



## MATHS

### BOOKS - BHARATI BHAWAN MATHS (HINGLISH)

#### Elementary Probability

##### Example

1. If  $p$  and  $q$  are chosen randomly from the set  $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$  with replacement, determine the probability that the roots of the equation  $x^2 + px + q = 0$  are real.

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2. A determinant of the second order is made with the elements 0 and 1. What is the probability that the determinant made is non-negative?



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3. Two squares of  $1 \times 1$  are chosen at random on a chessboard. What is the probability that they have a side in common ?



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4. Five ordinary dice are rolled at random and the sum of the numbers shown on them is 16. What is the probability that the numbers shown on each is any one from 2, 3, 4 or 5?



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5. Out of  $(2n+1)$  tickets consecutively numbered, three are drawn at random. Find the chance that the numbers on them are in AP.



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6. A car is parked among  $N$  cars standing in a row but not at either end. On his return, the owner finds that exactly  $r$  of the  $N$  places are still occupied. What is the probability that both the places neighbouring his car are empty?

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7. Two non negative integers are chosen at random. The probability that the sum of the square is divisible by 10, is

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8. From an ordinary pack of 52 cards an even number of cards are drawn at random. Find the probability of getting equal number of black and red cards.

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9. The sum of the digits of a seven-digit number is 59. Find the probability that this number is divisible by 11.

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10. A, B and C are events associated with a random experiment such that

$$P(A) = 0.3,$$

$$P(B) = 0.4, \quad P(C) = 0.8, \quad P(A \cap B) = 0.08, \quad P(A \cap C) = 0.28 \quad \text{and}$$

$$P(A \cap B \cap C) = 0.09. \quad \text{If}$$

$P(A \cup B \cup C) \geq 0.75$  Then prove that  $P(B \cap C)$  lies in the interval  $[0.23, 0.48]$ .

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11. A coin is tossed  $(m + n)$  times,  $(m > n)$ . Find the probability of getting exactly  $m$  consecutive heads.

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**12.** For the three events

$A, B,$  and  $C, P(\text{exactly one of the events } A \text{ or } B \text{ occurs}) = P(\text{exactly one of } A \text{ or } C) = p$

and

$P(\text{all three events occur simultaneously}) = p^2,$  where  $p > 0$

Then, find the probability of occurrence of at least one of the three events  $A, B,$  and  $C$ .



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**13.** The decimal parts of the logarithms of two number taken at random are found to six places. what is the chance that the second can be subtracted from  $A$  the first without borrowing?



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**14.** In a multiple choice question, there are five alternative answers of which one or more than one are correct. A candidate will get marks on the question, if he ticks all the correct answers. If he decides to tick

answer all random, then the least number of choices should he be allowed, so that the probability of his getting marks on the question exceeds  $\frac{1}{8}$  is

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**15.** A consignment of 15 record players contains 4 defectives. The record players are selected at random, one by one, and examined. The one is examined, are not put back. Then the probability that 9th one examined is the last defective, is

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

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17. Sixteen players  $S_1, S_2, \dots, S_{16}$  play in a tournament. They are divided into eight pairs at random. From each pair a winner is decided on the basis of a game played between the two players of the pair. Assume that all the players are of equal strength. Find the probability that the player  $S_1$  is among the eight winners.



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18. Sixteen players  $S_1, S_2, \dots, S_{16}$  play in a tournament. They are divided into eight pairs at random. From each pair a winner is decided on the basis of a game played between the two players of the pair. Assume that all the players are of equal strength. Find the probability that the player  $S_1$  is among the eight winners.



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19. A pair of unbiased dice are rolled together till a sum of either 5 or 7 is obtained. Then find the probability that 5 comes before 7.



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20.  $A$  and  $B$  play a game of tennis. The situation of the game is as follows: if one scores two consecutive points after a deuce, he wins; if loss of a point is followed by win of a point, it is deuce. The chance of a server to win a point is  $\frac{2}{3}$ . The game is a deuce and  $A$  is serving. Probability that  $A$  will win the match is (serves are change after each game)  $\frac{3}{5}$  b.  $\frac{2}{5}$  c.  $\frac{1}{2}$  d.  $\frac{4}{5}$



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21. There are 70 students in a class out of which 60% are boys. If 20 girls passes an examination then find the probability that a randomly selected girl would have passed the examination.



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22. In a series of five one-day cricket matches between India and Pakistan, the probability of India winning or drawing are respectively  $\frac{1}{3}$  and  $\frac{1}{6}$ . If a win, loss or draw gives 2, 0 or 1 point respectively then find the probability that India will score 5 points in the series.

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23. There are  $n$  person sitting in a row two of them are selected at random the probability that two selected persons are not together is

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24. A coin is tossed 10 times. The probability of getting exactly six heads is

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25. A coin is tossed 10 times. The probability of getting exactly six heads is



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26. A coin is tossed 10 times. The probability of getting exactly six heads is



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27. A man takes a step forward with probability 0.4 and backward with probability 0.6. The probability that at the end of eleven steps he is just one step away from the starting point, is



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28. The probability of a man hitting a target in one fire is  $\frac{1}{4}$ . How many times at least must he fire at the target in order that his chance of hitting the target at least once will exceed  $\frac{2}{3}$ ?



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29. In a sequence of independent trials, the probability of the success in one trial is  $\frac{1}{4}$ . Find the probability that the second success takes place on or after the fourth trial in 6 trials.

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30. Statement-1: If  $p$  is chosen at random in the closed interval  $[0,5]$ , then the probability that the equation

$$x^2 + px + \frac{1}{4}(p + 2) = 0 \text{ has real roots is } \frac{3}{5}.$$

Statement-2: If discriminant  $\geq 0$ , then roots of the quadratic equation are always real.

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31. Two numbers  $x \in R$  and  $y \in R$  are selected such that  $x \in [0, 4]$  and  $y \in [0, 4]$ . Find the probability that the selected numbers satisfy the inequality  $y^2 \leq x$ .

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32. There is 30 % chance that it rains on any particular day. What is the probability what where is at least one rainy day within a period of 7 days ? Given that there is at least one rainy day, What is the probability that there are at least two rainy days ?



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33. For two events  $A$  and  $B$ , if  $P(A)P\left(\frac{A}{B}\right) = \frac{1}{4}$  and  $P\left(\frac{B}{A}\right) = \frac{1}{2}$ , then which of the following is not true ?



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## Exercise

1. A has 3 shares in a lottery containing 3 prizes and 9 blanks, B has 2 shares in a lottery containing 2 prizes and 6 blanks. Compare their chances of success



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2. Three dice are thrown, the numbers appearing on them are respectively  $a$ ,  $b$  and  $c$ . chance that the roots of the quadratic equation  $ax^2 + bx + c = 0$  are real is



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3. Statement-1: Out of 21 tickets with number 1 to 21, 3 tickets are drawn at random, the chance that the numbers on them are in AP is  $\frac{10}{133}$ .

Statement-2: Out of  $(2n+1)$  tickets consecutively numbered three are drawn at random, the chance that the number on them are in AP is  $(4n-10)/(4n^2 - 1)$ .



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4. A box contains 2 fifty paise coins, 5 twenty five paise coins and a certain fixed number  $n$  ( $\geq 2$ ) of ten and five paise coins. Five coins are taken out

of the box at random. Find the probability that the total value of these 5 coins is less than one rupee and fifty paise.

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5. The digits 1,2,3,4,5,6,7,8 and 9 are written in random order to form a nine digit number. The probability that this number is divisible by 4, is

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6. A bag contains 36 tickets, numbered from 0 to 35. Three of the tickets are drawn at random. Find the probability of the sum of the numbers in the three tickets drawn to be 36.

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7. A four-letter word is written down by taking letters from the word KANYAKUMARI. What is the chance of the word to be of all different

letters?



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8. A card is drawn from a pack of 52 playing cards. The card is replaced and the pack is reshuffled. If this is done six times. The probability that 2 hearts, 2 diamond and 2 black cards are drawn is



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9. A word of 5 letters is written down at random with the letters of the word COLLEGE. What is the probability that all the repeated letters were used?



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10. Six different balls are put in three different boxes, no box being empty. The probability of putting balls in the boxes in equal numbers is

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11. A number of six digits is written down at random. Find the probability that sum of digits of the number is even.

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12. A bag contains 6 coupons numbered 1, 2, 3, 4, 5 and 6. Five coupons are drawn and the coupons are placed in a row at random. What is the probability that the number read will be divisible by 6?

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13. Let  $X = \{x \mid 1 \leq x \leq 50, x \in N\}$ . A member of the set  $X$  is selected at random. Find the probability that the selected number is a solution of the inequation  $\frac{x^2 - 30x + 200}{x - 15} < 0$ .

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14. A bag has 10 balls. Six balls are drawn in an attempt and replaced. Then another draw of 5 balls is made from the bag. The probability that exactly two balls are common to both the draws is  $\frac{5}{21}$  b.  $\frac{2}{21}$  c.  $\frac{7}{21}$  d.  $\frac{3}{21}$



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15. A question paper is split into two groups - A and B. Group A contains 4 questions, each question having an alternative. Group B also contains 4 questions. A student has to answer at least one question from each group and he can answer up to 8 questions. What is the probability that a student will answer 3 questions?



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16. A coin is tossed 5 times. What is the probability that head appears an odd number of times?



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



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



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19. A man and a woman appear in an interview for two vacancies in the same post. The probability of man's selection is  $\frac{1}{4}$  and that of the woman's selection is  $\frac{1}{3}$ . What is the probability that none of them will be selected?



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**20.** A man and a woman appear in an interview for two vacancies in the same post. The probability of mans selection of  $\frac{1}{4}$  and that the womans selection is  $\frac{1}{3}$ . What is the probability that none of them will be selected?



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**21.** An ant-aircraft gun can take maximum of 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 0.2 respectively. What is the probability that the plane gets hit?



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**22.** 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.

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**23.** Two persons each make a single throw with a pair of dice. The probability that the throws are unequal is given by:

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**24.** A coin is tossed 10 times. What is the probability of getting exactly 7 consecutive tails, no two other tails being consecutive?

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**25.** A coin is tossed 10 times. The probability of getting exactly six heads is

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26. A bag contains 8 balls of two colours, red and green. 3 balls are taken out at random. The probability of getting more red balls than green is  $\frac{40}{56}$  and that of getting more green balls than red is  $\frac{16}{56}$ . What is the number of green balls in the bag?

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27. A hunter has a chance  $\frac{1}{r^2}$  of shooting down a tiger from a distance  $r$  metres. He takes his first shot when the tiger is at a distance of 2 metres. If he misses then he takes the second shot when the tiger is at a distance of 3 metres and so on. If he misses at his sixth shot also then the tiger escapes. Find the probability that the hunter will be successful to shoot down the tiger.

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28. A and B throw a pair of dice alternately. A wins the game, if he gets a total of 6 and B wins, if she gets a total of 7. If A starts the game, then

find the probability of winning the game by A in third throw of the pair of dice.

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

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**30.** v31

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**31.** A and B throw with one die for a stake of ₹11 which is to be won by the player who first throw 6. If A has the first throw, then what are their

respective expectations?



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**32.** In a set of five games in tennis between two players A and B, the probability of a player winning a game is  $\frac{2}{3}$  who has won the earlier game. A wins the first game. What is the probability that A will win at least three of the next four games?



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**33.** Three persons A, B and C, in order, cut a pack of cards replacing them after each cut on the condition that the first who cuts a spade shall win the prize. Find their respective chances.



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**34.** A box contains 2 black, 4 white, and 3 red balls. One ball is drawn at random from the box and kept aside. From the remaining balls in the box, another ball is drawn at random and kept aside the first. This process is repeated till all the balls are drawn from the box. The probability that the balls drawn are in the sequence of 2 black, 4 white, and 3 red is  $\frac{1}{1260}$  b.  $\frac{1}{7560}$  c.  $\frac{1}{126}$  d. none of these

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**35.** A bag contains 9 white balls and 1 black ball. Another bag contains 10 white balls. Eight balls are drawn from the first bag at random and put in the second bag. Again, eight balls are drawn from the second bag and put in the first. What is the chance that the black ball is still in the first bag?

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



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**37.** Cards are drawn one at random from a well shuffled full pack of 52 playing cards until 2 aces are obtained for the first time. If  $N$  is the number of cards required to be drawn, then show that  $P_{\{N=n\}} = \frac{(n-1)(52-n)(51-n)}{(50 \times 49 \times 17 \times 13)}$ , where  $n \geq 2$



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**38.** A square is inscribed in a circle with radius  $7\sqrt{2}$  units. Find the probability that a point lying inside the circle selected at random will lie inside the square.



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**39.**  $n$  different letters are put at random in  $n$  addressed envelopes. What is the probability that no letter is placed in the correct envelope?



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**40.** A die is tossed and when 6 appears then a coin is tossed two times. What is the probability of getting two heads?



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**41.** A private tutor admits 10 students, boys or girls, in a batch. The probability that a student admitted in his batch is girl is 0.4, then number of boys in his batch is:



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42. If in 6 trials of an experiment the probability of a successes is 5 times the probability of a failure, then find the probability of two successes.

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

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44. A hotel has 5 rooms for rental and they are always occupied. The owner has 3 TV sets available on the rental Rs 20 per day per set. Only one set will be supplied to one occupant if he wants it. The chance that an occupant will want to hire a set is  $\frac{3}{5}$ . Find the probability that the hotel owner will get Rs 60 per day by renting the sets.

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45. Numberse are selected at random, one at a time, from the two-digit numbers 00,01,02,....99 with replacement. An event E occurs if and only if the product of the two digits of a selected number is 18. If four numbers are selected, find probability that the event E occurs at least 3 times.

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46. The minimum number of tosses of a pair of dice so that the probability of getting the sum of the digits on the dice equal to 7 on atleast one toss is greater than 0.95, is, then  $\frac{n+1}{6}$  is

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47. There is a circle in the x-y plane whose equation is  $x^2 + y^2 = 49$  and a square is circumscribing this circle then find the probability that a selected point will lie inside the circle.

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48. There are two circles in the  $x$ - $y$  plane whose equations are  $x^2 + y^2 - 2y = 0$  and  $x^2 + y^2 - 2y - 3 = 0$ . A point is chosen at random inside the larger circle. Find the probability that the point has been taken from outside the smaller circle.



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49. If there are 50 students in a class out of which 35 are boys. If only 60% of students pass in an examination then find the probability that a student selected at random will be a girl who has passed the exam.



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50. A real number  $x$  is selected at random from the solution set of inequality  $y^2 - y - 6 \leq 0$ . What is the probability that  $\frac{(x+1)(x-2)}{x} - 4 \geq 0$ ?

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51. Three tangents are drawn at random to a given circle. Show that the odds are 3:1 against the circle being inscribed in the triangle formed by the tangents.

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52. A floor is paved with rectangular marble blocks, each of length  $a$  and breadth  $b$ . A circular block of diameter  $c$  ( $c < a, b$ ) is thrown on the floor at random. Show that the chance that it falls entirely on one rectangular block is  $\frac{(a - c)(b - c)}{ab}$ .

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53. A letter is taken out at random from 'ASSIGNMENT' and another from 'ASSOCIATE'. The probability that both the letters are same is

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54. A fair dice is rolled once. The probability that an odd number less than 5 turns up is \_\_\_\_\_ and the probability that a number greater than or equal to 3 turns up is \_\_\_\_\_.



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55. The probabilities of two independent events A and B are respectively \_\_\_\_\_ and \_\_\_\_\_,  $P(A > B)$  if the probability that both occur is  $\frac{1}{6}$  and the probability that none of them occur is  $\frac{1}{3}$ .



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56. Two students A and B solve a problem. Their respective probabilities of solving the problem are  $\frac{2}{3}$  and  $\frac{1}{2}$ . The probability of the problem being solved by at least one of them is \_\_\_\_\_.



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57. If A, B are two equiprobable events such that  $P(A \cap B) = \frac{1}{4}$  and  $P(A' \cap B') = \frac{1}{5}$  then  $P(A) = \underline{\hspace{2cm}}$ .

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58. Events A, B, C are mutually exclusive events such that  $P(A) = \frac{3x + 1}{3}$ ,  $P(B) = \frac{1 - x}{4}$  and  $P(C) = \frac{1 - 2x}{2}$ . The set of all possible values of x are in the interval

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59. n letters are written to different persons and their addresses are also written on n envelopes. Letters are put at random in the envelopes. Then the probability that at least one letter is put in wrong envelope, is \_\_\_\_\_.

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**60.** A problem is given to three students whose chances of solving it are  $\frac{1}{2}$ ,  $\frac{1}{3}$  and  $\frac{1}{4}$  respectively. What is the probability that the problem will not be solved?



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**61.** Three items from a lot of 10 items are defective. If two items are selected randomly one by one without replacing then the probability that both are defective items.



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**62.** Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even?



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63. Three letters are written to different persons and their addresses are also written on three envelopes. Letters are put at random in the envelopes. Then the probability that at least two letters are put in correct envelopes, is \_\_\_\_\_.



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64. Three letters are written to different persons and their addresses are also written on three envelopes. Letters are put at random in the envelopes. Then the probability that at least one letter is put in the correct envelope, is \_\_\_\_\_.



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65. There are 4 envelopes and 4 letters are to be put in these envelopes randomly, then number of ways such that at least 2 letters are placed in wrong envelope.



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66. The probability that out of 10 person, all born in June, at least two have the same birthday is

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67. The probability of a leap year to have 53 Mondays is \_\_\_\_\_.

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68. If two of the 64 squares are chosen at random on a chess board, the probability that they have a side in common is

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69. 12 people are asked questions in succession in a random order and exactly 3 out of 12 people know the answer. The probability that the 6<sup>th</sup>

person asked is the 2<sup>nd</sup> person to know the answer, is

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70. Two numbers are selected at random from 1,2,3,...,100 and are multiplied, then the probability correct to two places of decimals that the product thus obtained is divisible by 3, is

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71. Three dice are thrown simultaneously. The probability of obtaining a sum of 6 is \_\_\_\_\_.

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72. Urn A contains 6 red and 4 black balls and urn B contains 4 red and 6 black balls. One ball is drawn at random from urn A and placed in urn B. Then, one ball is drawn at random from urn B and placed in urn A. If one

ball is drawn at random from urn A, the probability that it is found to be red, is....

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73. A and B are two events such that the probability that both A and B occur is  $\frac{1}{6}$  and the probability that at least one of them occurs is  $\frac{2}{3}$ .

The probability of the occurrence of A = \_ \_ if  $P(A) = 2P(B)$ .

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74. The probabilities that on a certain day the two trains from Calcutta and Mumbai arrive on time at Delhi are 0.93 and 0.89 respectively. The probability that both trains arrive on time is 0.87. Then the probability that at least one train is on time is \_\_\_\_\_.

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

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76. Three six-faced dice are thrown together. The probability that the sum of the numbers appearing on the dice is  $k$  ( $3 \leq k \leq 8$ ), is

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77. Four small squares on a chessboard are selected at random. The probability that they form a square of the size  $2 \times 2$  is \_\_\_\_\_.

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78. A coin is tossed three times. The probability of getting head and tail alternately, is



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**79.** A room contains 3 sockets for bulbs. If from a collection of 10 bulbs, out of which 6 are defective, 3 bulbs are selected at random and put in the sockets, then the probability that the room is lighted is



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**80.** A bag contains 17 markers with numbers 1 to 17 . A marker is drawn at random and then replaced, a second marker is drawn then the probability that first number is even and second is odd, is



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**81.** 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.  $\frac{{}^7P_5}{7^5}$  b.  $\frac{7^5}{{}^7P_5}$

c.  $\frac{6}{{}^6P_5}$  d.  $\frac{{}^5P_5}{5^5}$



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**82.** A card is drawn at random from a pack of 52 cards. The chance that it is either an ace or a heart is \_\_\_\_\_.



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**83.**  $P(A \cup B) = P(A \cap B)$  if and only if the relation between  $P(A)$  and  $P(B)$  is .....



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**84.** 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) 0.8750 (b) 0.0875 (c) 0.0625 (d) 0.0250

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85. If  $x$  denotes the number of sixes in four consecutive throws of a dice, then  $P(x=4)$  is

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86. Let an ordinary coin be tossed 15 times. If  $P_r$  denotes the probability of getting  $r$  tails and  $P_k$  is maximum then  $k = \underline{\hspace{2cm}}$ .

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87. Two coins are tossed 4 times. The chance that there will be equal number of heads and tails, is  $\underline{\hspace{2cm}}$ .

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**88.** The probability that an event A happens in one trial of an experiment, is 0.4. There independent trials of the experiments are performed. The probability that the event A happens atleast once, is

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**89.** The odds in favour of A winning a game against B are 4:3. The probability of B winning 3 games out of 7 played is \_\_\_\_\_.

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**90.** The probability of a missile hitting a target bridge is  $\frac{1}{5}$ . Two missiles are enough to destroy a bridge. If six missiles are fired at the bridge, the chance of the bridge being destroyed is \_\_\_\_\_.

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91. A dice is thrown six times. The probability of getting three sixes, the third six appearing in the sixth throw, is \_\_\_\_\_.

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92. Let  $A = [1, 2, 3, \dots, n]$  and  $f$  be any mapping from the set  $A$  to itself. If one such  $f$  is selected at random then the probability of  $f$  being invertible is \_\_\_\_\_.

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93. Two distinct integers  $x$  and  $y$  are chosen, without replacement, at random from the set  $\{x, y \mid 0 \leq x \leq 10, 0 \leq y \leq 10, x \text{ and } y \text{ are in integers}\}$  the probability that  $|x - y| \leq 5$  is :

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94. A trunk-call is booked. It is known that a trunk-call booked materialises any time within an hour. The chance that the call will take place within the first 15 minutes of the booking, is \_\_\_\_\_.



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



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96. The probabilities of two events are 0.25 and 0.50. The total probability of both happening together is 0.14. The probability of none of the events happening ?

A. 0.39

B. 0.25

C. 0.11

D. none of these

**Answer:**



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97. The probability that atleast one of the events A and B occurs is 0.6 If A and B occur simulataneously with probability 0.2, then  $P(\bar{A}) + P(\bar{B})$  is equal to

A. 0.4

B. 0.8

C. 1.2

D. 1.4

**Answer:**



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98. If the letters of the word ASSASSIN are written down in a row, the probability that no two S's occur together, is

A.  $\frac{1}{35}$

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

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

D. none of these

**Answer:**



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99. If  $P(A) = \frac{2}{3}$ ,  $P(B) = \frac{1}{2}$  and  $P(A \cup B) = \frac{5}{6}$ , then events A and B are

A. mutually exclusive

B. independent

C. independent as well as mutually exclusive

D. none of these

**Answer:**



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**100.** Three dice are rolled. The probability that different numbers will appear on them is

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

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

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

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

**Answer:**



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101. The probability of happening of an event A is 0.5 and that of B is 0.3. If A and B are mutually exclusive events, then the probability of neither A nor B is.....

- A. 0.6
- B. 0.5
- C. 0.7
- D. none of these

**Answer:**



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

- A.  $\frac{4}{5}$
- B.  $\frac{1}{6}$



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

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

**Answer:**



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**103.** A student appears for tests I, II and III. The student is successful if the passes either in tests I and II or tests I and III. The probabilities of the student passing in tests I, II and III are  $p, q$  and  $\frac{1}{2}$ , respectively. If the probability that the student is successful, is  $\frac{1}{2}$ , then

A.  $p(1 + q) = 1$

B.  $q(1 + p) = 1$

C.  $pq = 1$

D.  $\left(\frac{1}{p}\right) + \left(\frac{1}{q}\right) = 1$

**Answer:**



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**104.** The probability that Krishna will be alive 10 years hence is  $\frac{7}{15}$  and that Hari will be alive is  $\frac{7}{10}$ . What is the probability that both Krishna and Hari will be dead 10 years hence?

A.  $\frac{129}{150}$

B.  $\frac{126}{150}$

C.  $\frac{101}{150}$

D.  $\frac{94}{150}$

**Answer:**



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**105.** A soldier is firing at a moving target. He fires four shots. The probability of hitting the target at the first, second, third and fourth

shots are 0.6, 0.4, 0.2 and 0.1 respectively. What is the probability that he hits the target?

A.  $\frac{527}{625}$

B.  $\frac{3}{625}$

C.  $\frac{105}{625}$

D. none of these

**Answer: D**



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**106.** If  $A$  and  $B$  are independent events such that  $P(A) = 0.3$  and  $P(A \cup B') = 0.8$ , then  $P(B) =$

A.  $P(B) = \frac{1}{2}$

B.  $P(B) = \frac{2}{7}$

C.  $P(A \cap B) = \frac{3}{35}$

$$D. P(A \cap B) = \frac{3}{20}$$

**Answer:**



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**107.**  $A$  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  $1/3$ .

Find the probability of the occurrence of  $A$ .

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

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

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

D.  $\frac{1}{2}$  or  $\frac{1}{3}$

**Answer:**



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

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

B.  $\frac{11}{10}$

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

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

**Answer:**



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109. There are three events A, B and C one of which must , and only one can happen, the odd are 7 to 3 against A and 5 to 9 for B. Find the odds, against C.



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110. Two persons A and B throw two dice each. If A throws a sum of 9 then the probability of Y throwing a sum greater than that of A is

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

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

C.  $\frac{9}{54}$

D. none of these

**Answer: A**



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111. Three squares of Chess board are selected at random. Find the probability of getting 2 squares of one colour and other of a different colour.

A.  $\frac{8}{21}$

B.  $\frac{5}{21}$

C.  $\frac{16}{21}$

D. none of these

**Answer:**



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**112.** A natural number is selected at random from the set  $\{1 \leq x \leq 100\}$ .

The probability that number satisfies the inequation  $x^2 + 15 \leq 16x$ , is :-

A.  $\frac{9}{50}$

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

C.  $\frac{2}{11}$

D. none of these

**Answer:**



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

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

B.  $P(A \cap B) > P(A) + P(B)$

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

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

**Answer:**



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114. If E and F are independent events such that  $0 < P(E) < 1$  and  $0 < P(F) < 1$ , then

A. E, F are mutually exclusive

B. E,  $\bar{F}$  are independent

C.  $\bar{E}$ ,  $\bar{F}$  are independent



$$D. P\left(\frac{E}{F}\right) + P\left(\frac{\bar{E}}{F}\right) = 1$$

**Answer:**



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

$P(\bar{A} / \bar{B})$  is equal to

A.  $1 - P\left(\frac{A}{B}\right)$

B.  $1 - P\left(\frac{\bar{A}}{b}\right)$

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

D.  $P\frac{\bar{A}}{P}(\bar{B})$

**Answer:**



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116. For any two events A and B in a sample space, choose the correct option (s)

A.  $P\left(\frac{A}{B}\right) \geq \frac{P(A) + P(B) - 1}{P(B)}, P(B) \neq 0$

B.  $P(A \cap \bar{B}) \neq P(A) - P(A \cap B)$

C.  $P(A \cup B) = 1 - P(\bar{A})P(\bar{B})$  if A,B are independent

D.  $P(A \cup B) = 1 - P(\bar{A})P(\bar{B})$  if A,B are mutually exclusive

**Answer:**



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117. If M and N are any two events, then the probability that exactly one of them occurs is

A.  $P(A) + P(B) - 2P(A \cap B)$

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

C.  $P(A) + P(B) - 2P(\bar{A} \cap \bar{B})$

$$D. P(A \cap B) + P(\bar{A} \cap B)$$

**Answer:**



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**118.** Fifteen coupons are numbered 1, 2, 3,..., 15 respectively. Seven coupons are selected random one at a time with replacement. The probability that the largest number appearing on the selected coupons is atmost 9, is :

A.  $\left(\frac{9}{16}\right)^6$

B.  $\left(\frac{8}{15}\right)^7$

C.  $\left(\frac{3}{5}\right)^7$

D. none of these

**Answer:**



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119. In a box containing 60 bulbs 6 are defective . What is the probability that out of a sample of 5 bulbs (i) none is defective (ii) exactly 2 are defective ?

A.  $10^{-5}$

B.  $(1/2)^5$

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

D.  $9/10$

**Answer:**



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120. One hundred identical coins, each with probability 'p' of showing heads are tossed once. If  $0 < p < 1$  and the probability of heads showing on 50 coins is equal to that of heads showing on 51 coins, then the value of p is

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

B.  $\frac{49}{101}$

C.  $\frac{50}{101}$

D.  $\frac{51}{101}$

**Answer:**



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**121.** The probability that an event A happens in one trial of an experiment, is 0.4. There independent trials of the experiments are performed. The probability that the event A happens atleast once, is

A. 0.936

B. 0.784

C. 0.904

D. none of these

**Answer:**



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**122.** A fair coin is tossed  $n$  times. If the probability of getting 4, 5 and 6 heads be in A.P, then  $n$  is equal to

A. 12

B. 7

C. 15

D. 14

**Answer:**



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**123.** 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  $\frac{16}{81}$  b.  $\frac{1}{81}$  c.  $\frac{80}{81}$  d.  $\frac{65}{81}$

A.  $\frac{16}{81}$

B.  $\frac{1}{81}$

C.  $\frac{80}{81}$

D.  $\frac{65}{81}$

**Answer:**



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**124.** The probabilities of three mutually exclusive events are  $\frac{2}{3}$ ,  $\frac{1}{4}$ , and  $\frac{1}{6}$ . Is this statement correct?



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**125.** If the probabilities for A to fail in an examination is 0.2 and that for B is 0.3, then the probability that either A or B fails is



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**126.** State whether the statements are true or false. The probability of getting exactly 2 heads in tossing a coin thrice is  $\left(\frac{1}{2}\right)^3$ .



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**127.** A number  $x$  is selected from first 50 natural numbers. Find the probability that  $x$  satisfies the condition  $x + \frac{50}{x} > 25$



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**128.** State whether the statements are true or false. In a lottery all the tickets are blank except one, on which there is a prize,  $n$  persons draw a ticket each one after another without replacement. The probability of the 6th person to win the prize is  $\frac{6}{n}$ .



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**129.** If probabilities A and B are two independent events then  $P(A \cap \bar{B}) + P(A)P(B) = P(A)$ . State true or false.

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**130.** Out of 20 consecutive numbers, two are chosen at random, the probability that their sum is odd is

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**131.** The probability that a man fishing at a particular place will catch 1, 2, 3 and 4 fishes are 0.4, 0.3, 0.2 and 0.1 respectively. Then the expected number of fishes caught is \_\_\_\_\_.

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132. A dice is rolled four times. The probability of having more sixes than any other number at any stage is \_\_\_\_\_.



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133. A five-digit number is written down at random. The probability that the number written is such that when the digits are put in the reversed order the new number is also a five-digit number equal to the original number

A. 0.01

B. 0.9

C. 0.81

D. none of these

**Answer: A**



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134. The adjoining figure gives the road plan of lanes connecting two parallel roads AB and FJ. A man walking on the road AB takes a turn at random to reach the road FJ. It is known that he reaches the road FJ from O by taking a straight line. The chance that he moves on a straight line from the road AB to the road FJ is.

A. 0.25

B. 0.04

C. 0.2

D. none of these

**Answer:**



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135. Two numbers  $\lambda, \mu$  are chosen one after another at random (with replacement) from the set  $\{a: 1 \leq a \leq 10, a \in N\}$ . Find the probability that  $x^2 + \lambda x + \mu > 0$  for all  $x \in R$ .



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**136.** Two teams A and B play an one-day cricket match. The match is in the last over and the situation of the match is as follows: Four balls are to be bowled by the team B, no wides or no-balls are bowled, the team A has to score 16 runs to win. Runs that can be scored off a ball are 0,1, 2, 3, 4, 5 and 6. Find the probability that the team A will win by scoring in the last ball.



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**137.** On a piece of paper certain odd number of horizontal lines at equal distances are drawn. An equal number of vertical lines at equal distances are also drawn, forming rectangles. The rectangles are coloured black or white, set alternately. Three coins are put at random in these rectangles. Let  $p$  be the probability of having two coins in rectangles of the same colour and the third in a rectangle of the other colour, and  $p'$  be the probability of having all the coins in the rectangles of the same colour. If

$p:p' = 16:5$  then find the number of horizontal lines drawn on the paper.



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