MATHS

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PROBABILITY

Example

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1. A coin is tossed 6 times,What is the probability of getting exactly 4 heads.

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2. Find the probability of obtaining an even prime number as the sum when a pair of dice are rolled.

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3. In an examination.30% of students failed in Maths,20% of students failed in Chemistry and 10% of students failed in both Maths & Chemistry.A student is selected at

random.Find the probability that (i) The student has failed in Maths.

4. In an examination.30% of students failed in Maths,20% of students failed in Chemistry and 10% of students failed in both Maths & Chemistry.A student is selected at random.Find the probability that (ii) The student has failed in Chemistry

5. In an examination.30% of students failed in Maths,20% of students failed in Chemistry and 10% of students failed in both Maths & Chemistry.A student is selected at random.Find the probability that the student has failed in Maths,it is known that he has failed in Chemistry.

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6. A die is thrown and six possible out comes are equally liked.E is the event,the number appearing is a an multiple of 3,and F is the event,'The number appearing is even',Calculate P(E) and P(F)

7. A die is thrown and six possible outcomes are equally liked.E is the event,the number appearing is a an multiple of 3,and F is the

event,'The number appearing is even',Calculate

$P(E \cap F)$

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

9. Find the probability distribution of the number of sucesses in two tosses of a die where success is defined as number greater than 4

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10. Find the bionomial distribution whose mean is 10 and standard deviation $2\sqrt{2}$

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

12. 5 boys and 5 girls are siting in a row randomly . The probability that boys and girls sit alternatively is : a)$\dfrac{5}{126}$ b)$\dfrac{1}{126}$ c)$\dfrac{4}{126}$ d)$\dfrac{6}{126}$

13. If $P(A) = \dfrac{3}{4}$, P(B)=4/5 and $P(A \cup B) = \dfrac{31}{20}$ ` the events A and B are

A. a.Dependents only on A

B. b.Mutually exclusive

C. c.Independent

D. d.Dependent only on A

Answer:

▶

14. What is the probability that the position in which the consonants remains unchanged when the letters of "MATH"are re-arranged?

15. A shooter can hit a target once in a 4 shots.If he fires 4 shots in succession,what is the probability that he will hit his target.

16. Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that one of them is black and the other is red.

17. Out of 9 outstanding students of a school,there are 4 boys and 5 girls.A team of 4 students is to be selected for a quiz

competition.Find the probability that 2 boys and 2 girls are selected.

18. In a binominal distribution mean is 6 and standard deviation is $\sqrt{2}$.What is the number of trials.

19. A company has two plants to manufacture scooters.Plant I manufactures 70% of the scooters and Plant II manufactures 30%.At Plant I,30% of the scooters are 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?

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20. Let E and F be events such that $P(E) = \dfrac{1}{3}, P(F) = \dfrac{1}{4}, P(E \cap F) = \dfrac{1}{5}$.Find $P(E \mid F)$

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21. Let E and F be events such that $P(E) = \dfrac{1}{3}, P(F) = \dfrac{1}{4}, P(E \cap F) = \dfrac{1}{5}$Find $P(F \mid E)$

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22. Let E and F be events such that $P(E) = \dfrac{1}{3}$, $P(F) = \dfrac{1}{4}$, $P(E \cap F) = \dfrac{1}{5}$ Find $P(E \cup F)$

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23. Let E and F be events such that $P(E) = \dfrac{1}{3}$, $P(F) = \dfrac{1}{4}$, $P(E \cap F) = \dfrac{1}{5}$ Find $P(\overline{F} \backslash \overline{E})$

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24. A bag contains 4 white and 2 black balls.Another bag contains 3 white and 5 black balls.If one ball is drawn from each bag.Find the probability that both are white

25. A bag contains 4 white and 2 black balls.Another bag contains 3 white and 5 black balls.If one ball is drawn from each bag.Find the probability that both are black

26. A bag contains 4 white and 2 black balls.Another bag contains 3 white and 5 black balls.If one ball is drawn from each bag.Find the probability that One is white and one is black.

27. It is known that 10% of certain articles manufactured are defective . What is the

probability that in a random sample of 12 such

articles 9 are defective?

28. A can hit target 4 times out of 5 times,B

can hit target 3 times out of 4 times and C can

hit target 2 times out of 3 times. They fire

simultaneously.Find the Probability Any two

out of A,B and C will hit the target.

29. A can hit target 4 times out of 5 times,B can hit target 3 times out of 4 times and C can hit target 2 times out of 3 times. They fire simultaneously.Find the Probability that None of them will hit the target.

30. A coin is tossed 5 times.What is the probability of getting 3 heads?

31. A coin is tossed 5 times What is the probability of getting at least 3 heads?

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

the youngest is a girl

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

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

that both are girls given that

atleast one is a girl

35. A and B independently try to solve a problem.Probability that A slove the problem is 1/3 and that B solves the problem is 1/4.Find the probability that both of them solves the problem.

36. A and B independently try to solve a problem.Probability that A slove the problem is 1/3 and that B solves the problem is 1/4.Find the probability that the problem is solved

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37. Find the probability distribution of the number of heads in three tosses of a fair coin.

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38. What is meant by mutually exclusive events?

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

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40. In four throws with a pair of dice,what is the probability of throwing doublets twice

41. In four throws with a pair of dice,what is the probability of throwing doublets at least twice.

42. Suppose that 5 men out of 100 and 25 women out of thousand are colour blind.A colour blind person is chosen at random.What is the probability of this being male (assuming that males and females are in equal proportion).

43. A can hit a target 4 times in 5 shots.B three times in 4 shots,C two times in three

shots.Calculate the probability that A,B,C all may hit.

44. A can hit a target 4 times in 5 shots.B three times in 4 shots,C two times in three shots.Calculate the probability that B,C may hit and A may lose.

45. A can hit a target 4 times in 5 shots.B three times in 4 shots,C two times in three shots.Calculate the probability that any two will hit the target.

46. A can hit target 4 times out of 5 times,B can hit target 3 times out of 4 times and C can hit target 2 times out of 3 times. They fire

simultaneously.Find the Probability that None of them will hit the target.

47. An urn contains 5 white and 8 black balls.Two successive draws

of three balls at a time are made such that the balls are not

replaced brfore the second trial.Find the probability in ecah

case that the first drawing will give 3 white

and the

second 3 black balls.

48. An urn contains 5 white and 8 black

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probability in ecah

case that the first drawing will give 3 white

and the

second 3 black balls.

49. Two persons A and B throw a die alternatively till one of them gets a three and wins the game.If A begins,find (i) the probability of winning of A.

50. Two persons A and B throw a die alternatively till one of them gets a three and wins the game.If A begins,find (ii) the probability of winning of B.

51. A doctor claims that 60% of the patients he examines are allergic to some type of weed.what is the probability that (i) Exactly

three of his next four patients are allergic to weeds.

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52. A doctor claims that 60% of the patients he examines are allergic to some type of weed.what is the probability that (ii)None of his next four patients is allergic to weeds.

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53. Probability that a problem will be solved by three students are 1/4,1/2,3/4 respectively.what is the probability that all solves the problem.

54. Probability that a problem will be solved by three students are 1/4,1/2,3/4 respectively.what is the probability that none solves the problem

55. Probability that a problem will be solved by three students are 1/4,1/2,3/4 respectively.what is the probability that the problem will be solved

56. Probability that a problem will be solved by three students are 1/4,1/2,3/4 respectively.what is the probability that (iv).Exactly one solves the problem

57. A coin is tossed three times,where the events A:occurring at most two heads,B:occuring at most one tail (i)Write P(A),P(B)

58. A coin is tossed three times,where the events A:occurring at most two

heads,B:occuring at most one tail (ii)Find

$P(A \mid B)$ and $P(B \mid A)$

59. In a hostel 50% of the girls like tea, 40%
like coffee and 20% like both tea and coffee

A girl is selected at random.

Find the probability that she likes neither tea
or coffee .

60. In a hostel 50% of the girls like tea, 40% like coffee and 20% like both tea and coffee.A girl is selected at random.If the girl likes tea,then find the probability that she likes coffee.

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61. In a hostel 50% of the girls like tea, 40% like coffee and 20% like both tea and coffee .A girl is selected at random.If she likes coffee then find the probability she likes tea.

62. Vineetha and Reshma are competing for the post of school leader. The probability Vineetha to be elected is 0.6 and that of Reshma is 0.4 Futher if Vineetha is elected the probability of introducing a new pattern of election is 0.7 and the corresponding probability is 0.3 , if reshma is elected. Find the probability that the new pattern of election is introduced by Reshma ?

63. Find the probability distribution of the number of success in two tosses of a die where the success is defined as getting a number less than 5.

64. Given that E and F are events such that P(E) =0.6 P(F)=0.4 and $P(E \cap F) = 0.2$Then $\dfrac{P(E \mid F)}{P(F \mid E)}$ is (1/2,1/3,3/2,2/3)

65. A die thrown twice and the sum of the numbers appearing is observed to be greater than 9.What is the conditional probability that the number 5 is appearing at least once.

66. A and B are two events such that P(A)=1/5 and $P(A \cup B) = \dfrac{2}{3}$.Find p(B) if they are

mutually exclusive a)1/5 b) 2/5 c) 3/5 d) 7/15

67. A box contains 3 red and 4 blue balls. Two balls are drawn one by one without replacement. Find the probability of getting both balls red.

68. Three cards are drawn successively without replacement from a pack of 52 cards. What is the probability that first two cards are queen and the third is king.

69. Find $P(A \cap B)$ If A and B are independent events with P(A)=$\dfrac{1}{5}$ and P(B)=$\dfrac{5}{8}$. a) $\dfrac{6}{13}$ b)$\dfrac{33}{40}$ c) $\dfrac{1}{8}$ d)$\dfrac{5}{8}$

70. An unbiased die is thrown twice. Let the event A be getting prime number in the first throw and B be the event of getting an even number in the second throw. Check the independence of the events A and B

71. The probability of solving a problem independently by A and B are $\dfrac{1}{3}$ and $\dfrac{1}{4}$

respectively. Find the probability that exactly one of them solves the problem.

72. A set of events

$$E_1, E_2, ...E_n$$

are said to be a partition of the sample space, then which of the following conditions is always not true

73. A person has undertaken a business. The probabilities are 0.80 that there will be a crisis, 0.85 that the business will be completed on time if there is no crisis and 0.35 that the business will be completed on time if there is a crisis. Determine the probability that the business will be complete on time

74. A box contains 5 red and 10 black balls. A ball is drawn at random, its colour is noted

and is returned to the box. More over 2 additional balls of the colour drawn are put in the box and then a ball is drawn.what is the probability that the second ball is red.

75. Bag 1 contains 5 red and 6 black balls. Bag2 contains 7 red and 5 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from bag 1.

76. A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both diamonds. Find the probability of the lost card being diamond.

77. If X denotes number of heads obtained in tossing two coins. Then which of the following

is false a) X(HH) = 2 b)X(HT) = 1 c)X(TH) = 0

d)X(TT) = 0

A. (X(HH)=2

B. X(HT)=1

C. X(TH)=0

D. X(TT)=0

Answer:

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78. Find the probability distribution of number of heads in two tosses of a coin.

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

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80. Fill in the blank of a probability distribution of a random variable X.

X	0	1	2
P(X)	0.2	0.4	.....

A. 0.2

B. 0.3

C. 0.4

D. 0.6

Answer:

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

82. The probability that a student is not a sportsman is 1/5.Then the probability that out of 6 students,4 are sportsman is.

83. Find the probability of throwing at most 2 sixes in 6 throws of a single die.

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

85. If P(A) = 0.8, P(B) = 0.5, P(B/A) = 0.4, Find

$P(A \cap B)$

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86. If P(A) = 0.8, P(B) = 0.5, P(B/A) = 0.4, Find

P(A/B)

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87. If P(A) = 0.8, P(B) = 0.5, P(B|A) = 0.4, Find

$P(A \cup B)$

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

89. Find the probability distribution of number of heads in two tosses of a coin.

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

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91. A die is thrown again and again until three sixes are obtainined.find the probability of obtaining the third six in the sixth throw of the die.

92. 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 fails)=0.2 P(B fails

alone)=0.15 P(A and B fail)=0.15 Evaluate the following probabilities (i)P(A fails |B has failed)

93. 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 fails)=0.2 P(B failsalone)=0.15 P(A and B fail)=0.15 Evaluate the following probabilities (ii)P (A fails alone)

94. Given two independent events A and B such that $P(A) = 0.3, P(B) = 0.6$. Find i) P(A and B) ii) P(A and not B) III) P(A or B) iv) P(neither A nor B)

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95. Given two independent events A and B such that $P(A) = 0.3, P(B) = 0.6$. Find i) P(A and B) ii) P(A and not B) III) P(A or B) iv) P(neither A nor B)

96. Given two independent events A and B such that $P(A) = 0.3, P(B) = 0.6$. Find i) P(A and B) ii) P(A and not B) III) P(A or B) iv) P(neither A nor B)

97. Given two independent events A and B such that $P(A) = 0.3$, P(B)=0.6`. find P(neither

A nor B)

98. The probability distribution of a random variable X is given in the following table:

Find k.

X	0	1	2	3	4
P(X)	0.1	k	2k	2k	k

99. The probability distribution of a random variable X is given in the following table:

X	0	1	2	3	4
P(X)	0.1	k	2k	2k	k

Find the probability that X lies between 1 and 4.

100. The probability distribution of a random variable X in given in the following table:

Find the mean of X.

X	0	1	2	3	4
P(X)	0.1	k	2k	2k	k

101. The probability distribution of a random variable X in given in the following table:

Find the mean of X.

X	0	1	2	3	4
P(X)	0.1	k	2k	2k	k

102. A bag contains 4 red and 4 black balls, another bag contains 2 red and 6 black balls. One ball of the two bag is drawn at random and the ball is drawn the bag is found to be red. Find the probability that the ball is drawn from first bag

103. A random variable X has the following distribution function:

Find k.

X	0	1	2	3	4
P(X)	K	3k	5k	7k	4k

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104. A random variable X has the following distribution function:

X	0	1	2	3	4
P(x)	k	3k	5k	7k	4k

Find the mean and the variance of the random variable x.

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105. The probability distribution of a random variable is given by p(x) . What is $\sum P(x)$?

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106. The following is a probability distribution function of a random variable

Find K

x	-5	-4	-3	-2	-1	0
P(x)	k	2k	3k	4k	5k	7k
x	1	2	3	4	5	
P(x)	8k	9k	10k	11k	12k	

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107. The following is a probability distribution function of a random variable.

x	-5	-4	-3	-2	-1	0	1	2	3	4	5
p(x)	k	2k	3k	4k	5k	7k	8k	9k	10k	11k	12k

(ii) Find P(x>3)

108. The following is a probability distribution function of a random variable.

x	-5	-4	-3	-2	-1	0	1	2	3	4	5
p(x)	k	2k	3k	4k	5k	7k	8k	9k	10k	11k	12k

(iii)Find

$P(- 3 < x < 4)$

109. The following is a probability distribution function of a random variable.

x	-5	-4	-3	-2	-1	0	1	2	3	4	5
p(x)	k	2k	3k	4k	5k	7k	8k	9k	10k	11k	12k

Find $P(x \leq 3)$

110. If A and B are two events such that $A \subset B$

and $P(A) \neq 0$ then P(A/B) is

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

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

C. $\dfrac{1}{P(A)}$

D. $\dfrac{1}{P(B)}$

Answer:

111. There are two identical bags. Bag |

contains 3 red and 4 black balls while bag ||

contains 5 red and 4 black balls. One ball is

drawn at random from one of the bags.

Find the probability that all the ball drawn are

red

112. There are two identical bags. Bag I contains 3 red and 4 black balls while bag II contains 5 red and 4 black balls. One ball is drawn at random from one of the bags.

If the balls drawn is red what is the probability that it was drawn from bag I?

113. Consider the following probability distribution of a random variable X Find the value of K

X	0	1	2	3	4
P(X)	$\dfrac{1}{16}$	$\dfrac{2}{16}$	K	$\dfrac{5}{16}$	$\dfrac{1}{16}$

114. Consider the following probability distribution of a random variable X.

X	0	1	2	3	4
P(X)	$\dfrac{1}{16}$	$\dfrac{2}{16}$	K	$\dfrac{5}{16}$	$\dfrac{1}{16}$

(ii)

Determine the Mean and Variance of X.

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115. If P(A) = 0.3, P(B) = 0.4, then the value of $P(A \cup B)$ where A and B are independent events a)0.48 b)0.51 c)0.52 d)0.58

A. 0.48

B. 0.51

C. 0.52

D. 0.58

Answer:

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116. A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both diamonds. Find the probability of the lost card being diamond.

117. A pair of dice is thrown 4 times. If getting a doublet is considered as a success.Find the probability of getting a doublet.

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

119.

X	1	2	3	4	5
P(X)	1/2	1/4	1/8	1/16	p

The probability distribution of a random variable X taking values 1,2,3,4,5 is given a.Find the value of P

120.

X	1	2	3	4	5
P(X)	1/2	1/4	1/8	1/16	p

The probability distribution of a random variable X taking values 1,2,3,4,5 is given b.Find the mean of X

121.

X	1	2	3	4	5
P(X)	1/2	1/4	1/8	1/16	p

The probability distribution of a random variable X taking values 1,2,3,4,5 is given c.Find the variance of X

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Exercise

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

2. Two dice are thrown and it is known that the numbers which turns up are different.Find the probability that the sum of the two numbers is 6.

3. A and B try to solve a problem independently. The probability that A solves the problem is1/2 and that of B solves the problem is1/3. Find the probabilty that Both of them solved the problem.

4. A and B try to solve a problem independently. The probability that A solves

the problem is1/2 and that of B solves the

problem is1/3. Find the probabilty that the

problem is solved.

5.   If $P(A) = 0.8, P(B) = 0.5$ and

$P(B \mid A) = 0.4$,Find (i)$P(A \cap B)$

6. A and B are two events such that P(A)=0.8, P(B)=0.5 and P(B|A)=0.4, then find P(A|B)

7. If P(A) = 0.8, P(B) = 0.5, P(B|A) = 0.4, Find

$$P(A \cup B)$$

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

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