MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

PROBABILITY

Solved Examples And Exercises

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1. A pair of dice is thrown. Let E be the event that the sum is greater than or equal to 10 and F be the event 5 appears on the first - die. Find $P\left(\dfrac{E}{E}\right)$. if F is the event 5 appears on at least one die, find $P\left(\dfrac{E}{F}\right)$.

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2. The probability that a student selected at random from class will pass in Mathematics is 4/5, and the probability that he/she passes in

Mathematics and Computer Science is ½. What is the probability that he/she will pass in Computer Science if it is known that he/she has passed in Mathematics?

3. Ten cards numbered 1 through 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?

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

5. A coin is tossed thrice and all the eight outcomes are assumed equally likely. In which of the following cases are the following events A and B are independent?

A= the first thrown results in head, B= the last thrown results in tail

A= the number of heads is odd, B= the number of tails is odd

A= the number of heads is two, B= the last throw results in head

6. In a school there are 1000 students, out of which 430 are girls. It is known that out of 430, 10% of the girls study in class XII. What is the probability that a student chosen randomly studies in class XII given that the chosen student is a girl?

7. Prove that in throwing a pair of dice, the occurrence of the number 4 on the first die is independent of the occurrence of 5 on the second die.

8. if A and B be two events such that $P(A) = \dfrac{1}{4}, P(B) = \dfrac{1}{3}$ and $P(A \cup B) = \dfrac{1}{2}$, show that A and B are independent events.

9. A bag contains 4 white, 7 black and 5 red balls. Three balls are drawn one after the other without replacement. Find the probability that the balls drawn are white, black and red respectively.

10. A coin is tossed three times. Let the events A, B and C be defined as follows: $A = $ first toss is head, $B = $ second toss is head, and $C = $ exactly two heads are tossed in a row. Check the independence of $A\&B$ $B\&C$ $C\&A$

11. A card is drawn from a well-shuffled deck of 52 cards and then a second card is drawn. Find the probability that the first card is a heart and the second card is a diamond if the first card is not replaced.

12. 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 fox containing 15 oranges out of which 12 are good and 3 are bad ones will be approved for sale.

13. A coin is tossed three times. Find $P\left(\dfrac{A}{B}\right)$ in each of the following:

$A =$ Head on third toss, $B =$ Head on first two tosses $A =$ At least

two head, $B =$ At most two heads. $A =$ At most two tails, $B =$ At least one tail.

14. Two coins are tossed once. Find $P\left(\dfrac{A}{B}\right)$ in each of the following : (i) $A =$ Tail appears on one coin, $B =$ One coin shows head. (ii) $A =$ No tail appears, $B =$ No head appears.

15. If $P(A) = 0.4, P(B) = 0.8, P\left(\dfrac{B}{A}\right) = 0.6.$ Find $P\left(\dfrac{A}{B}\right)$ and $(A \cup B)$.

16. If A and B are two events such that $2P(A) = P(B) = \dfrac{5}{13}$ and $P\left(\dfrac{A}{B}\right) = \dfrac{2}{5}$, find $P(A \cup B)$.

17. If $P(A) = \dfrac{6}{11}$, $P(B) = \dfrac{5}{11}$ and $P(A \cup B) = \dfrac{7}{11}$, find $P(A \cap B)$, $P\left(\dfrac{A}{B}\right)$, $P\left(\dfrac{B}{A}\right)$

18. If $P(A) = \dfrac{7}{13}$, $P(B) = \dfrac{9}{13}$ and $P(A \cap B) = \dfrac{4}{13}$, find $P\left(\dfrac{A}{B}\right)$.

19. If A and B are events such that $P(A) = 0.6, P(B) = 0.3$ and $P(A \cap B) = 0.2$, find $P\left(\dfrac{A}{B}\right)$ and $P\left(\dfrac{B}{A}\right)$.

20. If A and B are two events such that $P(A \cap B) = 0.32$ and $P(B) = 0.5$, find $P\left(\dfrac{A}{B}\right)$.

21. A bag contains 20 tickets, numbered from 1 to 20. Two tickets are drawn without replacement. What is the probability that the first ticket has an even number and the second an odd number.

22. Two cards are drawn without replacement from a pack of 52 cards. Find the probability that i)both are kings ii)the first is a king and the second is an ace iii)the first is a heart and second is red.

23. From a deck of cards, three cards are drawn on by one without replacement. Find the probability that each time it is a card of spade.

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24. A bag contains 25 tickets, numbered from 1 to 25. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will show even numbers.

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25. Find the chance of drawing 2 white balls in succession from a bag containing 5 red and 7 white balls, the ball first drawn not being replaced.

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26. From a pack of 52 cards, 4 are drawn one by one without replacement. Find the probability that all are aces (or, kings).

27. From a pack of 52 cards, two are drawn one by one without replacement. Find the probability that both of them are kings.

28. A bag contains 5 white, 7 red and 3 black balls. If three balls are drawn one by one without replacement, find the probability that none is red.

29. An urn contains 3 white, 4 red and 5 black balls. Two balls are drawn one by one without replacement. What is the probability that at least one

ball is black?

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30. Compute $P\left(\dfrac{A}{B}\right)$, if $P(B) = 0.5$ and $P(A \cap B) = 0.32$

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31. If $P(A) = 0.4$, $P(B) = 0.3$ and $P\left(\dfrac{B}{A}\right) = 0.5$, find $P(A \cap B)$ and $P\left(\dfrac{A}{B}\right)$.

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32. A coin is tossed three times, if head occurs on first two tosses, find the probability of getting head on third toss.

33. A die is thrown three times, find the probability that 4 appears on the third toss if it is given that 6 and 5 appear respectively on first two tosses.

34. 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'.

35. Ten cards numbered 1 through 10 are placed in 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?

36. If A and B are two events such that $P(A) = \dfrac{1}{3}$, $P(B) = \dfrac{1}{5}$ and $P(A \cup B) = \dfrac{11}{30}$, Find $P\left(\dfrac{A}{B}\right)$ and $P\left(\dfrac{B}{A}\right)$.

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37. A couple has two children. Find the probability that both the children are (i) males, if it is known that at least one of the children is male. (ii) females, if it is known that the elder child is a female.

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38. Two numbers are selected at random from integers 1 through 9. If the sum is even, find the probability that both the numbers are odd.

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39. Find the probability that the sum of the numbers showing on two dice is 8, given that at least one die does not show five.

40. A pair of dice is thrown. Find the probability of getting the sum 8 or more, if 4 appears on the first die.

41. A die is rolled. If the outcome is an odd number, what is the probability that it is prime?

42. A pair of dice is thrown. Find the probability of getting 7 as the sum of it is known that hte second die always exhibits a prime number.

43. A pair of dice is thrown. Find the probability of getting 7 as the sum, if it is known that the second die always exhibits an odd number.

44. 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?

45. Mother, father and son line up at random for a family picture. If A and B are two events given by $A =$ Son on one end, $B =$ Father in the middle, find $P(A/B)$ and $P(B/A)$

46. A die is thrown three times. Find $P(A/B)$ and $P(B/A)$, if $A = 4$ appears on the third toss, $B = 6$ and 5 appear respectively on first two tosses.

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47. Two persons A and B throw a die alternately till one of them gets a 'three' and wins the game. Find their respectively probabilities of winning, if a begins.

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48. A doctor claims of 60% of the patients he examines are allergic to some type of weed. What is the probability that (i) exactly 3 of his next 4 patients are allergic to weeds? (ii) none of his next 4 patients is allergic to weeds?

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49. A clerk was asked to mail three report cards to three students. He addresses three envelopes but unfortunately paid no attention to which report card be put in which envelope. What is the probability that exactly one of the students received his or her own card?

50. There are three urns A, B and C. Urn A contains 4 white balls and 5 blue balls. Urn B contains 4 white balls and 3 blue balls. Urn C contains 2 white balls and 4 balls. One ball is drawn from each of these urns. What is the probability that out of these three balls drawn, two are white balls and one is a blue ball?

51. A bag contains 3 White, 3 black and 2 red balls. One by one three balls are drawn without replacement. Find the probability that third ballis red

52. The odds against a husband who is 45 years old, living till he is 70 are 7:5 and the odds against his wife who is now 36, living till she is 61 are 5:3. Find the probability that the couple will be alive 25 years hence, exactly one of them will be alive 25 years hence, none of them will be alive 25 years hence, at least one of them will be alive 25 years hence.

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53. A, B and C shot to hit a target. If A hits the target 4 times in 5 trails, B hit it 3 times in 4 trials and C hits 2 time in 3 trials; what is the probability that the target is hit by a least 2 person?

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

the majority are in favour of the book.

55. The probabilities of A, B and C solving a problem are 1/3, 2/7 and 3/8 respectively. If all the thee try to solve the problem simultaneously, find the probability that exactly one of them can solve it.
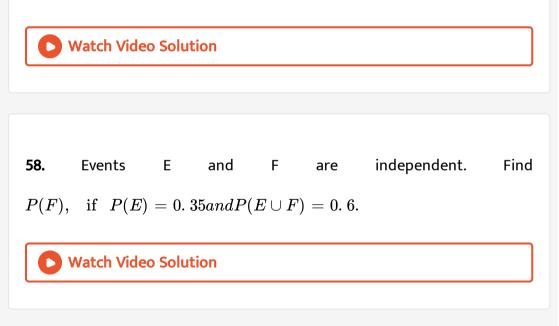
56. Three groups of children contain 3 girls and 1 boy; 2 girls and 2 boys; 1 girl and 3 boys respectively. One child is selected at random from each group. Find the chance that the three selected comprise one girl and 2 boys.

57. In the two dice experiment, if A is the event of getting the sum of the numbers on dice as 11 and B is the event of getting a number other that 5 on the first die, find $P(A \text{ and } B)$ Are A and B independent events? OR Two dice are tossed. Find whether the following two events A and B are independent:

$A = \{(x, y) : x + y = 11\}$, $B = \{(x, y) : x \neq 5\}$, $where(x, y)$ denote a typical sample point.

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58. Events E and F are independent. Find $P(F)$, if $P(E) = 0.35 and P(E \cup F) = 0.6$.

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59. Two dice are thrown together. Let A be the event getting 6 on the first die and B the event getting 2 on the second die. Are the events A and B independent?

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

$P(1) = P(2) = \dfrac{2}{10}, P(3) = P(5) = P(6) = \dfrac{1}{10} and P(4) = \dfrac{3}{10}$ The

die is thrown two times. Let A and B be the events as defined below

A=Getting same number each time, B=Getting a total score of 10 or more.

Determine whether or not A and B are independent events.

61. A and B are two candidates seeking admission in a college. The

probability that A is selected is 0.7 and the probability that exactly one of

them is selected is 0.6. Find the probability that B is selected.

62. A bag contains 5 white, 7 red and 4 black balls. If four balls are drawn

one by one with replacement, what is the probability that none is white?

63. If $P(A) = 0.4, P(B) = p, P(A \cup B) = 0.6 and A and B$ are given to be independent events, find the value of $p.$

64. Let A and B be two independent events. The probability of their simultaneous occurrence is 1/8 and the probability that neither occurs is 3/8. Find $P(A) and P(B).$

65. A class consists of 80 students, 25 of them are girls and 55 are boys. If 10 of them are rich and the remaining are poor and also 20 of them are intelligent, then the probability of selecting an intelligent rich girls is $5/128$ b. $25/128$ c. $5/512$ d. none of these

66. Two dice are thrown. Find the probability of getting an odd number on the first die and a multiple of 3 on the other.

67. A scientist has to make a decision on each f the two independent events I and II. Suppose the probability of error in making decision on event I is 0.02 and that on event II is 0.05. Find the probability that he scientist will make the correct decision on (i) both events (ii) only one event

68. In two successive throws of a pair of dice, determine the probability of getting a total of 8 each time.

69. A, B and C shot to hit a target. If A hits the target 4 times in 5 trails, B hit it 3 times in 4 trials and C hits 2 time in 3 trials; what is the probability that the target is hit by a least 2 person?

70. A company has estimated that the probabilities of success fro there products introduced in the market are $\frac{1}{3}, \frac{2}{5} and \frac{2}{3}$ respectively. Assuming independence, find the probability that the three products are successful. none of the products is successful,

71. A can solve 90% of the problems given in a book and B can solve 70%. What is the probability that at least one of them will solve the problem, selected at random from the book?

72. A bag contains 5 white, 7 red and 8 black balls. Four balls are drawn one by one with replacement, what is the probability that at least one is white?

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

74. The operates if all of its three components function. The probability that the first component fails during the year is 0.14, the second component fails is 0.10 and the third component fails is 0.05. What is the probability that the machine will fail during the year?

75. An anti aircraft gun take four shots at an enemy plane moving away from it. The probability of hitting the plane at the first, second, third and fourth shot are 0.4, 0.3, 0.2 and 0.1 respectively. The probability that the gun hit the plane is :- (A) 0.25 (B) 0.21 (C) 0.16 (D) 0.6976

76. An article manufactured by a company consists of two parts X and Y. In the process of manufacture of the part X, 9 out of 100 parts may be defective. Similarly, 5 out of 100 are likely to be defective in the manufacture of part Y. Calculate the probability that the assembled product will not be defective.

77. To test the quality of electric bulbs produced in as factory, two bulbs are randomly selected from a large sample without replacement. If either bulb is defective, the entire lot is rejected. Suppose a sample of 200 bulbs contains 5 defective bulbs. Find the probability that the sample will be rejected.

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

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79. If $A \, and \, B$ are two events such that $P(A) = 0.\,5, \, P(B) = 0.\,6 \, and \, P(A \cup B) = 0.\,8$, find $P(A/B)$

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80. If P(notA) = 0.7, $P(B) = 0.7 and P(B/A) = 0.5$, then find $P(A/B) and P(A \cup B)$.

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

82. A fair dice is rolled. Consider the following events: A={1,3,5},B={2,3} and C={2,3,4,5} Find (i) $\left(P\left(\dfrac{A}{B} \right) \text{ and } P\left(\dfrac{B}{C} \right) \right)$ (ii) $P\left(\dfrac{A}{C} \right)$ and $P\left(\dfrac{C}{A} \right)$ (iii) $P\left(\dfrac{A \cup B}{C} \right)$ and $P\left(\dfrac{A \cap B}{C} \right)$ (iv) $P\left(\dfrac{A \cap B}{C} \right)$

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

84. A die is rolled twice and the sum of the numbers appearing on them is observed to be 7. What is the conditional probability that the number 2 has appeared at least once?

85. 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.

86. Two integers are selected at random from integers 1 through 11. If the sum is even, find the probability that both the numbers are odd.

87. A factor has three machines A, B and C, which produce 100,200, and 300 items of a particular type daily. The machines produce 2%, 3% and 5% defective items respectively. One day when the production was over, an item was picked up randomly and it was found to be defective. Find the probability that it was produced by machine A.

88. A company has tow plant to manufacture bicycles. The first plant manufactures 60% of the bicycles and the second plant 40%. Out of that 80% of the bicycles are rated of standard quality at the first plant and 90% of standard quality at the second plant. A bicycle is picked up at

random and found to be standard quality. Find the probability that it comes from the second plant.

89. For A, B and C the chances of being selected as the manager of a firm are in the ratio 4:1:2 respectively. The respective probabilities fro them to introduce a radical change in marketing strategy are 0.3, 0.8, and 0.5. if the change does take place, find the probability that it is due to the appointment of B or C.

90. A bag contains 1 white and 6 red balls, and a second bag contains 4 white and 3 red balls. One of the bags is picked up at random and a ball is randomly drawn from it, and is found to be white in colour. Find the probability that the drawn ball was from the first bag.

91. A man is known to speak truth 3 out of 4 times. He throws a die and report that it is a 6. Find the probability that it is actually 6.

92. By examining the chest X-ray, probability that T.B is detected when a person is actually suffering is 0.99. the probability that the doctor diagnoses incorrectly that a person has T.B. on the basis of X-ray is 0.001. in a certain city 1 in 100 persons suffers from T.B. A person is selected at random is diagnosed to have T.B. What is the chance that he actually has T.B.?

93. 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 with probability 1/4. what is the probability that the student knows the answer given that he answers correctly.?

94. An instructor has a test bank consisting of 300 easy True/False questions, 200 difficult True/False questions, 500 easy multiple choice questions (MCQ) and 400 difficult multiple choice questions. If a questions is selected at random from the test bank, what is the probability that it will be an easy question given that it is a multiple choice question.

95. A committee of 4 students is selected at random from a grourp consisting of 8 boys and 4 girls. Given that there is at least one girl in the committee, calculate the probability that there are exactly 2 girls in the committee.

96. A bag contains 3 red and 4 black balls and another bag has 4 red and 2 black balls. One bag is selected at random and from the selected bag a ball is drawn. Let A be the event that the first bag is selected, B be the event that the second bag is selected and C be the event that the ball drawn is red. Find $P(A), P(C/A)$ and $P(C/B)$.

97. 10% of the bulbs produced in a factory are of red colour and 2% are red and defective. If one bulb is picked at random, determine the probability of its being defective if it red.

98. Three distinguishable balls are distributed in 3 cells. The probability that all three occupy the same cell, given that atleast two of them are in

same cell. (A)$\dfrac{1}{7}$ (B)$\dfrac{1}{9}$ (C)$\dfrac{1}{6}$ (D)None of these

99. An electronic assembly consists of two sub-systems say A and B. From previous testing procedures, the following probabilities are assumed to be known. $P(A \text{ fails}) = 0.2$, $P(B \text{ fails alone}) = 0.15$, $P(A \text{ and } B \text{ Fail}) = 0.15$. Evaluate the following probabilities: (i)$P(A \text{ fails}/B \text{ has failed })$ (ii) $P(A \text{ fails alone})$

100. Three dice are thrown at the same time. Find the probability of getting three two's if it is known that the sum of the numbers on the dice was a six.

101. A die is thrown three times. Events A and B are defined as follows: 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.

102. An urn contains four tickets with numbers 112, 1121, 211, 222 and one ticket is drawn. Let $A_i(i = 1, 2, 3)$ be the event that the ith digit of the number on ticket drawn is 1. Discuss the independence of the events A_1, A_2, A_3

103. 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 probability of the event the coin shows a tail, given that at least one die shows a 3.

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

105. An item is manufactured by three machines A, B and C. Out of hte total number of items manufactured during a specified period, 50% are manufacture on machine 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 n C are defective. All the items 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?

106. A letter is known to come either from TATANAGAR or CALCUTTA. On the envelope, Just to consecutive letters TA are visible. What is the probability that the letter came from TATANAGAR ?

107. Urn A contains 2 white, 1 black and 3 red balls, urn B contains 3 white, 2 black and 4 red balls and urn C contains 4 white, 3 black and 2 red balls. One urn is chosen at random and 2 balls are drawn at random from the urn. If the chosen balls happen to be red and black, what is the probability that both balls come from urn B?

108. There are 3 bags, each containing 5 white balls and 3 black balls. Also there are 2 bags, each containing 2 white balls and 4 black balls. A white ball is drawn at random. Find the probability that this white ball is from a bag of the first group.

109. A shopkeeper sells three types of seeds A_1, $A_2 and A_3$ They are sold as a mixture where the proportions are 4:4:2 respectively. The germination rate of three types of seeds are 45%, 60% and 35%. Calculate the probability (i)that it will germinate given that the seed is of type A_3 . (ii)of a randomly chosen seed to germinate. (iii)That it is of type A_2 given that a randomly chosen seed does not germinate.

110. For any two events A and B associated to a random experiment, $P(A) = 0.5$, $P(B) = 0.3$ and $P(A \cap B) = 0.2$. Find P(A∪B).
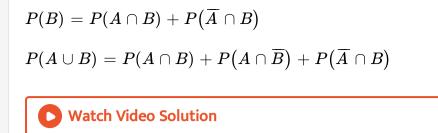
111. For any two events A and B associated to a random experiment, prove that:
$$P(A) = P(A \cap B) + P(A \cap \overline{B})$$

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

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

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112. The probability of simultaneous occurrence of at least one of two events A and B is p. If the probability that exactly one of A, B occurs is q then prove that $P(\overline{A}) + P(\overline{B}) = 2 - 2p + q$

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

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114. If the letters of the word ATTRACTION are written down at random, find the probability that (i) all the T's occur together, (ii) no two T's occur

together.

115. If each element of a second order determinant is either zero or one, what is the probability that the value the determinant is non-negative?

116. Each coefficient in the equation $ax^2 + bx + c = 0$ is determined by throwing an ordinary six faced die. Find the probability that the equation will have real roots.

117. Find the number of ways in which the birthday of six different persons will fall in exactly two calendar months.

118. A fair dice is rolled. Consider the following events: $A = \{1, 2, 5\}$, $B = \{2, 3\}$ and $C = \{2, 3, 4, 5\}$ Find (i) $P\left(\dfrac{A}{B}\right)$ and $P\left(\dfrac{B}{C}\right)$ (ii) $P\left(\dfrac{A}{C}\right)$ and $P\left(\dfrac{C}{A}\right)$ (iii) $P\left(\dfrac{A \cup B}{C}\right)$ and $P\left(\dfrac{A \cap B}{C}\right)$ (iv) $P\left(\dfrac{A \cap B}{C}\right)$

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119. A coin is tossed three times. Find $P(E/F)$ in each of the following:

(i) $E =$ Head on the third toss, $F =$ Heads on first two tosses (ii) $E =$ At least two heads, $F =$ At most two heads (iii) $E =$ At most two tails, $F =$ At least one tail

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120. A bag contains 6 red and 5 blue balls and another bag contains 5 red and 8 blue balls. A ball is drawn from the first bag and without noticing

its colour is put in the second bag. A ball is then drawn from the second bag. Find the probability that the ball drawn is blue in colour.

121. 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 fair die is cast, if the face 1 or 3 turns up, a ball is taken from the first bag, and if any other face turns up a ball is chosen from the second bag. Find the probability of choosing a black ball.

122. One bag contains 4 white and 5 black balls. Another bag contains 6 white and 7 black balls. A ball is transferred from first bag to the second bag and then a ball is drawn from the second bag. Find the probability that the ball dawn is white.

123. There are two bags. The first bag contains 5 white and 3 black balls and the second bag contains 3 white and 5 black balls. Two balls are drawn at random from the first bag and are put into the second bag without noticing their colours. Then two balls are drawn from the second bag. Find the probability that the balls are white and black.

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124. Find the probability of drawing a one-rupee coin from a purse with two compartments one of which contains 3 fifty-paise coins and 2 one-rupee coins and other contains 2 fifty-paise coins and 3 one-rupee coins.

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125. A probability of student A passing an examination is 2/9 and of student B passing is 5/9. Assuming the two events: A passes, B passes as

independent, find the probability of : (i) only A passing the examination (ii) only one of them passing the examination.

126. X is taking up subjects Mathematics, Physics and Chemistry in the examination. His probabilities of getting grade A in these subjects are 0.2, 0.3, and 0.5 respectively. Find the probability; that he gets (i) Grade A in all subjects (ii) Grade A in no subject (iii) Grade A in two subjects

127. A and B throw alternately a pair of dice. A wins if he throws 6 before B throws 7 and B wins if he throws 7 before A throws 6. Find their respective chance of winning, if A begins.

128. Three persons A, B, C throw a die in succession till one gets a six and wins the game. Find their respective probabilities of wining , if A begins.

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129. In a bolt factory, machines A, B and C manufacture respectively 25%, 35% and 40% of the total bolts. Of their output 5, 4 and 2 percent are respectively defective bolts. A bolt is drawn at random from the product. What is the probability that the bolt drawn is defective?

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130. Two thirds of the students in a class are boys and the rest girls. It is known that the probability of a girl getting a first class is 0.25 and that of a boy getting a first class is 0.28. find the probability that a student chosen at random will get first class marks in the subject.

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

132. A box has 5 blue and 4 red balls. One balls 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?

133. A bag contains 3 white and 2 black balls and another bag contains 2 white and 4 black balls. One bag is chosen at random. From the selected bag, one ball is drawn. find the probability that the ball drawn is white.

134. 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 $\dfrac{31}{42}$, determine the value of n.

135. One bag contains 4 white and 5 black balls. Another bag contains 6 white and 7 black balls. A ball is transferred from first bag to the second bag and then a ball is drawn from the second bag. Find the probability that the ball dawn is white.

136. A factory has two machines A and B. Past records show that the 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 were

defective and 1% produced by machine B were defective. If an item is drawn at random, what is the probability that it is defective?

137. A company has two plants to manufacture scooters. Plant I manufactures 70% of the scooters and Plant II manufactures 30%. At Plant I, 80% of the scooters are rated as of standard quality and at Plant II, 90% of the scooters are rated as of standard quality. A scooter is chosen at random and is found to be of standard quality. What is the probability that it has come from Plant II?

138. A bag contains 6 red and 8 black balls and another bag contains 8 red and 6 black balls. A ball is drawn from the first bag and without noticing its colour is put in the second bag. A ball is drawn from the second bag. Find the probability that the ball drawn is red in colour.

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139. Two balls drawn from an urn containing 2 white, 3 red and 4 black balls one by one without replacement. What is the probability that at least one ball is red?

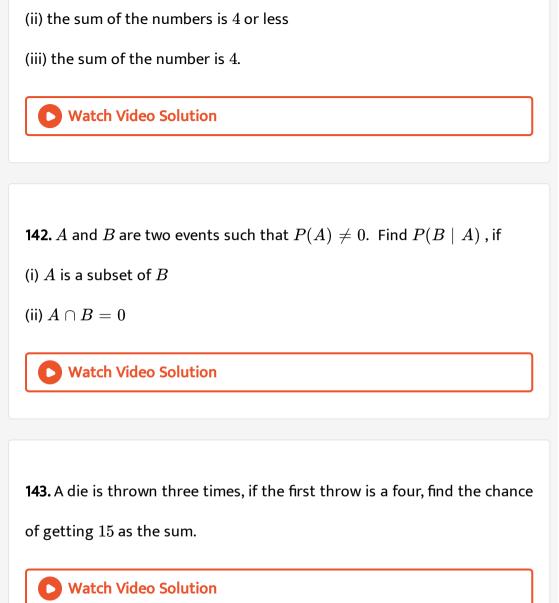**140.** An urn contains 5 white and 8 black balls. Two successive drawings of three balls at a time are made such that the balls are not replaced before the second draw. Find the probability that the first draw gives 3 white balls and second draw gives 3 black balls.

141. A pair of dice thrown. If the two numbers appearing on them are different, find the probability

(i) the sum of the numbers is 6

(ii) the sum of the numbers is 4 or less

(iii) the sum of the number is 4.

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

(i) A is a subset of B

(ii) $A \cap B = 0$

143. A die is thrown three times, if the first throw is a four, find the chance of getting 15 as the sum.

144. Two integers are selected at random from integers 1 through 11. If the sum is even, find the probability that both the numbers are odd.

145. Find the probability of drawing a diamond card in each of the two consecutive draws from a well shuffled pack of cards, if the card drawn is not replaced after the first draw.

146. A bag contains 10 white and 15 black balls. Two balls are drawn in succession without replacement. What is the probability that first is white and second is black?

147. A bag contains 19 tickets, numbered from 1 to19. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will show even numbers.

148. A bag contains 5 white, 7 red and 8 black balls. If four balls are drawn one by one without replacement, find the probability of getting all white balls.

149. Bag A contains 4 red and 5 black balls and bag B contains 3 red and 7 black balls. One ball is drawn from bag A and two from bag B. Find the probability that out of 3 balls drawn, two are black and one is red.

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

151. Two cards are drawn from a well shuffled pack of 52 cards without replacement. What is the probability that one is a red queen and the other is a king of black colour?

152. Two cards are drawn without replacement from a well shuffled pack of 52 cards. Find the probability that one is a spade and other is a queen of red colour.

153. A bag contains 5 white and 3 black balls. Four balls are successively drawn out without replacement. What is the probability that they are alternately of different colours?

154. Cards are numbered 1 to 25. Two cards are drawn one after the other. Find the probability that the number on one card is multiple of 7 and on the other it is a multiple of 11.

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

156. Find the minimum value of f(x)=$\dfrac{\pi^2}{16\cot^{-1}(-x)} - \cot^{-1}x$

157. A bag contains 4 white and 2 black balls. Another contains 3 white and 5 black balls. If the ball is drawn from each bag, find the probability that (i) both are white;   (ii) both are black (iii) one is white and on is black.

158. A box contains 3 red and 5 blue balls. Two balls are drawn one by one at as time at random without replacement. Find the probability of getting 1 red and 1 blue ball.

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

160. What is the probability that four 'S' comes consecutively in the word 'MISSISSIPPI` when rearranged?

161. A basket contains 20 apples and 10 oranges out of which 5 apples and 3 oranges are defective. If a person takes out 2 at random what is the probability that either both are apples or both are good?

162. The probability that a person will get an electric contact is $\dfrac{2}{5}$ and the probability that he will not get plumbing contract is $\dfrac{4}{7}$. If the probability of getting at least one contract is $\dfrac{2}{3}$, what is the probability that he will get both.

163. Let A ,B ,C be three events. If the probability of occurring exactly one event out of A and B is $1 - x$, out of B and C is $1 - 2x$, out of C and A is $1 - x$ and that of occurring three events simultaneously is x^2 , then prove that the probability that at least one out of A, B, C will occur is greater than 1/2 .

164. For the three events A, B and C, P(exactly one of the events A or B occurs) $= P$(exactly one of the events B or C occurs) $= P$(exactly one of the events C or A occurs) $= p$ and P(all the three events occur simultaneously) $= p^2$, where $0 < p < \dfrac{1}{2}$. Then, find the probability of occurrence of at least one of the events A, B and C.

165. The probabilities that a student passes in Mathematics,Physics and Chemistry are m, p and c, respectively. Of these subjects, the student has

a 75% chance of passing in at least one, a 50% chance of passing in at least two and a 40% chance of passing in exactly two. Which of the following relations are true?

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166. A die 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?

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167. Determine $P(E \mid F)$ in :Two coins are tossed once, where(i) E: tail appears on one coin, F : one coin shows head(ii) E : no tail appears, F : no head appears

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168. A couple has two children. Find the probability that Both the children are boys, if it is known that the older child is a boy. Both the children are girls, if it is known that he older child is a girl. Both the children are boys, if it is known that at least one of the children is a boy.

169. A die 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?

170. A die is thrown three times events A and B are defined as below: $A =$ Getting 4 on third die, $B =$ Getting 6 on the first and 5 on the second throw Find the probability of A given that B has already occurred.

171. 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.

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

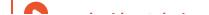**173.** In a school there are 1000 students, out of which 430 are girls. It is known that out of 430, 10% of the girls study in class XII. What is the probability that a student chosen randomly studies in Class XII given that the chosen student is a girl

174. An instructor has a question bank consisting of 300 easy True / False questions. 200 difficult True / False questions. 500 easy multiple choice questions and 400 difficult multiple choice questions. If a question is selected at random from the

175. Given that $A \, and \, B$ are two events such that $P:(a) = 0.6, \; P(B) = 0.3 \, and \, P(A \cap B) = 0.2,$ find $P\left(\dfrac{A}{B}\right) and \, P(B/A).$

176. If $P(A) = \dfrac{6}{11}, P(B) = \dfrac{5}{11}$ and $P(A \cup B) = \dfrac{7}{11}$, find(i) $P(A \cap B)$ (ii) $P(A \mid B)$ (iii) $P(B \mid A)$

177. Ten cards numbered1 through 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.

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

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

180. A die is thrown three times, find the probability that 4 appears on the third toss if it is given that 6 and 5 appear respectively on first two tosses.

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

182. If $P(A) = 0.4, \ P(B) = 0.3 \ and \ P(B/A) = 0.5$, find $P(A \cap B) \ and \ P(A/B)$.

183. A couple has two children. Find the probability that both the children are (i) males, if it is known that at least one of the children is male. (ii) females, if it is known that the elder child is a female.

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184. From a pack of 52 cards, two are drawn one by one without replacement. Find the probability that both of them are kings.

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185. From a pack of 52 cards, 4 are drawn one by one without replacement. Find the probability that all are aces (or, kings).

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186. Find the chance of drawing 2 white balls in succession from a bag containing 5 red and 7 white balls, the ball first drawn not being replaced.

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187. A bag contains 25 tickets, numbered from 1 to 25. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will show even numbers.

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188. From a deck of cards, three cards are drawn on by one without replacement. Find the probability that each time it is a card of spade.

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189. Two cards are drawn without replacement from a pack of 52 cards. Find the probability that both are kings the first is a king and the second is an ace the first is a heart and second is red.

190. A bag contains 20 tickets, numbered from 1 to 20. Two tickets are drawn without replacement. What is the probability that the first ticket has an even number and the second an odd number.

191. An urn contains 3 white, 4 red and 5 black balls. Two balls re drawn one by one without replacement. What is the probability that at least one ball is black?

192. A bag contains 5 white, 7 red and 3 black balls. If three balls are drawn one by one without replacement, find the probability that none is red.

193. A card is drawn from a well-shuffled deck of 52 cards and then a second card is drawn. Find the probability that the first card is a heart and the second card is a diamond if the first card is not replaced.

194. An urn contains 10 black and 5 white balls. Two balls are drawn from the nm one after the other

195. 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?

196. A box of oranges is inspected by examining three randomly selected oranges drawn without replacement. If all the three oranges are good, die box is approved for sale, otherwise, it is rejected. Find the probability that a box containing 15 orange

197. A bag contains 4 white, 7 black and 5 red balls. Three balls are drawn one after the other without replacement. Find the probability that the balls drawn are white, black and red respectively.

198. If A and B are two events such that

$P(A) = 0.3, \; P(B) = 0.6 \; and \; P(B/A) \; = 0.5$ find $P(A/B)$.

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199. If

$P(A) = \dfrac{3}{8}, \; P(B) = \dfrac{1}{2} and \; P(A \cap B) = \dfrac{1}{4}, \; f \in d \; P(A/B) and \; P(B/A$

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200. A couple has 2 children. find the probability that the both are boys if it is given that (i) one of the child is boy (ii) the older child is boy.

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201. Consider a random experiment in which a coin is tossed and if the coin shows head it is tossed again but if it shows a tail then a die is

tossed. If 8 possible outcomes are equally likely. Find the probability that the die shows a number greater than 4 if it is known that the first throw of the coin results in a tail.

202. A coin is tossed twice and the four possible outcomes are assumed to be equally likely. If A is the event, both head and tail have appeared, and B be the event, at most one tail is observed, find $P(A), \ P(B), \ P(A/B) \ and \ P(B/A).$

203. Two coins are tossed. What is the probability of coming up two heads if it is known that at least on head comes up.
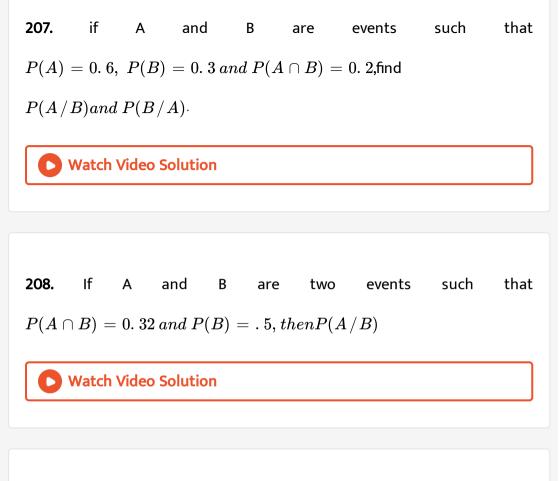
204. In a hostel 60% of the students read Hindi news paper, 40% read English newspaper and 20% read both Hindi and English newspapers. A student is selected at random.Find the probability that she reads neither Hindi nor English news paper ?

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205. 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

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206. If $P(A) = \frac{7}{13}, \ P(B) = \frac{9}{13} \, and \, P(A \cap B) = \frac{4}{13}$, find$\setminus P(A \, / \, B).$

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207. if A and B are events such that

$P(A) = 0.6,\ P(B) = 0.3\ and\ P(A \cap B) = 0.2$, find

$P(A/B)\ and\ P(B/A).$

208. If A and B are two events such that

$P(A \cap B) = 0.32\ and\ P(B) = .5,\ then P(A/B)$

209. If $P(A) = 0.4,\ P(B) = 0.8,\ P(B/A) = 0.6$. Find $P(A/B)$ and $P(A \cup B)$

210. If A and B are two events such that: $P(A) = 1/3,\ P(B) = 1/5$ and $P(A \cup B) = 11/30$, find $P(A/B)$ and $P(B/A)$.

211. If $P(A) = \dfrac{6}{11}, P(B) = \dfrac{5}{11}$ and $P(A \cup B) = \dfrac{7}{11}$, find(i) $P(A \cap B)$ (ii) $P(A \mid B)$ (iii) $P(B \mid A)$

212. If $P(A) \dfrac{7}{13}, P(B) = \dfrac{9}{13}$ and $P(A \cap B) = \dfrac{4}{13}$, find $P\left(\dfrac{A}{B}\right)$.

213. If $P(A) = \dfrac{6}{11}, P(B) = \dfrac{5}{11}$ and $P(A \cup B) = \dfrac{7}{11}$, find(i) $P(A \cap B)$ (ii) $P(A \mid B)$ (iii) $P(B \mid A)$

214. If $P(A) = \dfrac{6}{11}, P(B) = \dfrac{5}{11}$ and $P(A \cup B) = \dfrac{7}{11}$, find(i) $P(A \cap B)$ (ii) $P(A \mid B)$ (iii) $P(B \mid A)$

215. If $P(A) = \dfrac{6}{11}, P(B) = \dfrac{5}{11}$ and $P(A \cup B) = \dfrac{7}{11}$, find(i) $P(A \cap B)$ (ii) $P(A \mid B)$ (iii) $P(B \mid A)$

216. Determine $P(E \mid F)$ in :A coin is tossed three times, where (i) E : Head on third toss, F : heads on first two tosses(ii) E : at least two heads, F : at most two heads(iii) E : at most two tails, F : at least one tail

217. Two coins are tossed once. Find $P\left(\dfrac{E}{F}\right)$ in each of the following :

$E = $ Tail appears on one coin, $F = $ One coin shows head. $E = $ No tail appears, $F = $ No head appears.

218. A die is thrown three times. Find $P\left(\dfrac{A}{B}\right)$ and $P\left(\dfrac{B}{A}\right)$, if $A = 4$ appears on the third toss, $B = 6$ and 5 appear respectively on first two tosses.

219. Mother, father and son line up at random for a family picture. If A and B are two events given by $A = $ Son on one end, $B = $ Father in the middle, find $P\left(\dfrac{A}{B}\right)$ and $P\left(\dfrac{B}{A}\right)$.

220. 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?

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

222. A pear of dice is thrown. Find the probability of getting 7 as the sum, if it is known that the second die always exhibits an odd number.

223. A pair of dice is thrown. Find the probability of getting 7 as the sum of it is known that hte second die always exhibits a prime number.

224. A die is rolled. If the outcome is an odd number, what is the probability that it is prime?

225. A pair of dice is thrown. Find the probability of getting the sum 8 or more, if 4 appears on the first die.

226. Find the probability that the sum of the numbers showing on two dice is 8, given that at least one die does not show five.

227. Two integers are selected at random from integers 1 through 11. If the sum is even, find the probability that both the numbers are odd.

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228. A die is thrown twice and the sum of the numbers appearing is observed to be 8. What is the conditional probability that the number 5 has appeared at least once?

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229. Two dice are thrown and it is known that the first die shows a 6. Find the probability that the sum of the numbers showing on two dice is 7.

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230. A pair of dice is thrown. Let E be the event that the sum is greater than or equal to 10 and F be the event 5 appears on the first - die. Find $P\left(\dfrac{E}{E}\right)$. if F is the event 5 appears on at least one die, find $P\left(\dfrac{E}{F}\right)$.

231. The probability that a student selected at random from class will pass in Mathematics is 4/5, and the probability that he/she passes in Mathematics and Computer Science is . What is the probability that he/she will pass in Computer Science if it is known that he/she has passed in Mathematics?

232. The probability that a certain person will buy a shirt is 0.2, the probability that he will buy a trouser is 0.3, and the probability that he will buy a shirt given that he buys a trouser is 0.4. Find the probability

that he will buy both a shirt and a trouser. Find also the probability that he will but a trouser given that he buys a shirt.

233. In a school there are 1000 students, out of which 430 are girls. It is known that out of 430, 10% of the girls study in class XII. What is the probability that a student chosen randomly studies in Class XII given that the chosen student is a girl

234. Ten cards numbered 1 through 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?

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

236. A coin is tossed thrice. Let the event E be the first throw results in a head and the event F be the last throw results in a tail. Find whether the events E and F are independent.

237. 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.

238. 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 (EE), (E, G) and (F,G), which are independent? Which are dependent?

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

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

241. Events A and B are such that $P(A) = \dfrac{1}{2}$, $P(b) = \dfrac{7}{12}$ and $P($ not A or not $\Big) = \dfrac{1}{4}$. State whether A and B are independent?

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242. A die is thrown once. E is the event the number appearing is a multiple of 3 and F is the event the number appearing is even: Are the events E and F independent?

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243. Refer to question 1 above. If the die were fair, determine whether or not the events A and B are independent.

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244. If A and B are two events such that $P(A) = \dfrac{1}{2}$, $P(A \cup B) = \dfrac{3}{5}$ and

$P(B) = p$, then find the value of p when:

(i) A and B are mutually exclusive

(ii) A and B are independent events.

245. If A and B are two events such that $P(A) = \dfrac{1}{4}, P(B) = \dfrac{1}{2}$ and $P(A \cap B) = \dfrac{1}{8}$, find P (not A and not B).

246. If A and B are two independent events such that $P(A \cup B) = 2/15$ and $P(A \cup B) = 1/6$, then find $P(B)$.

247. A bag contains 3 red and 5 black balls and second bag contains 6 red and 4 black balls. A ball is drawn from each bag. Find the probability that one is red and the other is black.

248. A police man fires four bullets on a dacoit. The probability that the dacoit will be killed by one bullet is 0.6. What is the probability that the dacoit is still alive?

249. A problem in mathematics is given to 3 students whose chances of solving it are $\frac{1}{4}$; $\frac{1}{5}$; $\frac{1}{3}$. What is the probability that the problem is solved?

250. The odds against A solving the problem are 4 to 3 and the odds in favour of B solving the .problem are 7 to 5. Find the probability that the problem will be solved.

251. A coin is tossed and a die is thrown. Find the probability that the outcome will be a head or a number greater than 4, or both.

252. A combination lock on a suitcase has 3 wheels, each labelled with nine digits from 1 to 9. If an opening combination is a particular sequence of three digits with no repeats, what is the probability of a person guessing the right combination ?

253. A coin is tossed thrice and all the eight outcomes are assumed equally likely. In which of the following cases are the following events A and B are independent? $A =$ the first thrown results in head, $B =$ the last thrown results in tail $A =$ the number of heads is odd, $B =$ the number of tails is odd $A =$ the number of heads is two, $b =$ the last throw results in head

254. 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 dr

255. A coin is tossed three times. Let the events A B, and C be defined as follows; A= first toss is head, B= second toss is head, and C= exactly two

heads are tossed in a row. Check the independence of i. A and B ii. B and C and iii. C and A

256. If A and B be two events such that $P(A) = 1/4, \; P(B) = 1/3$ and $P(A \cup B) = 1/2$ show that A and B are independent events.

257. Given two independent events A and B such that $P(A) = 0.3 \; and \; P(B) = 0.6$. Find: $P(A \cap B)$

258. Given two independent events A and B such that $P(A) = 0.3 \; and \; P(B) = 0.6$. Find: $P(A \cup B)$

259. Given two independent events A and B such that $P(A) = 0.3 \; and \; P(B) = 0.6$. Find: $P(A \cap B)$

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260. Given two independent events A and B such that $P(A) = 0.3 \; and \; P(B) = 0.6$. Find: $P(A/B)$

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261. Given two independent events A and B such that $P(A) = 0.3 \; and \; P(B) = 0.6$. Find: $P(B/A)$

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262. Given two independent events A and B such that $P(A) = 0.3 \; and \; P(B) = 0.6$. Find: $P(A \cap B)$
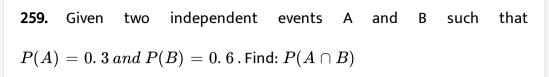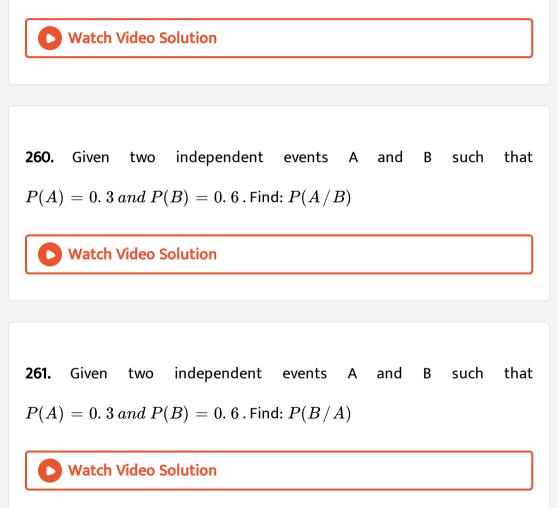
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263. Given two independent events A and B such that $P(A) = 0.3 \; and \; P(B) = 0.6$. Find: $P(A \cap B)$

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264. If $P(\neg B) = 0.65, \; P(A \cup B) = 0.85,$ and A and B are independent events then find $P(A)$.

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265. If A and B are two independent events such that $P(A \cup B) = 2/15$ and $P(A \cup B) = 1/6$, then find $P(B)$.

266. A and B are two independent events.The probability that both A and

B occur is 1/6 and the probability that neither of them occurs is 1/3.Then

the probability of the two events are respectively:

267. If A and B are two independent events such that

$P(A \cup B) = 0.\,60 \; and \; P(A) = 0.\,2$, find $P(B)$.

268. A die is tossed twice. Find the probability of getting a number

greater than 3 on each toss.

269. Given the probability that A can solve a problem is 2/3 and the probability that B can solve the same problem is 3/5. Find the probability that none of the two will be able to solve the problem.

270. An unbiased die is tossed twice. Find the probability of getting 4, 5, 6 on the first toss and 1, 2, 3 or 4 on the second toss.

271. A bag contains 3 red and 2 black balls. On ball is drawn from it at random. Its colour is noted and then it is put back in the bag. A second draw is made and the same procedure is repeated. Fid the probability of drawing i.tow red balls, ii. Two black balls, iii first red and second black ball.

272. Three cards are drawn with replacement from a well shuffled pack of cards. Find the probability that the cards drawn are king, queen and jack.

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273. The probability that A hits a target is 1/3 and the probability that B hits it is 2/5 . What is the probability that the target will be , if each one of A and B shoots at the target?

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274. The odds against a certain event are 5 to 2, and the odds in favor of another event independent of the former are 6 to 5. Find the chance that one at least of the events will happen.

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

276. 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.

277. An urn contains 4 red and 7 black balls. Two balls are drawn at random with replacement. Find the probability of getting i. 2 red balls, ii. 2 black balls, iii. One red and one black ball.

278. The probabilities of two students A and B coming to the school in time are $\frac{3}{7}$\ and $\frac{5}{7}$ respectively. Assuming that the events, A coming in time and B coming in time are independent, find the probability of only one of them coming to the school in time. Write at least one advantage of coming to school in time.

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279. A speaks truth n 60% of the cases and B in 90% of the cases. In what percentage of cases are they likely to i. contradict each other in stating the same fact? ii. agree in stating the same fact?

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280. The probability of student A passing an examination is 3/7 and of student b passing is 5/7. Assuming the two events Apasses, B passes, as independent, find the probability of: Only A passing the examination Only one of them passing the examination

281. A certain team wins with probability 0.7, loses with probability 0.2and ties with probability .1 the team plays three games. Find the probability that the team wins at least two of the games, but not lose.

282. Neelam has offered physics, chemistry and mathematics in Class XII. She estimates that her probabilities of receiving a grade A in these courses are 0.2, 0.3 and 0.9 respectively. Find the probabilities that Neelam receives

(i) all A grades (ii) no A grade (iii) exactly 2 A grades.

283. 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

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

285. A bag contains 6 black and 3 white balls. Another bag contains 5 black and 4 white balls. If one ball is drawn from each bag, find the probability that these tow balls are of the same colour.

286. A bag contains 3 red and 5 black balls and second bag contains 6 red and 4 black balls. A ball is drawn from each bag. Find the probability that one is red and the other is black.

287. Two balls are drawn at a random with replacement from a box containing 10 black and 8 red balls. Find the probability that i. both the balls are red. Ii. first ball is black and second is red. iii. One of them is black and other is red.

288. Two cards are drawn successively without replacement from a well shuffled deck of 52 cards. Find the probability of exactly one ace.

289. A speaks truth in 75% and B in 80% of the cases. In what percentage of cases are they likely to contradict each other in narrating the same incident?

290. Kamal and Monica appeared for n interview for two vacancies. The probability of Kamal's selection is 1/3 and that of Monika's selection is 1/5. Find the probability that Both of them will be selected None of them will be selected At least one of them will be selected Only one of them will be selected.

291. A bag contains 3 white, 4 red and 5 black balls. Two balls are drawn one after the other, without replacement. What is the probability that one is white and the other is black?

292. A bag contains 8 red and 3 green balls. Three balls are drawn one after another without replacement. Find the probability that at least two balls drawn are green.

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293. A and B toss a coin alternately till one of them gets a head and wins the game. If A starts the game, find the probability that B will win the game.

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294. Two cards are drawn from a well shuffled pack of 52 cards one after another without replacement. Find the probability that one of these red card and the other a black card?

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295. Tickets are numbered from 1 to 10. Two tickets are drawn one after the other art random. Find the probability that the number on one of the tickets is a multiple of 5 and on the other a multiple of 4.

296. In a family the husband tells a lie in 30% cases and the wife in 35% cases. Find the probability that both contradict each other on the same fact.

297. A husband and wife appear in an interview for two vacancies for the same post. The probability of husband's selection is 1/7 and that of wife's selection is 1/5. What is the probability that Both of them will be selected? Only one of them will be selected? None of them will selected?

298. A bag contains 7 white, 5 black and 4 red balls. Four balls are drawn without replacement find the probability that t least three balls are black.

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299. A, B, and C are independent witness of an event which is known to have occurred. A speaks the truth three times out of four B four times out of five and C five times out of six. What is the probability that the occurrence will be reported truthfully be majority of three witnesses?

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300. A bag contains 4 white, 2 black balls another contains 3 white balls and 5 black balls. If one ball is drawn from each bag, find the probability that 1.Both are the white 2.Both are black 3.One is white and one is black.

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301. A bag contains 4 white , 7black and 5 red balls. 4 balls are drawn with replacement. What is probability that at least two are white?

302. A bag contains 4 red and 5 black balls, a second bag contain 3 red and 7 black balls. One ball is drawn at random from each bag, find the probability that the ball are of the same colour.

303. There are three urns. A, B, and C . Urn A contains 4 red balls and 3 black balls. Urn B contains 5 red balls and 4 black balls urn c contains 4 red and 4 black balls. New balls is drawn from each of these urns. What is the probability that 3 balls drawn consist of 2 red balls and a black ball?

304. A and B take turns in throwing two dice, the first to throw 9 being awarded the prize. Show that their chance of winning are in the ratio 9:8.

305. Fatima and John appear in an interview for two vacancies for the same post. The probability of Fatimas selection is $\frac{1}{7}$ and that of Jonhs selection us $\frac{1}{5}$. what is the probability that Both of them will be selected? Only one of them will be selected? None of them will be selected?

306. A bag contains 8 marbles of which 3 are blue and 5 are red. One marble is drawn at random, its colour is noted and the marble is replaced in the bag. A marble is again drawn from the bag and its colour is noted. Find the probability that he marble will be (i)blue followed by red, (ii)blue and red in any order (iiI)of the same colour

307. An urn contains 7 red and 4 blue balls. Two balls redrawn at random with replacement. Find the probability of getting 2 red balls 2 blue balls one red and one blue ball.

308. A card is drawn from a well shuffled deck of 52 cards. The outcome is noted, the card is replaced and the deck reshuffled. Another card is then drawn from the deck. What is the probability that both the cards are of the same suit? What is the probability that the first card is an ace and the second card is a red queen?

309. Out of 100 students two sections of 40 and 60 are formed If you and your friend are among 100 students what is the probability (i) you both

enter the same section (ii)you both enter the different sections

310. A bag contains 4 red and 3 black balls. A second bag contains 2 red and 4 black balls. One bag is selected at random. Form the selected bag, one all is drawn. Find the probability that the ball drawn is red.

311. A bag A contains 4 black and 6 red balls and bag B contains 7 black and 3 red balls. A die is thrown. If 1 or 2 appears on it, then bag a is chosen, otherwise bag B. If two balls are drawn (without replacement) from the selected bag, find the probability of one of them being red and another black.

312. 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 ther

313. A bag A contains 5 white and 6 black balls. Another bag B contains 4 white and 3 black balls. A ball is transferred from bag A to the bag B and then a ball is taken out of the second bag. Find the probability of this ball being black.

314. A purse contains 2 silver and 4 copper coins. A second purse contains 4 silver and 3 copper cons. If a coin is pulled at random from one of the two purses, what is the probability that it is a silver coin?

315. The contents of three bags, I, II and III are s follows: Bag I:1 white, 2 back and 3 red balls Bag II: 2 white, 1 black and 1 red ball; Bag III: 4 white, 5 black and 3 red balls, A bag is chosen at random and two balls are drawn. what is the probability that the balls are white and red?

316. A unbiased coin is tossed. If the result is a head a pair of unbiased dice is rolled and the sum of the numbers obtained is noted. If the result is a tail, card from a well shuffled pack of eleven cards numbered 2, 3, 4, ...12 is picked and the number on the card is noted. What is the probability that the noted number is either 7 or 8?

317. The bag A contains 8 white and 7 black balls while the bag B contains 5 white and 4 black balls. One ball is randomly picked up from the bag A and mixed up with the balls in bag B. Then a ball is randomly drawn out from it. Find the probability that ball drawn is white.

318. A bag contains 4 white and 5 black balls and another bag contains 3 white and 4 black balls. A ball is taken out from the first bag and without seeing its colour is put in the second bag.A ball is taken out from the latter. Find the probability that the ball drawn is white.

319. An urn contains 10 white and 3 black balls.Another urn contains 3 white and 5 black balls.Two balls are drawn from the first urn and put into the second urn and then a ball is drawn from the second urn.Find the probability that ball drawn from 2nd urn is white.

320. Three machinesE1, E2 and E3 in a certain factory producing electric bulbs, produce 50%, 25% and 25% respectively, of the total daily output of electric bulbs. It is known that 4% of the bulbs produced by each of machines E1 and E2 are defective and that 5% of those produced by machine E3are defective. If one bulb is picked up at random from a days production, calculate the probability that it is defective.

321. 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 b

322. Three urns contain 6 red, 4 black 4 red, 6 black and 5 red, 5 black balls respectively. One of the urns is selected at random and a ball is drawn from it. If the ball drawn is red, find the probability that it is drawn from the first urn.

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

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

325. 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

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

327. 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 t

328. 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 these person being male? Assume that there are equal number of males and females.

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

330. A bag contains 3 red and 7black balls. Two balls are selected at random one by one without replacement. If the second ball happens to be red, what is the probability that the first selected ball is also red?

331. 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 groups O. If a left handed person os selected at random, what is the probability that he/she will have blood group O?

332. As 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.

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

334. 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 transportation are respectiely $\frac{3}{10}, \frac{1}{5}, \frac{1}{10}$ or $\frac{2}{5}$. 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. If the arrives late, find the probability that he comes by train.

335. Suppose that the reliability of a HIV test is specified as follows: Of people having HIV. 90% of the test detects the disease but 10% go undetected. Of people free of HIV, 99% of the test are judged HTV-ive but 1% are diagnosed as showing H3V+ive

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

337. The contents of three urns are as follows: Urn 1-7 white, 3 black balls.Urn 2 - 4 white, 6 black balls Urn 3 - 2 white and 8 black balls.One of these urns is chosen at random with probabilities 0.20, 0.60 and 0.20 respectively. From the chosen urn two balls are drawn at random without

replacement. If both these balls are white, what is the probability that these came from urn 3 ?

338. Suppose a girl throws a die. If she gets a 5 or 6, she tosses a coin 3 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? site:shaalaa.com

339. Two groups are competing for the positions of 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.

340. Suppose 5 men out of 100 and 25 women out of 1000 are god orators. An orator is chosen at random. Find the probability that a male person is selected. Assume that there are equal number of men and women.

341. In a class, 5% of the boys and 10% of the girls have an IQ of more than 150. In this class 60% of the students are boys. If a student is selected at random and found to have an IQ of more than 150, find the probability that the student is a boy.

342. A factory has three machines X, Y, and Z producing 1000, 2000 and 3000 bolts per day respectively. the machine X produces 1% defective

bolts, Y produces 1.5% and Z produces 2% defective bolts. At the end of a day, a bolt is drawn at random and is found to be defective. What is the probability that this defective bolt has been produced by machine X?

343. An insurance company insured 3000 scooters, 4000 cars and 5000 trucks. The probabilities of the accident involving a scooter, a card and a truck are 0.02, 0.03 and 0.04 respectively. One of the insured vehicles meet with an accident. Find the probability that it is a i. scooter ii. car iii. truck.

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

345. 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 tune, B is on the job

346. There are three coins. One is two headed coin (having head on both faces),another is biased coin that comes up heads 75% of the times and third is also a biased coin that comes up tail 40% of the times. One of the three coins is chosen at random and tossed, and it shows heads. What is the probability that it was the two headed coin?

347. Three urns, A, B, and C contain 6 red and 4 white ; 2 red and 6 white; and 1 red and 5 white balls respectively. An urn is chosen at random and a bal is drawn. If the ball drawn is found to be red, find the probability that the ball was drawn from urn A.

348. In a certain college, 4% of boys and 1% of girls are taller than 1.75 metres. Furthermore, 60% of the students in the college are girls. A student is selected at random from the college and is found to be taller than 1.75 metres. Find the probability that the selected student is a girl.

349. An insurance company insured 2000 scooters and 300 motorcycles. The probability of an accident involving a scooter is 0.01 and that of a motorcycle of 0.02. an insured vehicle met with an accident. Find the probability that the accidental vehicle was as motorcycle.

350. Of the students in a college, it is known that 60% reside in a hostel and 40% do not reside in hostel. Previous year results report that 30% of students residing in hostel attain A grade and 20% of one's not residing in hostel attain A grade in their annual examination. At the end of the year, one students is chosen at random from the college and he has an A grade. What is the probability that the selected student is a hosteller?

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

352. Assume that the chances of a patient having a heart attack is 40%. Assuming that a meditation and yoga course reduces the risk of heart attack by 30% and prescription of certain drug reduces its chance 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. Interpret the result and state which of the above stated methods is more beneficial for the patient.

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353. A test for detection of a particular disease is not fool proof. The test will correctly detect the disease 90% of the time, but will incorrectly detect the disease 1% of the time. For a large population of which an estimated 0.2% have the disease, a person is selected at random, given the test, and told that he has the disease. What are the chances that the person actually have the disease?

354. Let $d1$, $d2$, $d3$ be three mutually exclusive diseases. Let S be the set of observable symptoms of these diseases. A doctor has the following information from a random sample of 5000 patients: 1800 had disease $d1$, 2100 has disease $d2$ and the others had disease $d3$. 1500 patients with disease $d1$, 1200 patients with disease $d2$ and 900 patients with disease $d3$ showed the symptom. Which of the diseases is the patient most likely to have?

355. A laboratory blood test is 99% effective in detecting a certain disease when it is 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% of the population actually has the disease, what is

the probability that a person has disease given that his test result is positive?

356. A four digit number is formed using the digits $1, 2, 3, 5$ with no repetitions. Write the probability that the number is divisible by 5.

357. When three dice are thrown, write the probability of getting 4 or 5 on each of the dice simultaneously.

358. Three digit numbers are formed with the digits $0, 2, 4, 6$ and 8. Write the probability of forming a three digit number with the same digits.

359. A ordinary cube has four plane faces, one face marked 2 and another face marked 3, find the probability of getting a total of 7 in 5 throws.

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360. Three numbers are chosen from 1 to 20. Find the probability that they are consecutive.

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361. 6 boys and 6 girls sit in a row at random. Find the probability that all the girls sit together.

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362. If A and B are two independent events such that $P(A) = 0.3$ and

$P(A \cup B') = 0.8$

Find $P(B)$

363. An unbiased die with faced marked 1, 2, 3, 4, 5, and 6 is rolled four times. Out of four face value obtained, the probability that the minimum face value is not less than 2 and the maximum face value is not greater than five is then

A. a) $\dfrac{16}{81}$

B. b) $\dfrac{1}{81}$

C. c) $\dfrac{80}{81}$

D. d) $\dfrac{65}{81}$

Answer: null

364. If A and B are two events write the expression for the probability of occurrence of exactly one of two events.

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365. Write the probability that a number selected at random from the set of first 100 natural numbers is a cube.

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366. In a competition A, B and C are participating. The probability that A wins is twice that of B, the probability that B wins is twice that of C. find the probability that A losses.

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367. If A, B, C are mutually exclusive and exhaustive events associated to a random experiment, then write the value of $P(A) + P(B) + P(C)$

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368. If A and B are two independent events the write $P(A \cup B)$ in terms of $P(A)$ and $P(B)$

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369. If $P(A) = 0.3$, $P(B) = 0.6$, $P(B/A) = 0.5$, find $P(A \cup B)$.

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370. If $A, B,$ and C are independent events such that $P(A) = P(B) = P(C) = p$, then find the probability of occurrence of at least two of A, B, and C.

371. For three events A, B and C, P (Exactly one of A or B occurs) $= P$ (Exactly one of B or C occurs) $= P$ (Exactly one of C or A occurs) $= \dfrac{1}{4}$ and P (All the three events occur simultaneously) $= \dfrac{1}{6}$ Then the probability that at least one of the events occurs, is :

A. a) $\dfrac{7}{64}$

B. b) $\dfrac{3}{16}$

C. c) $\dfrac{7}{32}$

D. d) $\dfrac{7}{16}$

Answer: null

372. If A and B are independent events such that $P(A) = p$, $P(B) = 2p$ and P (Exactly one of A and B occurs) $= \dfrac{5}{9}$,

find the value of p

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

374. Four cards are drawn at a time from a pack of 52 playing cards. Find the probability of getting all the four cards of the same suit.

375. A and B are two events such that $P(A) = 0.25$ and $P(B) = 0.50$. The probability of both happening together is 0.14. The probability of both A and B not happening is

A. a) 0.39

B. b) 0.25

C. c) 0.11

D. d) none of these

Answer: a) 0.39

376. The probabilities of a student getting I, II and III division in an examination are $\frac{1}{10}, \frac{3}{5}$ and $\frac{1}{4}$ respectively. The probability that the student fails in the examination is

A. a) $\frac{197}{200}$

B. b) $\frac{27}{100}$

C. c) $\frac{83}{100}$

D. d) none of these

Answer: b) $\dfrac{27}{100}$

377. India plays two matches each with West Indies and Australia. In any match the probabilities of India getting points $0, 1$ and 2 are $0.45, 0.05$ and 0.50 respectively. Assuming that the outcomes are independent, the probability of India getting at least 7 points is

A. (a) 0.8750

B. (b) 0.0875

C. (c) 0.0625

D. (d) 0.0250

Answer: (b) 0.0875

378. The probability that a leap year will have 53 Fridays or 53 Saturday is

A. a) $\dfrac{2}{7}$

B. b) $\dfrac{3}{7}$

C. c) $\dfrac{4}{7}$

D. d) $\dfrac{1}{7}$

Answer: b) $\dfrac{3}{7}$

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379. A person write 4 letters and addresses 4 envelopes. If the letters are placed in the envelopes at random, then the probability that all letters are not placed in the right envelopes, is

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

B. b) $\dfrac{11}{24}$

C. c) $\dfrac{15}{24}$

D. d) $\dfrac{23}{24}$

Answer: null

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380. A speaks truth in 75% cases and B speaks truth in 80% cases.

Probability that they contradict each other in statement, is

A. a) $\dfrac{7}{20}$

B. b) $\dfrac{13}{20}$

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

D. d) $\dfrac{2}{5}$

Answer: a) $\dfrac{7}{20}$

381. Three integers are chosen at random from the first 20 integers. The probability that their product is even is

A. a) $\dfrac{2}{19}$

B. b) $\dfrac{3}{29}$

C. c) $\dfrac{17}{19}$

D. d) $\dfrac{4}{19}$

Answer: c) $\dfrac{17}{19}$

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382. Out of 30 consecutive integers 2 are chosen at random. The probability that their sum is odd, is

A. a) $\dfrac{14}{29}$

B. b) $\dfrac{16}{29}$

C. c) $\dfrac{15}{29}$

Answer: c) $\dfrac{15}{29}$

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383. A bag contains 5 black balls, 4 white balls and 3 red balls. If a ball is selected random wise, the probability that if is black or red balls is

A. a) $\dfrac{1}{3}$

B. b) $\dfrac{1}{4}$

C. c) $\dfrac{5}{12}$

D. d) $\dfrac{2}{3}$

Answer: d) $\dfrac{2}{3}$

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384. Two dice are thrown simultaneously. the probability of getting a pair

of aces is

    A. a) $\dfrac{1}{36}$

    B. b) $\dfrac{1}{3}$

    C. c) $\dfrac{1}{6}$

    D. d) none of these

Answer: a) $\dfrac{1}{36}$

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385. An urn contains 9 balls two of which are red, three blue and four

black. Three balls are drawn at random. The probability that they are of

the same colour is

    A. a) $\dfrac{5}{84}$

    B. b) $\dfrac{3}{9}$

C. c) $\dfrac{3}{7}$

D. d) $\dfrac{7}{17}$

Answer: a) $\dfrac{5}{84}$

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386. A coin is tossed three times. Event A: two heads appear Event B: last should be head Then identify whether events A and B are independent or dependent.

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387. Five persons entered the lift cabin on the ground floor of an 8 floor house. Suppose that each of them independently and with equal probability can leave the cabin at any floor beginning with the first, then the probability of al 5 persons leaving at different floor is

A. a) $\dfrac{7_{P_5}}{7^5}$

B. b) $\dfrac{7^5}{7_{P_5}}$

C. c) $\dfrac{6}{6_{P_5}}$

D. d) $\dfrac{5_{P_5}}{5^5}$

Answer: a) $\dfrac{7_{P_5}}{7^5}$

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388. A box contains 10 good articles and 6 defective articles. One item is drawn at random. the probability that it is either good or has a defect, is

A. a) $\dfrac{64}{64}$

B. b) $\dfrac{49}{64}$

C. c) $\dfrac{40}{64}$

D. d) $\dfrac{24}{64}$

Answer: a) $\dfrac{64}{64}$

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

390. A bag contains 5 brown and 4 white socks. A man pulls out two socks. The probability that these are of the same colour is

A. a) $\dfrac{5}{108}$

B. b) $\dfrac{18}{108}$

C. c) $\dfrac{31}{108}$

D. d) $\dfrac{48}{108}$

Answer: d) $\dfrac{48}{108}$

391. If S is the sample space and $P(A) = \dfrac{1}{3}P(B)$ and $S = A \cup B$,where A and B are two mutually exclusive events then $P(A) =$

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

B. b) $\dfrac{1}{2}$

C. c) $\dfrac{3}{4}$

D. d) $\dfrac{3}{8}$

Answer: null

392. If A and B are two events, then $P(A \cap B) =$

A. a) $P(A)P(B)$

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

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

D. d) $P(B) - P(A \cap B)$

Answer: c) $P(A) + P(B) - P(A \cup B)$

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393. If $P(A \cup B) = 0.8$ and $P(A \cap B) = 0.3$,then $P(A) + P(B) =$

A. a) 0.3

B. b) 0.5

C. c) 0.7

D. d) 0.11

Answer: d) 0.11

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394. A bag X contains 2 white and 3 black balls and another bag Y contains 4 white and 2 black balls. One bag is selected at random and a ball is drawn from it. The, the probability chosen to be white is

A. a) $\dfrac{2}{15}$

B. b) $\dfrac{7}{15}$

C. c) $\dfrac{8}{15}$

D. d) $\dfrac{14}{15}$

Answer: c) $\dfrac{8}{15}$

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395. Two persons A and B take turns in throwing a pair of dice. The first person to throw 9 from both dice will be awarded the prize. If A throws first, then the probability that B wins the game is

A. a) $\dfrac{9}{17}$

B. b) $\dfrac{8}{17}$

C. c) $\dfrac{8}{9}$

D. d) $\dfrac{1}{9}$

Answer: b) $\dfrac{8}{17}$

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

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397. From a set of 100 cards numbered 1 to 100, one card is drawn at random the probability that the number obtained on the card is divisible by 6 or 8 but not by 24 is

A. a) $\dfrac{6}{25}$

B. b) $\dfrac{1}{4}$

C. c) $\dfrac{1}{6}$

D. d) $\dfrac{1}{5}$

Answer: d) $\dfrac{1}{5}$

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398. If A and B are two events such that $P(A) = \dfrac{4}{5}$, and $P(A \cap B) = \dfrac{7}{10}$, then $P(B/A) =$

A. a) $\dfrac{1}{10}$

B. b) $\dfrac{1}{8}$

C. c) $\dfrac{7}{8}$

D. d) $\dfrac{17}{20}$

Answer: c) $\dfrac{7}{8}$

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399. If A and B are two events associated to a random experiment such that $P(A \cap B) = \dfrac{7}{10}$ and $P(B) = \dfrac{17}{20}$, then $P(A/B) =$

A. a) $\dfrac{14}{17}$

B. b) $\dfrac{17}{20}$

C. c) $\dfrac{7}{8}$

D. d) $\dfrac{1}{8}$

Answer: a) $\dfrac{14}{17}$

400. If $P(A) = \dfrac{3}{10}$, $P(B) = \dfrac{2}{5}$ and $P(A \cup B) = \dfrac{3}{5}$ then

$P(A/B) + P(B/A)$ equals

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

B. b) $\dfrac{7}{12}$

C. c) $\dfrac{5}{12}$

D. d) $\dfrac{1}{3}$

Answer: b) $\dfrac{7}{12}$

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401. Let $P(A) = \dfrac{7}{13}$, $P(B) = \dfrac{9}{13}$ and $P(A \cap B) = \dfrac{4}{13}$. Then

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

A. a) $\dfrac{5}{9}$

B. b) $\dfrac{4}{9}$

C. c) $\dfrac{4}{13}$

D. d) $\dfrac{6}{13}$

Answer: b) $\dfrac{4}{9}$

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

A. a) $\dfrac{5}{6}$

B. b) $\dfrac{5}{7}$

C. c) $\dfrac{25}{42}$

D. d) $\dfrac{1}{3}$

Answer: d) $\dfrac{1}{3}$

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

A. a) $\dfrac{1}{12}$

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

C. c) $\dfrac{1}{4}$

D. d) $\dfrac{3}{16}$

Answer: a) $\dfrac{1}{12}$

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

A. a) $\dfrac{2}{5}$

B. b) $\dfrac{3}{8}$

C. c) $\dfrac{3}{20}$

D. d) $\dfrac{6}{25}$

Answer: a) $\dfrac{2}{5}$

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405. If $P(B) = \dfrac{3}{5}, P(A/B) = \dfrac{1}{2}$ and $P(A \cup B) = \dfrac{4}{5},$ then $P(B/A) =$

A. a) $\dfrac{1}{5}$

B. b) $\dfrac{4}{5}$

C. c) $\dfrac{1}{2}$

D. d) $\dfrac{3}{5}$

Answer: d) $\dfrac{3}{5}$

406. If A and B are two events such that $P(A) = 0.4$, $P(B) = 0.3$ and $P(A \cup B) = 0.5$,then $P(B \cap A)$ equals

A. a) $\dfrac{2}{3}$

B. b) $\dfrac{1}{2}$

C. c) $\dfrac{3}{10}$

D. d) $\dfrac{1}{5}$

Answer: d) $\dfrac{1}{5}$

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

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

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

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

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

Answer: c) $P(A) \cdot P(B)$

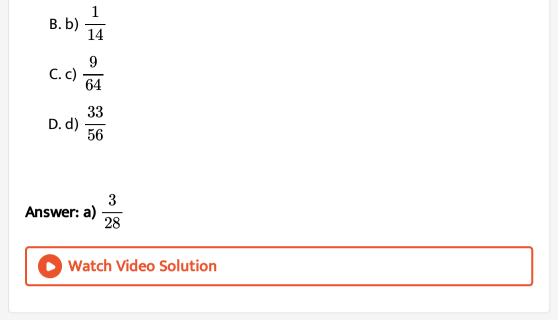> ▶ Watch Video Solution

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

A. a) $\dfrac{4}{15}$

B. b) $\dfrac{8}{45}$

C. c) $\dfrac{1}{3}$

D. d) $\dfrac{2}{9}$

Answer: a) $\dfrac{4}{15}$

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409. If A and B are two independent events such that $P(A) = 0.3$, $P(A \cup B) = 0.5$, then $P(A/B) - P(B/A) =$ b) $\dfrac{3}{25}$ c) $\dfrac{1}{70}$ d) $\dfrac{1}{7}$

A. a) $\dfrac{2}{7}$

B. b) $\dfrac{3}{25}$

C. c) $\dfrac{1}{70}$

D. d) $\dfrac{1}{7}$

Answer: c) $\dfrac{1}{70}$

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410. A flash light 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. a) $\dfrac{3}{28}$

B. b) $\dfrac{1}{14}$

C. c) $\dfrac{9}{64}$

D. d) $\dfrac{33}{56}$

Answer: a) $\dfrac{3}{28}$

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

A. a) $\dfrac{15}{29}$

B. b) $\dfrac{15}{56}$

C. c) $\dfrac{45}{196}$

D. d) $\dfrac{15}{392}$

Answer:

412. A bag containing 5 red and 3 blue balls. If 3 balls are drawn at random without replacement the probability that exactly two of the three balls were red, the first being red is

413. In a college 3% 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. a) $\dfrac{1}{10}$

B. b) $\dfrac{1}{3}$

C. c) $\dfrac{2}{5}$

D. d) $\dfrac{9}{20}$

Answer: c) $\dfrac{2}{5}$

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414. Three persons A , B and C fire target is turn starting with A. their probabilities of hitting their target are $0.4, 0.3$ and 0.2 respectively. The probability of two hits is

    A. a) 0.024

    B. b) 0.452

    C. c) 0.336

    D. d) 0.188

Answer: d) 0.188

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

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

A. a) $\dfrac{1}{13} \times \dfrac{1}{13}$

B. b) $\dfrac{1}{13} + \dfrac{1}{13}$

C. c) $\dfrac{1}{13} \times \dfrac{1}{17}$

D. d) $\dfrac{1}{13} \times \dfrac{4}{5}$

Answer: a) $\dfrac{1}{13} \times \dfrac{1}{13}$

417. 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. a) $\dfrac{167}{168}$

B. b) $\dfrac{1}{28}$

C. c) $\dfrac{2}{21}$

D. d) $\dfrac{3}{28}$

Answer: d) $\dfrac{3}{28}$

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

A. a) $\dfrac{1}{18}$

B. a) $\dfrac{5}{18}$

C. c) $\dfrac{1}{5}$

D. d) $\dfrac{2}{5}$

Answer: c) $\dfrac{1}{5}$

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

A. a) $\dfrac{2}{3}$

B. b) $\dfrac{3}{5}$

C. c) $\dfrac{1}{3}$

D. d) $\dfrac{3}{4}$

Answer: c) $\dfrac{1}{3}$

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

A. a) $\dfrac{1}{2}$

B. b) $\dfrac{1}{4}$

C. c) $\dfrac{1}{8}$

D. d) $\dfrac{3}{4}$

Answer: c) $\dfrac{1}{8}$

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

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422. Let A and B be two events. If $P(A) = 0.2$, $P(B) = 0.4$, $P(A \cup B) = 0.6$ then $P(A/B)$ is equal to

A. a) 0.8

B. b) 0.5

C. c) 0.3

D. d) 0

Answer: d) 0

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Others

1. Let d_1, d_2, d_3 be thee mutually exclusive diseases. Let $S = \{s_1, s_2, s_3, s_6\}$ be the set of observable symptoms of these diseases. For example s_1 is the shortness of breath, s_2 is loss of weight, s_3 is fatigue etc. Suppose a random sample of 10,000 patients contains 3200

patients with disease d_1, 3500 with disease d_2 and 3300 with disease d_3.

Also, 3100 patients with disease d_1, 3300 with disease d_2 and 3000 with disease d_3 show the symptom S. Knowing that the patient has symptom S, the doctor wishes to determine the patients illness. One the basis of this information, what should the doctor conclude?

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2. Three bags contain a number of red and white balls are as follow: Bag I:3 red balls; Bag II: 2 red balls and 1 white ball; Bag III: 3 white balls selected, what is the probability that it came from (i) Bag II (ii) Bag III

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3. There are 3 red and 5 black balls in bag A; and 2 red and 3 black balls in bag B. One ball is drawn from bag A; and two from bag B. Find the probability that out of the 3 balls drawn one is red and 2 are black.

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4. A coin is tossed, then a die is thrown. Find the probability of obtaining a 6 given that head came up.

5. If A and B are two events such that: $P(A) = \dfrac{1}{2}$, $P(B) = \dfrac{1}{3}$ and $P(A \cap B) = \dfrac{1}{4}$, find $P(A/B)$,$P(B/A)$, $P(A/B)$ and $P(A/B)$.

6. If A and B are two events such that 2 $P(A) = P(B) = \dfrac{5}{13} and \ P(A/B) and P(A/B)$.

7. The probability that a teacher will give an un announced test during any class meeting is 1/5. If a student is absent twice, what is the

probability that he will miss at least one test?

8. In a hockey match, both teams A and B scored same number of goals upto the end of the game, so to decide the winner, the referee asked both the captains to throw a die alternatively and decide that the team, whose captain gets a first six, will be declared the winner. If the captain of team A was asked to start, find their respective probabilities of winning the match and state whether the decision of the refree was fair or not.

9. One bag contains 4 yellow and 5 red balls. Another bag contains 6 yellow and 3 red balls. A ball is transferred from the first bag to the second bag and then a ball is drawn from the second bag. Find the probability that ball drawn is yellow.

10. The contents of urn, I, II, III are as follows Urn I: White, 2 black and 3 red balls Urn II: 2 white, 1 black and 1 red balls. Urn III: 4 white, 5 black and 3 red balls One run is chosen at random and two balls are drawn. They happen to be white and red what is the probability that they come from Urns, I, II, III?

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11. In a factory machine A produces 30% of the total output, machine B produces 25% and the machine C produces the remaining output. If defective items produced by machines A, B and C are 1% , 1.2% 2% respectively. Three machines working together produce 10000 items in a day. An item is drawn at random from a day's output and found to be defective. Find the probability that it was produced by machine B?

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

Black $(B1-3), (B2-2), (B3-1), (B4-4)$

White $(B1-4), (B2-2), (B3-2), (B4-3)$

Red $(B1-5), (B2-2), (B3-3), (B4-1)$

Blue $(B1-6), (B2-2), (B3-1), (B4-5)$

A box is selected at random and then a ball is randomly drawn from the selected box. The color of the ball is black, what is the probability that ball drawn is from the box III.

13. If two events A and B are such tat $P(A) = 0.3$, $P(B) = 0.4$ and $P(A \cap B') = 0.5$, find $P(B/A \cap B')$

14. If A and B are two events such that $P(A) \neq \varphi$, $B = \varphi$, then $P(A/B) = b)$P(A//B)=P(A)P(B)$c)$P(A//B)=P(B//A)=1$d)$P(A//B)=(P(A))/(P(b))$`

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

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

C. c) $P(A/B) = P(B/A) = 1$

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

Answer: a) $P(A/B) = \dfrac{P(A \cap B)}{P(B)}$

15. If two events are independents, then

A. a) They must be mutually exclusive

B. b) The sum of their probabilities must be equal to 1

C. c) A and B both are correct

D. d) None of the above is correct

Answer: d) None of the above is correct

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

A. a) $\dfrac{9}{10}$

B. b) $\dfrac{10}{9}$

C. c) $\dfrac{8}{9}$

D. d) $\dfrac{9}{8}$

Answer: b) $\dfrac{10}{9}$

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