Answer: D

Watch Video Solution

11. If $P(B)=\frac{3}{5}, P(A/B)=\frac{1}{2}$ and $P(A\cup B)=\frac{4}{5}$ then $P(A\cup B)'+P(A'\cup B)$=

.....

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

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

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

D. 1

Answer: D

Watch Video Solution

12. If $P(A) = \frac{7}{13}, P(B) = \frac{9}{13}$ and $P(A \cap B) = \frac{4}{13}$ then find $P(A' \mid B)$.

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

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

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

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

Answer: D

Watch Video Solution

13. If A and B are such events that $P(A) > 0$ and $P(B) \neq 1$, then $P(A'/B')$= .....

A. $1 - P(A/B)$

B. $1 - P(A'/B)$

C. $\frac{1 - P(A \cup B)}{P(B')}$

D. $P(A')/P(B')$

Answer: C

Watch Video Solution

14. If A and B are two independent events with $P(A) = \frac{3}{5}$ and $P(B) = \frac{4}{9}$, then $P(A' \cap B')$ equals to .....

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

B. $\frac{8}{45}$

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

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

Answer: D

Watch Video Solution

15. If two events are independent, then .....

A. They must be mutually exclusive

B. Sum of their probability is 1

C. (A) and (B) both are correct

D. None of above is correct

Answer: D

Watch Video Solution

16. Let A and B be two events such that $P(A) = \frac{3}{8}, P(B) = \frac{5}{8}$ and $P(A \cup B) = \frac{3}{4}.$

Then $P(A/B) \cdot P(A'/B)$ is equal to .....

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

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

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

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

Answer: D

Watch Video Solution

17. If the events A and B are independent, then $P(A \cap B)$ is equal to .....

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

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

C. $P(A) \cdot P(B)$

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

Answer: C

Watch Video Solution

18. Two events E and F are independent. If $P(E) = 0.3$ and $P(E \cup F) = 0.5$, then $P(E/F) - P(F/E)$ equal .....

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

B. $\frac{3}{35}$

C. $\frac{1}{70}$

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

Answer: C

Watch Video Solution

19. A bag contains 5 red and 3 blue balls. If 3 balls are drawn at random without replacement the probability of getting exactly one red ball is .....

A. $\frac{45}{196}$

B. $\frac{135}{392}$

C. $\frac{15}{56}$

D. $\frac{15}{29}$

Answer: C

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20. A bag contains 5 red balls and 3 black marbles. Three balls are drawn one by one without replacement. The probability that exactly two of

the three balls were red, the first ball being red, is

.....

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

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

C. $\frac{15}{28}$

D. $\frac{10}{28}$

Answer: B

Watch Video Solution

21. Three persons A, B and C, fire at a target in turn starting with A. Their probability of hitting the target are 0.4, 0.3 and 0.2 respectively. The probability of two hits is .....

A. 0.024

B. 0.188

C. 0.336

D. 0.452

Answer: B

Watch Video Solution

22. Assume that in a family, each child is equally likely to be a boy or a girl. A family with three children is chosen at random. The probability that the eldest child is a girl given that the family has atleast one girl is .....

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

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

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

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

Answer: D

Watch Video Solution

23. A die is thrown and a card is selected at random from a deck of 52 playing cards. The probability of getting an even number on the die and a spade card is .....

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

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

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

D. $\frac{3}{9}$

Answer: C

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Watch Video Solution

24. A box contains 3 orange balls, 3 green balls and 2 blue balls. Three balls are drawn at random from the box without replacement. The probability of drawing 2 green balls and one blue ball is .....

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

B. $\frac{2}{21}$

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

D. $\frac{167}{168}$

Answer: A

Watch Video Solution

25. A flashlight has 8 batteries out of which 3 are dead. If two batteries are selected without replacement and tested, the probability that both are dead is .....

A. $\frac{33}{56}$

B. $\frac{9}{64}$

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

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

Answer: D

Watch Video Solution

Watch Video Solution

26. Eight coins are tossed together. The probability of getting exactly 3 heads is .....

A. $\frac{1}{256}$

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

C. $\frac{5}{32}$

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

Answer: B

Watch Video Solution

27. Two dice are thrown. If it is known that the sum of numbers on the dice was less than 6, the probability of getting a sum 3, is .....

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

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

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

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

Answer: C

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28. Which one is not a requirement of a binomial distribution ?

A. There are 2 outcomes for each trial

B. There is a fixed number of trials

C. The out come must be dependent on each other

D. The probability of success must be the same for all the trials

Answer: C

 Watch Video Solution

29. Two cards are drawn from a well shuffled deck of 52 playing cards with replacement. The probability, that both cards are queens, is .....

A. $\left(\frac{1}{13}\right)\left(\frac{1}{13}\right)$

B. $\frac{1}{13}+\frac{1}{13}$

C. $\left(\frac{1}{13}\right)\left(\frac{1}{17}\right)$

D. $\left(\frac{1}{13}\right)\left(\frac{4}{51}\right)$

Answer: A

Watch Video Solution

30. The probability of guessing correctly atleast 8 out of 10 answers on a true-false type examination is .....

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

B. $\frac{7}{128}$

C. $\frac{45}{1024}$

D. $\frac{7}{41}$

Answer: B

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31. The probability that a person is not a swimmer is 0.3. The probability that out of 5 persons 4 are swimmers is .....

A. ${}^5C_4(0.7)^4(0.3)$

B. ${}^5C_1(0.7)(0.3)^4$

C. ${}^5C_4(0.7)(0.3)^4$

D. $(0.7)^4(0.3)$

Answer: A

Watch Video Solution

32. The probability distribution of a discrete random variable X is given below :

x	2	3	4	5
P(X)	$\frac{5}{k}$	$\frac{7}{k}$	$\frac{9}{k}$	$\frac{11}{k}$

The value of k is .....

A. 8

B. 16

C. 32

D. 48

Answer: C

Watch Video Solution

33. For the following probability distribution :

x	-4	-3	-2	-1	0
P(X)	0.1	0.2	0.3	0.2	0.2

E(X) is equal to .....

A. 0

B. -1

C. -2

D. -1.8

Answer: D

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34. For the following probability distribution

x	1	2	3	4
P(X)	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{2}{5}$

$E(X^2)$ is equal to .....

A. 3

B. 5

C. 7

D. 10

Answer: D

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35. Suppose a random variable X follows the binomial distribution with parameters n and p, where $0 < p < 1$. If $P(x = r)/P(x = n - r)$ is independent of n and r, then p equals .....

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

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

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

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

Answer: A

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36. In a college, 30% students fail in physics, 25% fail in mathematics and 10% fail in both. One student is chosen at random. The probability that she fails in physics if she has failed in mathematics is .....

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

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

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

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

Answer: B

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37. A and B are two students. Their chances of solving a problem correctly are $\frac{1}{3}$ and $\frac{1}{4}$, respectively. If the probability of their making a common error is $\frac{1}{20}$ and they obtain the same answer, then the probability of their answer to be correct is .....

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

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

C. $\frac{13}{120}$

D. $\frac{10}{13}$

Answer: D

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38. A box has 100 pens of which 10 are defective. What is the probability that out of a sample of 5 pens drawn one by one with replacement at most one is defective ?

A. $\left(\frac{9}{10}\right)^5$

B. $\frac{1}{2}\left(\frac{9}{10}\right)^4$

C. $\frac{1}{2}\left(\frac{9}{10}\right)^5 + \left(\frac{9}{10}\right)^4$

D. $\left(\frac{9}{10}\right)^5 + \frac{1}{2}\left(\frac{9}{10}\right)^4$

Answer: D

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Solutions Of Ncert Exemplar Problems True False

1. Let $P(A) > 0$ and $P(B) > 0$. Then, A and B can be both mutually exclusive and independent.

Watch Video Solution

Watch Video Solution

2. If A and B are independent events, then A' and B' are also independent.

Watch Video Solution

3. If A and B are mutually exclusive events, then they will be independent also.

Watch Video Solution

4. Two independent events are always mutually exclusive.

Watch Video Solution

5. If A and B are two independent events then $P(A \cap B) = P(A) \cdot P(B)$.

Watch Video Solution

6. Another name for the mean of a probability distribution is expected value.

Watch Video Solution

7. If A and B' are independent events, then $P(A' \cup B) = 1 - P(A) \cdot P(B')$.

Watch Video Solution

8. If A and B are independent, then P (exactly one of A, B occurs) = $P(A) \cdot P(B') + P(A') \cdot P(B)$.

Watch Video Solution

9. If A and B are two events such that $P(A) > 0$ and $P(A) + P(B) > 1$, then $P(B/A) \geq 1 - \frac{P(B')}{P(A)}$.

Watch Video Solution

10. If A, B and C are three independent events such that $P(A) = P(B) = P(C) = p$, then P (Atleast two of A, B, C occur) $= 3p^2 - 2p^3$.

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Solutions Of Ncert Exemplar Problems Fillers

1. If A and B are two events such that $P(A \mid B) = p, P(A) = p, P(B) = \frac{1}{3}$ and $P(A \cup B) = \frac{5}{9}$ then p = ...

Watch Video Solution

2. If A and B are events such that $P(A' \cup B') = \frac{2}{3}$ and $P(A \cup B) = \frac{5}{9}$, then $P(A') + P(B')$ = ...

Watch Video Solution

3. If X follows binomial distribution with parameters $n = 5$, p and $P(X = 2) = 9P(X = 3)$ then p = ...

Watch Video Solution

4. Let X be a random variable taking values $x_1, x_2, x_3, \ldots\ldots, x_n$ with probabilities $p_1, p_2, p_3, \ldots\ldots\ldots, p_n$ respectively. Then var (X) = ...

Watch Video Solution

5. Let A and B be two events. If $P(A \mid B) = P(A)$, then A is ..... of B.

Watch Video Solution

Multiple Choice Questions Mcqs

1. If A and B are two events such that $P(A) > 0$ and $P(B) \neq 1$, then $P(A \mid B')$ is .....

A. $1 - P(A \mid B')$

B. $1 - P(A \mid B)$

C. $\frac{P(A')}{P(B)}$

D. $1 - P(A' \mid B')$

Answer: D

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2. A study has been done to determine whether or not a certain drug leads to an improvement in symptoms for patients with a particular medical condition. The results are shown in the following table :

	Improvement	No improvement	Total
Drug	270	530	800
No drug	120	280	400
Total	390	810	1200

Based on this table, what is the probability that a patient shows improvement if it is known that the patient was given the drug ?

A. 0.4375

B. 0.225

C. 0.3375

D. 0.3205

Answer: C

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3. A and B are two events such that $P(A) = \frac{1}{4}, P(A \mid B) = \frac{1}{2}, P(B \mid A) = \frac{2}{3},$

then P(B)= .....

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

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

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

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

Answer: C

Watch Video Solution

4. If two events A and B are such that $P(A') = 0.3, P(B) = 0.5$ and $P(A \cap B) = 0.3$, then $P(B \mid A \cup B')$ is .....

A. 0.375

B. 0.32

C. 0.31

D. 0.28

Answer: A

Watch Video Solution

5. The probabilities of new purchased television and refrigerator will be working 10 years hence are $\frac{7}{15}$ and $\frac{7}{10}$ respectively. The probability that both will not be working 10 years hence is .....

A. $\frac{21}{150}$

B. $\frac{24}{150}$

C. $\frac{49}{150}$

D. $\frac{56}{150}$

Answer: B

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6. Two unbiased dice are thrown. The probability that sum of the numbers appearing on the top face of two dice is 12, if 6 appears on the top face of first dice is .....

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

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

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

D. $\frac{5}{36}$

Answer: B

Watch Video Solution

7. If A and B are two events such that $P(A) \neq 0$ and $P(B) \neq 0$, then $P(A' \mid B') =$ .....

A. $1 - P(A \mid B)$

B. $1 - P(A' \mid B)$

C. $\dfrac{1 - P(A \cup B)}{P(B')}$

D. $\dfrac{P(A')}{P(B')}$

Answer: C

Watch Video Solution

8. Two unbiased dice are thrown. The probability that the sum of the numbers appearing on the top face of two dice is greater than 7, if 4 appear on the top face of first dice is .....

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

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

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

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

Answer: B

Watch Video Solution

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

A. $\frac{37}{40}$

B. $\frac{37}{45}$

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

D. $\frac{8}{45}$

Answer: B

Watch Video Solution

10. If A and B are two events such that $P(A) = \frac{5}{8}, P(B) = \frac{3}{8}$ and $P(A \cup B) = \frac{3}{4}$ then $P(A \mid B)$= .....

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

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

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

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

Answer: B

Watch Video Solution

11. If $4P(A) = 6P(B) = 10P(A \cap B) = 1$ then $P(B \mid A)$ = ...

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

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

C. $\frac{7}{10}$

D. $\frac{19}{60}$

Answer: A

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12. In a family having two children if one of the child is a girl, then the probability that other is also a girl is .....

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

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

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

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

Answer: C

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13. A and B are events such that $P(A') = 0.3, P(B) = 0.4$ and $P(A \cap B') = 0.5$ then $P[B \mid (A \cup B')] =$ .....

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

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

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

D. 1

Answer: C

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14. A coin is tossed three times is 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 $P(E \mid F)$= .....

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

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

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

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

Answer: A

Watch Video Solution

15. If $P(A \mid B) > P(A)$ then which of the following is true ?

A. $P(B \mid A) < P(B)$

B. $P(A \cap B) < P(A) \cdot P(B)$

C. $P(B \mid A) > P(B)$

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

Answer: C

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16. Choose the correct answer:

If A and B are any two events such that P(A) + P(B) - P(A and B) = P(A), then

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

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

C. $P(B \mid A) = 0$

D. $P(A \mid B) = 0$

Answer: B

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17. If $P(A) = 0.2, P(B) = 0.3$ and $P(A \cup B) = 0.25$ then $P(B \mid A') =$ .....

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

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

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

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

Answer: B

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18. If $P(A) = 0.1, P(B) = 0.2$ and $P(A \cup B) = 0.25$ then $P(A' \mid B')$= .....

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

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

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

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

Answer: B

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19. If $P(A) = 0.30, P(B) = 0.40$ and $P(A \cup B) = 0.60$ then $P(B \mid A) =$ .....

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

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

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

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

Answer: C

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20. One card is selecting from the pack of 52 playing cards if A and B denotes that card is an ace and it is of square then $P(A \mid B)$ = ...

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

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

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

D. None

Answer: A

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

A. $1 - P(A \cap B) \mid C$

B. $1 - P(A \cup B') \mid C$

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

D. None of these

Answer: A

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22. A and B are events such that $P(A) \neq 0, P(B) \neq 1$ then $P\left(\overline{A} / \overline{B}\right) =$ .....

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

B. $1 - P(\overline{A} \mid \overline{B})$

C. $\frac{1 - P(A \cup B)}{P(\overline{B})}$

D. $1 - P(A \mid B)$

Answer: C

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23. Two unbaised coins are tossed. If one coin shows head, the probability that the other also shows head is .....

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

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

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

D. 1

Answer: B

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24. In a college 12 % students fails in mathematics, 25% fails in physics and 12% fails in both subjects. One student is selected at random. Then ..... is

the probability of an event that student fail in Maths if he fail in physics.

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

B. $\frac{3}{25}$

C. $\frac{12}{25}$

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

Answer: C

Watch Video Solution

25. Complementary events of E and F are E' and F' respectively if $0 < P(F) < 1$ then .....

A. $P(E/F) + P(E'/F) = 1$

B. $P(E/F) + P(E'/F') = 1$

C. $P(E'/F) + P(E/F') = 1$

D. $P(E/F) + P(E'/F') = 1$

Answer: A

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26. Two cards are drawn in succession from a standard well shuffled pack of 52 card. What is the probability that both the cards are aces if the cards are drawn without replacement ?

A. 0.0045

B. 0.0385

C. 0.045

D. 0.0059

Answer: A

Watch Video Solution

27. a circular wheel with numbers 1 to 20 on its surface is rolled twice. What is the probability of getting two 13's ?

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

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

C. $\frac{1}{400}$

D. $\frac{1}{200}$

Answer: C

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28. Let A and B be two events such that $P(A) = 0.4, P(A \cup B) = 0.7$ and $P(B) = p$. For what choice of p are A and B independent ?

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

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

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

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

Answer: A

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

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

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

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

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

Answer: A

Watch Video Solution

30. The probability that A speaks truth is $\frac{4}{5}$, while this probability for B is $\frac{3}{4}$. The probability that they contradict each other when asked to speak on an event is .....

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

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

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

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

Answer: A

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31. A company has three plants at which it produces a certain item. 30% are produced at plant A, 50% at plant B and remaining at plant C. Suppose that 1% , 4% and 3% of the items produced at plants A, B and C respectively are defective. If an item is selected at random from all of those produced, what is the probability that item was produced at plant B is defective ?

A. 0.5

B. 0.2

C. 0.02

D. 0.04

Answer: C

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32. A problem of mathematics is given to three students and probability of solving the problem is $\frac{1}{3}, \frac{1}{3}, \frac{1}{3}$ respectively. The probability that at least one of them solves the problem is .....

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

B. $\frac{19}{27}$

C. $\frac{8}{27}$

D. $\frac{26}{27}$

Answer: B

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33. Let $E_1, E_2, E_3, \ldots, E_n$ be independent events with respective probabilities $p_1, p_2, p_3, \ldots, p_n$. The probability that none of them occurs is .....

A. $(1-p_1)(1-p_2)(1-p_3)\ldots(1-p_n)$

B. $1-\{(1-p_1)(1-p_2)(1-p_3)\ldots(1-p_n)\}$

C.

$$(1-p_1)+(1-p_2)+(1-p_3)+\ldots+(1-p_n)$$

D. $p_1 + p_2 + p_3 + \ldots + p_n$

Answer: A

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34. Two cards are drawn at random from the well shuffled pack of 52 cards. If the first card is not replaced before the second card is drawn, then the probability of getting two aces is .....

A. $\frac{1}{221}$

B. $\frac{1}{169}$

C. $\frac{1}{26}$

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

Answer: A

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35. If A and B are two independent events such that $P(A) = \frac{1}{2}, P(B) = \frac{1}{5}$, then $P(A \mid (A \cup B))$=

.....

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

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

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

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

Answer: D

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36. A small town has one fire engine and one ambulance available for emergencies. The probability that the fire engine is available when needed is 0.98 and the probability that the ambulance is available when called is 0.92. In the event of injury resulting from a building on fire, the

probability that both the ambulance and the fire engine will be available is .....

A. 0.0016

B. 0.0784

C. 0.0184

D. 0.9016

Answer: D

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37. If A and B are two independent events such that $P(A \cap B) = \frac{3}{25}$ and $P(A' \cap B) = \frac{8}{25}$, then $P(B) =$ .....

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

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

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

D. $\frac{9}{11}$

Answer: A

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38. A and B are independent events $P(A \cap B) = 0.5$ and $P(A) = 0.2$ then $P(B) =$ .....

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

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

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

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

Answer: A

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39. A purse contains 6 Silver coins and 3 Gold coins. Another purse contains 4 Silver coins and 5 Gold coins. A purse is selected at random and a coin is drawn from it. It's known that a coin is Gold then what is the probability that a Gold coin is selected from another $\left(II^{nd}\right)$ purse?

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

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

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

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

Answer: C

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40. A fair coin is tossed n times, then what is the probability that H (Head) has appeared at least once ?

A. $\frac{6^n - 5^n}{5}$

B. $1 - \left(\frac{1}{6}\right)^n$

C. $1 - \left(\frac{5}{6}\right)^n$

D. $1 - \left(\frac{1}{2}\right)^n$

Answer: D

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41. A building has two lifts. L_1 and L_2 are events when lifts are working. Probability $P(L_1) = 0.01 = P(L_2) \cdot L_1$ and L_2 are independent events. What is the probability of atleast one lift is not working ?

A. 0.9999

B. 0.09

C. 0.0009

D. 0.9989

Answer: A

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42. Suppose A and B are two persons. The probability that A does the job is $\frac{4}{5}$ and probability that B does the job is $\frac{3}{4}$. Then what is the probability that only one person does the job?

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

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

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

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

Answer: D

Watch Video Solution

43. Three machines A, B and C produce respectively 30%, 50% and 20% of the total number of items of a factory. The percentage of defective output of these machines are 1%, 4% and 3% respectively. If an item is selected at random, find the probability that the item is non-defective.

A. 0.963

B. 0.971

C. 0.961

D. 0.981

Answer: B

Watch Video Solution

44. Let X be the random variable with following probability distribution.

$\therefore E(X^2) =$ .....

X = x	1	2	3	4	5
P(x)	0.1	0.1	0.2	0.3	0.3

A. 3.6

B. 24.6

C. 14.6

D. 14.8

Answer: C

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45. If $P(A \cap B) = \frac{1}{12}$ and $P(A' \cap B') = \frac{1}{2}$ then $P(A) + P(B) =$ .....

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

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

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

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

Answer: A

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46. Probability of an event that newly purchase mobile and laptop will be in working condition after 8 years is $\frac{7}{12}$ and $\frac{7}{9}$ respectively. Then .... is the probability that both are not in working condition after 8 years.

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

B. $\frac{14}{54}$

C. $\frac{49}{108}$

D. $\frac{14}{108}$

Answer: A

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

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

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

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

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

Answer: D

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48. Probability of an event that 10 persons $A_1, A_2, \ldots, A_{10}$ with ages 70 years above expires in one year is $\frac{1}{2}$. Then ..... is the probability that person A_1 expire first in one year.

A. $\frac{1}{10240}$

B. $\frac{9217}{10240}$

C. $\frac{1023}{24010}$

D. $\frac{1023}{10240}$

Answer: D

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49. In one day match of 50 overs Sachin Tendulkar becomes out in odd numbers of over. Then ..... is the probability that he out in 9^{th} over or over multiple of 9 = ...

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

B. $\frac{3}{25}$

C. $\frac{15}{25}$

D. None of these

Answer: B

View Text Solution

50. Probability of an event that one male person lives 10 years more is $\frac{1}{4}$. His wife lives 10 years more is $\frac{1}{3}$. Then of least one person lives has ..... probability.

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

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

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

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

Answer: B

View Text Solution

51. 4 American and 1 Indian couple Total 5 couples seats around the circular table at random. If it is given that each American seat near by his wife then

..... is the probability of an event that Indian person can seat near by his wife.

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

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

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

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

Answer: C

Watch Video Solution

52. In a city 40% persons have gray hair, 25% person have gray eyes and 15% person have gray hair as well as gray eyes. One person is selected at random then ..... is the probability of an event that person has gray hair and gray eyes.

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

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

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

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

Answer: B

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53. $f(x) = x^3 + ax^2 + bx + c$ is real valued function in which a, b and c are selected by tossing one baised dice twice. Then ..... is the probability for f(x) becomes an increasing function.

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

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

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

D. $\frac{16}{34}$

Answer: A

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54. In box I and II there are 7 white 3 black, and 3 white, 7 black ball respectively. Now two balanced coins are tossed. If two heads comes up then box I is selected and one ball is drawn from it randomly. otherwise box II is selected and one ball is drawn from it randomly. Then ..... is the probability that selected ball is being white.

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

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

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

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

Answer: A

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55. In box X there are 4 red and 6 white balls and in box Y there are 3 red and 7 white balls. Now one ball is selected from box X and placed into box Y. Then from box Y one ball is drawn at random.

Then ..... is the probability that selected ball is of red colour and ball placed in box Y from box X is of white colour.

A. $\frac{6}{55}$

B. $\frac{7}{55}$

C. $\frac{8}{55}$

D. $\frac{9}{55}$

Answer: D

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56. In bag X there are 2 white and 3 black balls and in bag Y there are 4 white and 2 black balls. One bag is selected at random and one ball is drawn

from it. Then what is the probability that selected ball is white ?

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

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

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

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

Answer: A

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57. For the post of principal in school three persons A, B and C are candidates.

Probability of their appointment is in ratio $4:2:3$. If school time will changes to morning then probability of the appointment of candidate will be 0.3, 0.5 and 0.8 respectively. Then find probability of an event that school time changes to morning.

A. $\frac{21}{45}$

B. $\frac{23}{45}$

C. $\frac{25}{45}$

D. $\frac{27}{45}$

Answer: B

View Text Solution

58. Box B_1 contains 4 white and 6 black balls and box B_2 contains 6 white and 4 black balls. Now one balanced coin is tossed. If two head comes up then 2 balls are drawn from box B_1 other wise 2 white balls are drawn from Box B_2. Then find probability of an event that selected both balls are of white colour.

A. $\frac{19}{60}$

B. $\frac{21}{60}$

C. $\frac{17}{60}$

D. $\frac{23}{60}$

Answer: C

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59. There are 2 white and 3 red balls in box A and 4 white, 5 red balls in box B One box is selected at random and one ball is drawn from it. Then ..... is the probability that selected ball is of red colour.

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

B. $\frac{5}{16}$

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

D. $\frac{26}{45}$

Answer: D

Watch Video Solution

60. There are 16 coins in bag. Out of which 2 coins are defective having both sides head and remaining coins are good. One coin is selected at

random from box and is tossed. Then ..... is the probability of event that head is obtained on it.

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

B. $\frac{11}{16}$

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

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

Answer: A

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61. In three boxes numbers of balls are 3 white & 1 black, 2 white and 2 black, 1 white and 3 black balls respectively. One ball is drawn from each box randomly. Then ..... is the probability of event that selected balls are 2 white and 1 black.

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

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

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

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

Answer: A

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62. For given events A and B if P(A) = 0.25 and P(B) = 0.50 probability that both event occurs together is 0.14. Then ..... is the probability of an event that A and B does not occurs.

A. 0.39

B. 0.25

C. 0.11

D. None of these

Answer: A

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63. The probability of an event that student gets I, II and III grade in exam is $\frac{1}{10}, \frac{3}{5}$ and $\frac{1}{4}$ respectively. Then ..... is the probability that he fails in exam.

A. $\frac{197}{200}$

B. $\frac{27}{100}$

C. $\frac{83}{100}$

D. $\frac{127}{100}$

Answer: B

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64. ..... is the probability of an event that there are 53 sundays in year 2019.

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

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

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

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

Answer: C

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65. A person writes 4 letters and addresses on 4 covers. If these letters are inserted in covers randomly then ..... is the probability that all letters are not in proper cover.

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

B. $\frac{11}{24}$

C. $\frac{15}{24}$

D. $\frac{23}{24}$

Answer: D

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66. Person A speaks true in 75% and B speaks true in 80% then ..... is the probability that both contradict each other.

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

B. $\frac{13}{20}$

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

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

Answer: A

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67. 3 integers are selected from the numbers 1 to 20. Then ..... is the probability that their product is an even number.

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

B. $\frac{3}{29}$

C. $\frac{17}{19}$

D. $\frac{4}{19}$

Answer: C

Watch Video Solution

68. S is sample space if $P(A) = \frac{1}{3}P(B)$ and $S = A \cup B$ Then P(A) = ... Where A and B are mutually exclusive events.

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

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

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

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

Answer: A

Watch Video Solution

69. For events A and B $P(\overline{A \cup B}) = \frac{1}{6}, P(\overline{A}) = \frac{1}{4}$ and $P(A \cap B) = \frac{1}{4}$, Where $(\overline{A})$ is the complementary event of A then events A and B are

A. Independent but not equiprobable

B. Independent and are equiprobable

C. Independent and mutually exclusive

D. Equiprobable but not independent.

Answer: A

Watch Video Solution

70. In a vessel there are 5 red and 2 green balls. One ball is selected at random from it. If selected ball is green than one red ball is added in vessel and if selected ball is red then one green ball is added in vessel. Here selected ball is not placed back. Now second ball is drawn from it. Then ..... is the probability of event that second ball is of red colour.

A. $\frac{27}{49}$

B. $\frac{32}{49}$

C. $\frac{21}{49}$

D. $\frac{26}{49}$

Answer: B

Watch Video Solution

71. One balanced coin is tossed. If two head comes up then two balanced dice are tossed and sum of the numbers obtained on it is noted. If tail is obtain then one card is selected from the card numbered 1 to 9 and its number is noted. Then ..... is the probability of event that noted number from card is 7 or 8.

A. $\frac{15}{72}$

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

C. $\frac{19}{72}$

D. $\frac{19}{36}$

Answer: C

Watch Video Solution

72. Probability of independent events is $P(A_i) = \frac{1}{i+1}$. Where i = 1, 2, 3 ... n, probability of an event that at least one event occurs is .....

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

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

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

D. None of these

Answer: C

Watch Video Solution

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

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

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

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

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

Answer: D

Watch Video Solution

74. A purse contains 4 copper and 3 silver coins while another purse contains 6 copper and 2 silver coins. A purse is drawn at random and coin is drawn. Then ..... is the probability that selected coin is of copper.

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

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

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

D. $\frac{37}{56}$

Answer: D

Watch Video Solution

75. In the box there are a white and b black balls. Two persons A and B takes ball one after the other and each time ball is placed back in box. Person A starts the game. If white ball is obtained then

person A wins the game probability of winning game by person A is double then the winning probability of person B. Then $a:b=$ .....

A. $1:2$

B. $2:1$

C. $1:1$

D. $1:3$

Answer: C

Watch Video Solution

76. The probability of an event that person hits the target is $\frac{1}{4}$. He hits target at least n times. The probability that to hit target n times is more than $\frac{2}{3}$ then minimum value of n is .....

A. 2

B. 4

C. 6

D. 8

Answer: B

Watch Video Solution

77. Each element of the second order determinant is 1 and - 1 then ..... is the probability that value of determinant is not zero.

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

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

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

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

Answer: A

Watch Video Solution

78. A coin is tossed 2n times. During the toss any person can't get head and tail with equal numbers. Its probability is .....

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

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79. For events E and F if $P(E) \leq P(F)$ and $P(E \cap F) > 0$ then .....

A. E occurs $\Rightarrow$ F occurs

B. F occurs $\Rightarrow$ E occurs

C. E does not occurs $\Rightarrow$ F does not occurs

D. None of above is valid

Answer: D

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80. The probability that a student is not a swimmer is $\frac{4}{5}$. The probability that out of 5 students exactly 4 are swimmers is .....

A. $\left(\frac{1}{5}\right)^3$

B. $4\left(\frac{1}{5}\right)^4$

C. ${}_5C_4\left(\frac{4}{5}\right)^4$

D. $\left(\frac{4}{5}\right)^4$

Answer: B

Watch Video Solution

81. The probability distribution of random variable X is as follows.

$X = x$	0	1	2	3
$p(x)$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{8}$

Then possible value of $E(2X + 3)$ .....

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

B. 1

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

D. 6

Answer: D

Watch Video Solution

82. Mean and variance of binomial distribution of random variance X are 4 and 2 respectively then $P(X = 1) =$ .....

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

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

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

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

Answer: D

Watch Video Solution

83. In experiment probability that event A occurs in first trail is 0.4 then ..... is the probability that in three independent trial event A occurs.

A. 0.936

B. 0.784

C. 0.904

D. 0.874

Answer: B

Watch Video Solution

84. Probability distribution of random variable X is as follows :

$X = x$	0	1	2	3
$p(x)$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{8}$

Then variance of $g(X) = 2X + 3$ .....

A. 6

B. 36

C. 4

D. 8

Answer: C

Watch Video Solution

85. A random variable X has the probability distribution:

X = x	1	2	3	4	5	6	7	8
$p(x)$	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

For the events E = { X is a prime number } and $F = \{X < 4\}$, the probability $P(E \cup F)$ is .....

A. 0.35

B. 0.77

C. 0.87

D. 0.50

Answer: B

Watch Video Solution

86. If a random variable X can take all non- negative integral values and the probability that X takes the value r is proportional to $\alpha^r (0 < \alpha < 1)$ then $P(X = 0)$ is .....

A. $1 - \alpha$

B. α

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

D. α^2

Answer: A

Watch Video Solution

87. The mean and standard deviation of a random variable X are 10 and 5 respectively. Match the following.

A		B	
(i)	$E(X^2)$	(p)	0
(ii)	$E(X(X+1))$	(q)	135
(iii)	$E\left(\left(\frac{X-10}{5}\right)\right)$	(r)	125
(iv)	$E\left(\left(\frac{X-10}{5}\right)^2\right)$	(s)	1

A. $(i):(q),(ii):(r),(iii):(p),(iv):(s)$

B. $(i):(r),(ii):(q),(iii):(s),(iv):(p)$

C. $(i):(r),(ii):(q),(iii):(p),(iv):(s)$

D. $(i):(p),(ii):(q),(iii):(r),(iv):(s)$

Answer: C

Watch Video Solution

88. The probability distribution of a random variable X is given below :

$X = x$	-2	-1	0	1	2	3
$p(x)$	$\frac{1}{10}$	k	$\frac{1}{5}$	$2k$	$\frac{3}{10}$	k

The value of k is .....

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

B. $\frac{2}{10}$

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

D. $\frac{7}{10}$

Answer: A

Watch Video Solution

89. Mean of the following probability distribution is

.....

$X = x_i$	1	2	3
$p(x_i)$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{8}$

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

B. $\frac{19}{8}$

C. 1

D. $\frac{51}{8}$

Answer: B

Watch Video Solution

90. A fair dice is rolled 6 times. If "getting an even number" is a success the probability of 5 successes is .....

A. $\frac{5}{64}$

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

C. $\frac{63}{64}$

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

Answer: B

Watch Video Solution

91. A fair dice is rolled 6 times. If "getting a prime number" is a "success" , the probability of no seccess is .....

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

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

C. $\frac{63}{64}$

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

Answer: A

Watch Video Solution

92. A bag consists of 10 balls each marked with one e digits 0 to 9. If four balls are drawn successively with replacement from the bag, what is the probability that none is marked with the digit 0?

A. $\frac{1}{(10)^5}$

B. $\frac{9}{(10)^4}$

C. $\left(\frac{9}{10}\right)^4$

D. $\frac{9^4}{10^5}$

Answer: C

Watch Video Solution

93. Mean of the binomial distribution is 100 then it standard deviation lies in ..... interval.

A. $(0, 10)$

B. $(0, 1)$

C. $(0, 100)$

D. $(-10, 10)$

Answer: A

Watch Video Solution

94. In a box there are 100 electric bulbs out of which 10 are defective. 5 bulbs are selected from it then .....is the probability that bulb is defective.

A. 10^{-1}

B. $\left(\frac{1}{2}\right)^5$

C. $\left(\frac{9}{10}\right)^5$

D. $\frac{9}{10}$

Answer: C

Watch Video Solution

95. Mean and variance of one binomial distribution are $\frac{4}{3}$ and $\frac{20}{21}$ respectively then p = ... where p is parameter.

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

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

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

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

Answer: B

Watch Video Solution

96. Probability distribution of a discrete random variable X is given in the following table.

X = x	−3	−2	−1	0	1	2	3
P(x)	0.08	0.14	0.19	0.27	0.17	0.09	0.06

1) Find the probability of random variable X assuming negative values.

2) Find the value of $P(0 \leq x \leq 3)$

A. 0.40, 0.53

B. 0.39, 0.50

C. 0.41, 0.54

D. 0.41, 0.59

Answer: D

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97. Mean and variance of binomial distribution are 3 and 2 respectively then parameter n is .....

A. 9

B. 3

C. 8

D. 6

Answer: A

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98. The probability function of the binomial distribution is $P(x) = \binom{6}{x} p^x q^{6-x}, x = 0, 1, 2, \ldots\ldots, 6.$ If $2P(2) = 3P(3)$ then value of q is .....

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

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

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

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

Answer: D

Watch Video Solution

99. Let X be the random variable with following probability distribution.

$\therefore E(X^2) = ...$

X = x	1	2	3	4	5
P(x)	0.1	0.1	0.2	0.3	0.3

A. 3.6

B. 24.6

C. 14.6

D. 14.8

Answer: C

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100. The mean and standard deviation of a random variable X are given by E(X) = 5 and $\sigma_x = 3$ respectively, then

$(1) E\left(X^2\right) = \ldots\ldots$

(2) $E\left[(3X-2)^2\right] = \ldots\ldots\ldots$

(3) $V(3-2X) = \ldots\ldots\ldots\ldots$

A. (1) 34, (2) 250, (3) 36

B. (1) 34, (2) 370, (3) 81

C. (1) 34, (2) 370, (3) 36

D. (1) 34, (2) 250, (3) 81

Answer: A

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101. Let X be a random variable with probability distribution.

X = x	0	1	2	3
P(x)	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{8}$

then $E(5X-2) =$ ..... .

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

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

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

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

Answer: B

Watch Video Solution

102. Two balanced dice are tossed 500 times. If sum of integers obtained on dice is 9 will be the success then .....and .....are the mean and variance of success.

A. $\frac{500}{9}$ and $\frac{4000}{81}$

B. $\frac{1}{9}$ and $\frac{8}{9}$

C. $\frac{4000}{81}$ and $\frac{500}{9}$

D. $\frac{500}{9}$ and $\frac{4000}{9}$

Answer: A

Watch Video Solution

103. A probability distribution of random variable X is as follows.

X = x	0	1	2	3	4	5	6	7
P(x)	0	b	$2b$	$2b$	$3b$	b^2	$2b^2$	$7b^2+b$

$b = \ldots\ldots, E(X) = \ldots\ldots$

A. 0.1, 3.66

B. 0.1, 16.8

C. 0.01, 3.66

D. 0.01, 3.4

Answer: A

104. A man takes a step forward with probability 0.4 and backwards with probability 0.6. Find probability that at the end of 11 steps he is just one step away from the starting point.

A. $462 \times (0.24)^5$

B. $462 \times (0.24)^4$

C. $462 \times (0.24)^6$

D. $264 \times (0.24)^5$

Answer: A

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105. ω is the cube root of 1 and $\omega \neq 1$. Now r_1, r_2 and r_3 are the number obtained while tossing dice thrice. Then ..... is the probability for $\omega^{r^1} + \omega^{r^2} + \omega^{r^3} = 0$

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

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

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

D. $\frac{3}{36}$

Answer: C

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106. One number is selected from the set

$S = \{1, 2, 3, \ldots, 50\}$

$A = \left\{n \in S / n + \frac{50}{n} > 27\right\}$

$B = \{n \in S / n \text{ is prime number}\}$

$C = \{n \in S / n \text{ is perfect square}\}$

Then .....of the following probability relation is valid

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

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

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

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

Answer: B

View Text Solution

107. In binomial distribution of random variable X if

mean = np and variances = npq then

$$\frac{P(X=k)}{P(X=k-1)} = \ldots\ldots$$

A. $\frac{n-k}{k-1} \times \frac{p}{q}$

B. $\frac{n-k+1}{k} \times \frac{p}{q}$

C. $\frac{n+1}{k} \times \frac{p}{q}$

D. $\frac{n-1}{k+1} \times \frac{p}{q}$

Answer: B

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108. In binomial distribution of random variable X if parameter n = 5 and $p(X = 1) = 8p(X = 3)$, then P = ...

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

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

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

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

Answer: B

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109. Random variable X takes integer values from 1 to n with equal probabilities then $E(X) = \ldots\ldots\ldots$

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

B. 0

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

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

Answer: D

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110. 8 coins are tossed togather. Then ..... is the probability of an event that head H comes up at least 6 times.

A. $\frac{57}{64}$

B. $\frac{229}{256}$

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

D. $\frac{37}{256}$

Answer: D

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111. Mean and variance of the binomial distribution is 4 and 3 respectively. Then ..... is the probability for $X = 6$

A. $16C_6\left(\frac{1}{4}\right)^{10}\left(\frac{3}{4}\right)^{6}$

B. $16C_6\left(\frac{1}{4}\right)^{6}\left(\frac{3}{4}\right)^{10}$

C. $17C_6\left(\frac{1}{4}\right)^{10}\left(\frac{3}{4}\right)^{4}$

D. $12C_6\left(\frac{1}{4}\right)^{6}\left(\frac{3}{4}\right)^{6}$

Answer: B

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112. One ticket is selected from pack of 100 tickets numbered with 00, 01, 02, 03 ... 99. If X and Y denotes the sum and product of numbers obtain on it then $P\left(\frac{X=7}{Y=0}\right) =$ .....

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

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

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

D. None of these

Answer: B

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113. Mean and variance of variable X of the binomial distribution are $\frac{7}{3}$ and $\frac{14}{9}$. Then ..... is the probability for $X = 6$ or 7.

A. $\frac{1}{729}$

B. $\frac{5}{729}$

C. $\frac{7}{729}$

D. $\frac{13}{729}$

Answer: B

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114. X and Y are independent binomial variables. $B\left(5, \frac{1}{2}\right)$ and $B\left(7, \frac{1}{2}\right)$ then $P(X+Y=3) =$

.....

A. $\frac{55}{1024}$

B. $\frac{55}{4049}$

C. $\frac{55}{2048}$

D. None of these

Answer: A

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115. 10 % bulbs are defective produced by some factory. 5 bulbs are selected at random then ..... is the probability that bulb is without defect.

A. $\left(\frac{1}{2}\right)^5$

B. $\left(\frac{1}{10}\right)^5$

C. $\frac{9}{10}$

D. $\left(\frac{9}{10}\right)^5$

Answer: D

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116. Match the following Section I to Section II

Section-I	Section-II
(i) For binomial distribution $B\left(5, \frac{4}{5}\right)$ Variance is V and standard deviation is S then	(1) $\sqrt{\frac{V^2+S^2}{V^2-S^2}}=7$
(ii) For binomial distribution $B\left(5, \frac{3}{5}\right)$ Variance is V and standard deviation is S then	(2) $\sqrt{\frac{S^2+V^2}{S^2-V^2}}=3$
(iii) For binomial distribution $B\left(25, \frac{24}{25}\right)$ Variance is V and standard deviation is S then	(3) $5(V^2-S^2)=S^2$

A. $(i) \to (3), (ii) \to (1), (iii) \to (2)$

B. $(i) \to (2), (ii) \to (3), (iii) \to (1)$

C. $(i) \to (2), (ii) \to (1), (iii) \to (3)$

D. $(i) \to (1), (ii) \to (3), (iii) \to (2)$

Answer: B

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117. A coin is tossed 19 times random variable X denotes the numbers of heads on it Then for ..... value of r for $P(X = r)$ is maximum.

A. 12

B. 9

C. 15

D. 19

Answer: B

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118. Mean and variance of random variable X are 2 and 1 respectively. Then ..... is the probability that X takes more than one value.

A. $\frac{11}{16}$

B. $\frac{5}{16}$

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

D. $\frac{13}{16}$

Answer: A

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119. Parameters of binomial distribution of variable X are $2n+1$ and $p=\frac{1}{2}$. Then ..... Is the probability that random variable X takes odd numbers.

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

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

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

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

Answer: A

View Text Solution

120. A coin is tossed for some times. Probability to get head 7 times is the same as probability to get head 9 times then ..... is the probability to get head two times.

A. $\frac{15}{28}$

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

C. $\frac{15}{2^{13}}$

D. None of these

Answer: C

Watch Video Solution

121. The sum and product of mean and variance of one binomial distribution is 24 and 128 then parameters of distribution are .....

A. $\left(\frac{1}{7}+\frac{1}{8}\right)^{12}$

B. $\left(\frac{1}{4}+\frac{3}{4}\right)^{12}$

C. $\left(\frac{1}{6}+\frac{5}{6}\right)^{24}$

D. $\left(\frac{1}{2}+\frac{1}{2}\right)^{32}$

Answer: D

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122. A dice is tossed 100 times. If even number is obtained on dice is success then variance of success is .....

A. 10

B. 20

C. 25

D. 50

Answer: C

Watch Video Solution

123. If P(E) = 0.8, P(F) = 0.5 and $P(E \cap F) = 0.4$ then $P(E/F) = \ldots\ldots\ldots$

A. 0.80

B. 0.32

C. 0.64

D. 0.98

Answer: C

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124. A random variable X has the following probability distribution :

X	0	1	2	3	4
P(X)	0.1	k	$2k$	$2k$	0.15

then $P(X \leq 1) = \ldots\ldots\ldots$

A. 0.55

B. 0.25

C. 0.15

D. 0.75

Answer: B

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125. Choose the correct answer

The probability of obtaining an even prime number on each die, when a pair of dice is rolled is

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

B. 0

C. 1

D. $\frac{35}{36}$

Answer: A

 Watch Video Solution

126. An unbiased coin is tossed 5 times. Suppose that a variable X is assigned the value k when k consecutive heads are obtained for $k = 3, 4, 5$

otherwise X takes the value -1. The expected value of X, is .....

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

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

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

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

Answer: A

View Text Solution

127. In a workshop, there are five machines and the probability of any one of them to be out of service on a day is $\frac{1}{4}$. If the probability that at most two machines will be out of service on the same day is $\left(\frac{3}{4}\right)^3 k$ then k is equal to :

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

B. 4

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

D. $\frac{17}{8}$

Answer: D

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128. If the foot of perpendicular drawn from the point $(1, 0, 3)$ on a line passing through $(\alpha, 7, 1)$ is $\left(\frac{5}{3}, \frac{7}{3}, \frac{17}{3}\right)$, then α is equal to .....

A. 3

B. 6

C. 5

D. 4

Answer: D

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Practice Paper 13 Section A Choose The Correct Option

1. If $P(A) = \frac{6}{11}, P(B) = \frac{5}{11}$ amd $P(A \cup B) = \frac{7}{11}$, find

(i) $P(A \cap B)$ (ii) P(A|B) (iii) P(B|A)

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

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

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

D. $\frac{9}{11}$

Answer: A

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2. Evaluate $P(A \cup B)$, if $2P(A) = P(B) = \frac{5}{13}$ and $P(A \mid B) = \frac{2}{5}$.

A. $\frac{5}{26}$

B. $\frac{3}{26}$

C. $\frac{11}{26}$

D. $\frac{1}{26}$

Answer: C

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3. Three faces of dice are marked integer 1, two faces are marked integer 2 and one face is marked with integer 5. Then find the mean of an event of getting number on dice while tossing.

A. 2

B. 4

C. 6

D. 8

Answer: A

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4. Out of 100 bulbs in a box 10 bulbs are defective. Five bulbs are selected at random from it. Then find the probability of an event that selected bulb is of without defect.

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

B. $\left(\frac{1}{10}\right)^{10}$

C. $\left(\frac{9}{10}\right)^{5}$

D. $\left(\frac{1}{10}\right)^{5}$

Answer: C

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5. Mean and standard deviation of the random variable X are $\frac{7}{3}$ and $\frac{14}{9}$ respectively. Then find value of n and p.

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

B. $7, \frac{2}{3}$

C. $5, \frac{1}{3}$

D. $5, \frac{2}{3}$

Answer: A

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6. Mean and variance of random variable X are 2 and 1 respectively. Then ..... is the probability that X takes more than one value.

A. $\frac{11}{16}$

B. $\frac{5}{16}$

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

D. $\frac{13}{16}$

Answer: A

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Practice Paper 13 Section B Answer The Following Questions

1. A couple has two children,

(i) Find the probability that both children are males, if it is known that at least one of the children is male.

(ii) Find the probability that both children are females, if it is known that the elder child is a female.

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2. Given that the events A and B are such that $P(A) = \frac{1}{2}, P(A \cap B) = \frac{3}{5}$. And P(B)= p. Find p if they are (i) mutually exclusive (ii) independent.

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3. Find mean of following probability distribution.

X :	1	2	3	4
P(x) :	$\frac{1}{8}$	$\frac{2}{8}$	$\frac{3}{8}$	$\frac{2}{8}$

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4. Find the probability of getting 5 exactly twice in 7 throws of a die.

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Practice Paper 13 Section C Answer The Following Questions

1. Bag I contains 3 red and 4 black balls and Bag II contains 4 red and 5 black balls. One ball is transferred from Bag I to Bag II and then a ball is drawn from Bag II. The ball so drawn is found to be

red in colour. Find the probability that the transferred ball is black.

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

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3. Let a pair of dice be thrown and the random variable X be the sum of the numbers that appear

on the two dice. Find the mean or expectation of X.

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4. On a multiple choice examination with three possible answers for each of the five questions, what is the probability that a candidate would get four or more correct answers just by guessing?

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Practice Paper 13 Section D Answer The Following Questions

1. In a game, a man wins a rupee for a six and loses a rupee for any other number when a fair die is thrown. The man decided to throw a die thrice but to quit as and when he gets a six. Find the expected value of the amount he wins/loses.

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2. 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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