MATHS

JEE (MAIN AND ADVANCED) MATHEMATICS

PROBABILITY

Example

1. In the experiment of throwing a die,consider the following events:

A={1,3,5}, B={2,4,6}, C={1,2,3}

Are these events equally likely?

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2. In the experiment of throwing a die, consider the following events:

A={1,3,5}, B={2,4},C={6}

Are these events ,mutually exclusive ?

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3. In the experiment of throwing a die, consider the events.

A={2,4,6}, B={3,6},C={1,5,6}

Are these events exhaustive?

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4. Give two examples of mutually exclusive events.

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5. Give two examples of exhaustive events.

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6. Give examples of two events that are neither mutually exclusive nor exhausive.

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7. Give two examples of events that are neither equally like nor exhaustive.

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8. Give examples of two events that are neither mutually exclusive nor exhausive.

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9. Suppose $S = \{0, 1, 2, 3\}$ be a sample space of a randomm experiment. $P(0) = 0.1$, $P(1) = 0.3$, $P(2) = 0.3$ and $P(3) = 0.3$ and

$P(A) = \sum_{a \in A} P(a)$ for any subset A of S. Is P a probability function or not.

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10. A point is selected at random from the interior of a circle. The probability that the point is closer to the centre than the boundary of the circle is

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11. The height of an equilateral triangle whose side is a units is

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12. A point is randomly chosen inside the circumcircle of an equilateral triangle. Find the probability that it lies inside the inscribed circle of that triangle.

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13. Two points A and B are selected at random on a segment of length l. Find the probability that a triangle can be constructed from these three segments.

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14. The points A,B,C are randomly selected on the circumference of a circle. Find the probability that the points lie on a semi circle.

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15. If a point is selected at random inside the rectangle formed by the four lines $x = 0, y = 0, x = 2, y = 4$. Find the probability that the point lies inside the parabola $y^2 = x$. (This problem is to be discussed after Areas in Integral Calculus is over)

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Solved Example

1. A page is opened at random from a book containing 600 pages. What is the probability that the number on the page is a perfect square.

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2. Find the probability that a leap year will have 53 sundays.

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3. If 4 fair coins are tossed simultaneously, then find the probability that 2 heads and 2 tails appear.

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4. Find the probability of throwing a total score 8 with 2 dice.

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5. Two dice are rolled. What is the probability that none of the dice shows the number 2 ?

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6. A single die is rolled twice in succession. What is the probability that the number showing on the second toss is greater than that on the first rolling?

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7. If two cards are drawn from pack 52 cards at random, then find the probability of getting both club cards.

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8. A and B are among 20 persons sit at random along a round table. Find the probability that there are any 6 persons between A and B.

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9. A class has 15 boys and 5 girls. Suppose three students are selected at random from the class. Find the probability that they are all boys.

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10. A box contains 20 screws of which 5 are defective. Two screws are drawn at random. Find the probability of the event that

(i) neither of the 2 screws is defective.

(ii) atleast one of them is defective.

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11. Out of 30 consecutive integers two are drawn at random. Then what is the probability that their sum is odd.

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12. Suppose $S = \{1, 2, 3, 4\}$ is the sample space of a random experiment, Suppose $P(1) = x, P(2) = 2x, P(3) = 3x$, and $P(4) = 4x$, where P is a probability function . Find x.

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13. If four people are chosen at random, then the probability that no two of them were born in the same day of the week

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14. Out of 30 consecutive integers, three integers are drawn at random. Find the probability that their sum is (i) an odd number (ii) an even number

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15. If E_1, E_2 are two events with $E_1 \cap E_2 = \phi$ then show that $P\left(E_1^C \cap E_2^C\right) = P\left(E^C\right) - P(E_2)$

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16. If $P(A) = x, P(B) = y$ and $P(A \cap B) = z$. Find $P(A^c \cap B^c)$.

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17. Two events A and B have the probabilities 0.25 and 0.5 respectively. The probability that both A and B occur simultaneously is 0.14. Find the

probability that neither A nor B occurs.

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18. The probability of the event A occuring is 0.5 and of B occurring is 0.3. If A and B are mutually exclusive events then the probability of neither A nor B occuring is

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19. For any two events A,B shows that

$$P(A \cap B) - P(A)P(B) = P\left(A^C\right)P(B) - P\left(A^C \cap B\right)$$
$$= P(A)P\left(B^C\right) - P\left(A \cap B^C\right)$$

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20. A and B are seeking admission into I.I.T. If the probability for A to be selected is 0.5 and that both to be selected is 0.3. Is it possible that the

probability of B to be selected is 0.9?

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21. In an experiment of drawing a card at random from a pack, the event of getting a spade is denoted by A and getting a picture card (king, Queen or jack) is denoted by B. Find the probabilities of $A, B, A \cap B$ and $A \cup B$.

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22. If two cards are drawn from pack 52 cards at random, then find the probability of getting both red or both kings.

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23. Three students A,B,C are to take part in a swimming competition. The probabilities of A's winning or the probability of B's winning is 3 times the

probability of C's winning. The probability of the event of either B or C to win is

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24. If $\frac{1+3p}{3}, \frac{1-p}{4}, \frac{1-2p}{2}$ are the probabilities of 3 mutually exclusive events then find the set of all values of p.

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25. (i) If A,B,C are any three events in an experiment and $A \subseteq B$, $P(C) > 0$ then show that $P(A/C) \leq P(B/C)$

(ii) If A, B are mutually exclusive and $P(B) \neq 1$ then show that $P\left(A/B^C\right) = \frac{P(A)}{1-P(B)}$

(iii) If A, B are mutually exclusive and $P(A \cup B) \neq 0$ then $P(A/A \cup B) = \frac{P(A)}{P(A)+P(B)}$

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26. Suppose A and B are independent events with $P(A) = 0.6$, $P(B) = 0.7$ then compute

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

$(iii) P(B/A)$ $(iv) P(A^c \cap B^c)$

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27. A pair of dice are rolled. What is the probability that neither die shows a 2, given that they sum to 7 ?

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28. An urn contains 12 red balls and 12 green balls. Suppose two balls are drawn one after another without replacement . Find the probability that the second ball drawn is green given that the first ball drawn is red.

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29. Suppose there are 12 boys and 4 girls in a class. If we choose three children one after another in succession at random, find the probability that alll the three are boys.

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30. Find the probability of drawing 2 red balls in succession from a bag containing 4 red balls and 5 black balls when the ball that is drawn first is (i) not replaced (ii) replaced

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31. If A,B,C are independent events, shows that $A \cup B$ and C are also a independent events.

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32. If A and B are two independent events, and $P(A) = 1/4$, $P(B) = 1/3$ then find $P(A - B) \cup (B - A))$. i.e., propbability of occurrence of exactly one of the events A and B.

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33. The probability that A hits a target is $1/4$ and the probability that B hits the target is $1/3$. If each of then fired once, what is the probability that the target will be hit atleast once ?

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34. In a shooting test the probability of A,B,C hitting the targets are $\frac{1}{2}, \frac{2}{3}$ and $\frac{3}{4}$ are respectively. If all of them first at the same target. Find the probability that

i) Only one of them hits the target,

ii) atleast one of them hits the target.

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35. An urn contains 10 white balls and 5 black balls. Two players Q and R alternatively draw a ball with replacement from the urn. The player that draws a white ball first wins the game. If Q begins the game, find the probability of his winning the game.

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36. Bag B_1 contains 4 white and 2 black balls.

Bag B_2 contains 3 white and 4 black balls.

A bag is drawn at random and a ball is chosen at random from it. What is the probability that the ball drawn is white.

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37. Bag A contains 4 white and 7 black balls. Bag B contains 5 white and 6 black balls. A die is rolled . If 2 or 5 turns up then choose bag A otherwise

choose bag B. If one ball is drawn at random from the selected bag, then find the probability that it is black.

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38. Bag A contains 4 white and 3 black balls. Bag B contains 3 white and 2 black balls. One ball is transferred from bag A to bag B. Now one ball is drawn from bag B. Find the probability that it is white.

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39. Three boxes numbered I,II,III contain the balls as follows.

	White	Black	Red
I	1	2	3
II	2	1	1
III	4	5	3

One box is randomly selected and a ball is drawn from it. If the ball is red, then find the probability that it is from box II.

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40. A survey shows that in a certain village 2 out of every 100 men and 1 out of every 100 women have strength ulcers. A person selected at random from the village is found to have stomach ulcer. Find the probability that the person is a male, given that the probability of selecting a male from the village is 0.55.

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41. A bag contains 5 balls the colours of which are not known. Two balls are drawn and found them to be red. Find the probability that all the balls in the bag are red.

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42. A man is known to speack the truth 2 out of 3 times . He throws a die and reports that it is a six . The probability that it is actually a six is

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43. A letter is known to have come from either 'MAHARASTRA or MADRAS` on the post mark only consecutive letters 'RA' can be read clearly. What is the chance that the letter came from 'MAHARASTRA'.

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44. Suppose that an unbaised pair of dice is rolled. Let A denote the event that the same number shows on each die. Let B denote the event that the sum is greater than 7. Find (i) $P\left(\frac{A}{B}\right)$ ii) $P\left(\frac{B}{A}\right)$

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45. Prove that A and B are independent events if and only if $P\left(\frac{A}{B}\right) = P\left(\frac{A}{B^C}\right)$

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Additional Solved Example

1. A game consists of tossing a coin 3 times and nothing its outcome. A boy wins if all tosses give the same outcomes and losses otherwise. Find the probability that the boy losses the game.

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2. If 10 coins are tossed, find the odds against the event of getting atleast 2 heads.

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3. Five coins are tossed whose faces are marked 2 and 3 . Find the probability of getting sum 12.

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4. Two dice are rolled. What is the probability that none of the dice shows the number 2 ?

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5. If three dice are rolled, find the probability of showiing all different numbers.

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6. Three fair dice are rolled. Find the probability that the greatest number on the dice must exceed 3.

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7. If n letters are placed at random in n addressed envelops then the probability that all the letters are placed in correct envelops is

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8. If there are m students in a class, then find the probability that (i) all the students have different birthdays in a non leap year (ii) All the students have same birthday in a non leap year

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9. (i) Obtain the probability that the birth days of seven people will fall on seven different days of the week, assuming equal probabilities for the seven days.

(ii) What is the probability that the birth days of twelve people will fall in twelve different months (assume equal probabilites of the twelve months)

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10. Out of 52 cards 4 are drawn at random without replacement. What is the probability that

(i) they belong to different suits (i.e., one from each suit)

(ii) they belong to different denominations

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11. Three electric bulb holders are fixed in a room. 3 bulbs are chosen at random from a set of 20 bulbs of which 16 are good and fitted to the holders. What is the probability that the room is lighted.

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12. There are 50 tickets in a lottery in which there is a first and a second prize. What is the probability of a man drawing prize if he owns 5 tickets ?

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13. A has 3 shares in a lottery where there are 3 prizes and 6 blanks, B has one share in another, where there is but 1 prize and 2 blanks. Show that A has a better chance of winning a prize than B, in the ratio of 16 to 7.

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14. Two numbers are selected at random from 1,2,3,.....100 without replacement. Find the probability that the minimum of the two numbers is less than 70.

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15. A natural number x is chosen at random from the first 100 natural numbers. Find the probability that $\frac{(x-20)(x-40)}{(x-30)} < 0$

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16. If the letters of the word 'QUESTION' are arranged at random. What is the probability that there are exactly two letters between Q and U.

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17. A is a set containing 'n' elements . A subset P of A is chosen at random . The set A is reconstructed by replacing the elements of the subset of P, a subset Q of A is again chosen at random. Find the probability that (i) $P \cap Q = \phi$ $(ii) P \cup Q = A$

$(iii) P \cup Q = A$ and $P \cap Q = \phi$ (iv) Q is subset of P

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18. Let F be the set of all 4 digited numbers whose sum is 34. If a number is selected from F then find the probability that the selected number is even.

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19. Two numbers are selected at random from 1,2,3,.....100 and multiplied. Find the probability that the product thus obtained is divisible by 3.

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20. A car is parked among 'N' cars in a row, 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 neighbouring places are empty ?

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21. Two squares are chosen at random from the small squares on a chess board. What is the chance that the two squares have exactly one common corner.

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

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23. There are 100 stations between two stations A and B. A train is to stop at ten of these 100 stations. What is the probability that no two of these ten stations are consecutive.

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24. From a heap containing 10 pairs of shoes 6 shoes are selected at random. Find the probability that

(i) There is no complete pair in the selected shoes

(ii) atleast one correct pair in the selected shoes

(iii) 2 correct pairs in the selected shoes.

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25. (i) Twelve balls are distributed at random among three boxes what is the probability that the first box will contain 3 balls ?

(ii) If 'n' different biscuits are distributed amoong N beggers, find the chance that a particular begger receives exactly $r(<n)$ biscuits.

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26. Out of 3n consecutive integers, three are selected at random. Show that the chance that their sum is divisible by 3 is $\frac{3n^2-3n+2}{(3n-1)(3n-2)}$

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27. Two numbers X and Y are chosen at random from the set $\{1, 2, \ldots\ldots 3n\}$. Find the probability that $X^2 - Y^2$ is divisible by 3.

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28. If three dice are rolled. Find the probability of getting sum 16 or getting 6 on first die.

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29. A number is chosen from the first 100 natural numbers. Find the probability that it is a multiple of 4 or 6.

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30. A box contains 2 red, 3 blue and 4 black balls. Three balls are drawn at random. What is the probability that two balls are of the same colour and the third of a different colour.

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31. A contractor submitted tenders for 2 works. If $0.4, 0.6, 0.1$ are the respective probabilities that his first tender, atleast one tender, both the tenders are accepted, what is the probability that his second tender is accepted.

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32. If A,B and C are mutually exclusive and exhaustive events such that $P(B) = \frac{3}{2}P(A)$ and $P(C) = \frac{1}{3}P(B)$. Find odds in favour of $(A \cup B)$

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33. A die is loaded so that six turns up twice as often as one and three times as often as any other face. Find the probability of getting an even number on the die if the die is rolled once.

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34. A couple has two children. Find the probability that both are male if it is known that atleast one of them is a male child.

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35. Two dice are thrown. Find the conditional probability that two fives occur, if it is known that the total is divisible by 5.

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36. A pair of dice is thrown . Find the probability that the sum is 10 or greater if ,br> (i) 5 appears on the first die

(ii) 5 appears on atleast one of the dice

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37. A die is thrown 3 times. Find the probability of the event of getting sum of the numbers thrown as 15 when it is known that the first throw

was a five.

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38. A box contains 5 black, 4 white and 6 red balls. Two balls are drawn one after another without replacement. What is the probability that the first will be white and the second will be balck ?

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39. A box contains 19 screws, 3 of which are defective, Two screws are drawn at random with replacement. Find the probability that neither of the two screws is defective.

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40. A box contains 5 red balls , 6 green balls and 7 white balls. If three balls are drawn at random, then find the probability that these are green,

red and white in the order if the balls are replaced.

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41. A bag B_1 contains 4 white balls and 2 black and another bag B_2 contains 3 white balls and 3 balls. One ball each is drawn at random from the two bags with replacement. Then find the probability that both the are of same colour.

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42. Two fair dice are rolled once. Let A be the event of getting suum 10 and B be the event of getting even on both the dice. Find whether A, B are independent or not.

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43. A consignment of 15 record players contains 4 efective. The record players are selected at randoom one by one and examined. The ones examined are not placed back. What is the probability that the $9th$ one examined is the last defective.

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44. Four persons A,B,C,D cut a pack of 52 cards successively in that order given. If the person who cuts a spade first wins, find their probability of winning.

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45. A bag contains 6 white balls and 4 balck balls. A ball is drawn and is put back in the bag with 5 balls of the same colours as that of the ball drawn . A ball is drawn again at random. What is the probability that the ball drawn now is white.

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46. A card from pack of 52 cards is lost. From the remaining cards of pack, two cards are drawn and are found to be spades. Find the probability of the missing card to be a spade.

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47. Why does it pay to bet consistently on seeing 6 at least once in 4 throws of a die, but not on seeing a double six at least once in 24 throws with two dice ? (one of the problems posed by De Mere's to Pascal)

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48. p is the probability that a man aged 'x' years will die in a year. Find the probability that out of 'n' men A_1, A_2,....., A_n each aged x, A_1 will die in a year and will be the first to die.

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Exercise 2.1(very short answer)

1. An integer in picked from 1 to 20, both inclusive. Find the probability that it is a prime.

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2. Find the probability that a non- leap year

contains i) 53 Sunday ii) 52 Sundays only.

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3. Find the probability that a leap year will have 53 Mondays.

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4. Find the probability of getting.

(i) two tails and one head when 3 coins are tossed.

(ii) 2 heads when 4coins are tossed

(iii) atleast one head when 5 coins are tossed

(iv) a head an odd number of times a fair coin is tossed 200 times.

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5. A and B toss a fair coin 50 times each simultaneously. Then find the probability that both of them will not get tails at the same toss

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6. Find the probability of getting.

(i) a prime number when a die is rolled.

(ii) sum 9 when two dice are rolled.

(iii) sum atleast 10 when two dice are rolled.

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7. Ten dice are thrown. Find the probability that none of the dice shows the number 1.

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8. A pair of dice rolled 24 times. A person wins by not getting a pair of 6's on any of the 24 rolls. What is the probability of his winning?

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9. A card is drawn from a well shuffled pack of 52 playing cards. Find the probability of getting (i) an ace card (ii) a spade card (iii) a king card of red colour.

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10. If 4 cards are drawn at random from a pack of 52 playing cards, then find the probability to get 2 red and 2 black cards.

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11. Find the probability that 2 particular persons never sit together, when n persons sit in a row.

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12. A and B are among 30 persons who sit at random along a round table. Find the probability that there are any six persons between A and B .

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13. A bag contains 4 red, 5 black and 6 blue balls. Find the probability that two balls drawn at random simultaneously from the bag are a red and a

black ball.

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14. If a number x is selected from natural numbers 1 to 100, then the probability for $x + 100/x > 29$ is

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15. Suppose $S = \{1, 2, 3, 4, 5\}$ is the sample space of a random experiment. Given that $P(1) = 0.2, P(2) = 0.3, P(3) = 0.3, P(4) = 0.1$, find $P(5)$ such that P is a probability function.

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Exercise 2.1(short answer type question)

1. If two numbers are selected randomly from 20 consecutive natural numbers, find the probability that the sum of the two numbers is (i) an even number (ii) an odd number.

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2. In a box containing 15 bulbs, 5 are defective.

If 5 bulbs are selected at random from the box, find the probability of the event, that

(i) None of them is defective

(ii) Only one of them is defective.

(iii) Atleast one of them is defective.

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3. A box contains 12 two rupee coins, 7 one rupee coins and 4 half rupee coins. If 3 coins are selected at random, find the probability that

(i) sum of three coins is maximum

(ii) each coin is of different value

(iii) selection contains atleast one rupee coin

(iv) all selected 3 coins have same value

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4. Two unit squares are chosen at random on a chess board. Find the probability that they have a side in common.

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5. On a festival day, a man plans to visit 4 holy temples A,B,C,D in a random order.

Find the probability that he visits (i) A before B (ii) A before B and B before C.

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Exercise 2.2(very short answer type question)

1. If $P(A \cup B) = 0.65$ and $P(a \cap B) = 0.15$ then find $P(\overline{A}) + P(\overline{B})$.

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2. The probability for a contractor to get a road contract is $\frac{2}{3}$ and to get a building contract is $\frac{5}{9}$. The probability to get atleast on contract is $\frac{4}{5}$. Find the probability to get both the contracts.

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3. If A and B are two events then show that

(i) $(P(A \cap B^c)) = P(A) - P(A \cap B)$

(ii) The probability that exactly one of them occurs is given by $P(A) + P(B) - 2P(A \cap B)$

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4. (i) If P is a probability function, show that for any two events A, B.

$$P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$$

(ii) For any two events A,B show that

$$P(\overline{A} \cap \overline{B}) = 1 + P(A \cap B) - P(A) - P(B)$$

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5. For any two events A,B shows that

$$P(A \cap B) - P(A)P(B) = P\left(A^C\right)P(B) - P\left(A^C \cap B\right)$$

$$= P(A)P\left(B^C\right) - P\left(A \cap B^C\right)$$

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Exercise 2.2(short answer type question)

1. Find the probability of drawing and ace or a spade from a well suffled pack of 52 cards ?

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2. In a class of 60 boys and 20 girls, half of the boys and half of the girls know cricket.

Find the probability of the event that a person selected from the class is either a boy or girl who knows cricket.

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3. If one ticket is randomly selected from tickets numbered 1 to 30. Then find the probability that the number on the ticket is.

i) a multiple of 5 or 7

ii) a multiple of 3 or 5

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4. In a committee of 25 members, each member is proficient either in Mathematics or in Statistics or in both. If 19 of these are proficient in

Mathematics, 16 in statistics, find the probability that a person selected from the committee is proficient in both.

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5. A,B,C are three horses in a race. The probability of A to win the race is twice that of B and probability of B is twice that of C. What are the probability of A,B and C to win the race?

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6. Three dailies A,B,C are published in a city. 20% of the city population read A, 16% read B, 14% read C, 8% read both A and B, 5% both A and C, 4% both B and C, 2% read all the three. Find percentage of population that read atleast one news paper and find the percentage of population who read news paper A only.

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7. The probabilities of three events A,B,C are such that P(A)=0.3, P(B)=0.04, P(C) = 0.8 $P(A \cap B) = 0.08$ $P(A \cap C) = 0.28$, $P(A \cap B \cap C) = 0.09$ and $P(A \cup B \cup C) \geq 0.75$. Show that $P(B \cap C)$ lies in the interval [0.23,0.48]

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8. From the employees of a company 5 persons are selected to represent them in the managing committee of the company. The particulars of 5 persons are as follows :

S.No.	Name	Sex	Age in years
1.	Harish	M	30
2.	Rohan	M	33
3.	Sheetala	F	46
4.	Alis	F	28
5.	Salim	M	41

A person is selcted at random from this group to act as a spokesperson. Find the probability that the spokeperson wll be either male or above 35 years.

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Exercise 2.3(very short answer type question)

1. A fair die is rolled. Consider the events $A = \{1, 3, 5\}$, $B = \{2, 3\}$ and $C = \{2, 3, 4, 5\}$. Find

$(i) P(A \cap B), P(A \cup B)$ $(ii) P(A/B), P(B/A)$

$(iii) P(A/C), P(C/A)$ $(iv) P(B/C), P(C/B)$

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2. If A, B are two events, then show that

(i) $P\left(\frac{A}{B}\right)P(B) + P\left(\frac{A}{B^C}\right)P\left(B^C\right) = P(A)$

(ii) $P(A^c \mid B^c) = \frac{1 - P(A \cup B)}{1 - P(B)}, P(A) > 0, P(B) \neq 1$

(iii) $P\left(A/B^C\right) = \frac{P(A) - P(A \cap B)}{-P(B)}, P\left(B^C\right) > 0$

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3. Let A and B be independent events with $P(A) = 0.2, P(B) = 0.5$. Let us find

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

$(iii) P(A \cap B) (iv) P(A \cup B)$

$(v) P(A^c \cap B^c)$

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Exercise 2.3(short answer type question)

1. (i) A pair of dice are rolled. What is the probability that they sum to 7 given that neither die shows a 2 ?

(ii) A pair of dice is thrown. Find the probability that either of the dice shows 2 when their sum is 6.

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2. (i) An urn contains 7 red and 3 black balls. Two balls are drawn one after another without replacement. What is the probability that the second ball is red if it is know that the first ball drawn is red.

(ii) A box contains 8 red and 10 green balls. Two balls are drawn one after another without replacement. What is the probability that the second ball is green if it is know that the first ball drawn is red.

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3. A box contains 4 defective and 6 good bulbs. Two bulbs are drawn at random without replacement. Find the probability that the both the bulbs drawn are good.

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4. Three screws are drawn at random from a lot of 50 screws, 5 of which are defective.

Find the probability of the event that all 3 screws are non-defective

assuming that the drawing is a) with replacement b) without replacement.

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5. If one card is drawn at random from a pack of cards then show that event of getting an ace and getting heart are independent events.

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6. The probability that a boy A will get a scholarship is 0.9 and that another boy B will get is 0.8. What is the probability that atleast one of them will get the scholarship?

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7. (i) A problem is Calculus is given to two students A and B whose chances of solving it are $\frac{1}{3}$ and $\frac{1}{4}$. Find the probability of the problem

being solved if both of them try independently.

(ii) A problem is given to three students A, B and C. The chances of their solving the same are $1/3, 1/4, 1/5$ respectively. Then find the probability that the problem will be solved.

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8. A and B are two independent events such that the probability of the both the events to occurs is $\frac{1}{6}$ and the probability of both the events do not occur is $\frac{1}{3}$. Find the probability of A.

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9. A speaks the truth in 75% of the cases , B in 80% cases. What is the probability that their statements about an incident do not match ?

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10. 4 A person is known to speak truth 2 out of 3 times. He throws a die and reports that it is 1. Find the probability that it is actually 1.

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11. Suppose that a coin is tossed three times. Let A be "getting three heads" and B be the event of "getting a head on the first toss".Show that A and B are dependent events.

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Exercise 2.3(long answer type question)

1. A,B,C are aiming to shoot a balloon. A will succeed 4 times out of 5 attempts. The change of B to shoot the balloon is 3 out of 4 and that of C is 2 out of 3. If three aim the balloon simultaneously, then find the probability that atleast two of them hit the balloon.

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2. The probability that Australia wins a match against India in a cricket game is given to be $\frac{1}{3}$. If india and Australia play 3 matches, what is the probability that,

i) Australia will loose all the three matches ? ii) Australia will win atleast one match ?

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3. If A,B,C are three independent events of an experiment. Such that $P\left(A \cap B^C \cap C^C\right) = \frac{1}{4}$

$P\left(A^C \cap B \cap C^C\right) = \frac{1}{8}, P\left(A^C \cap B^C \cap C^C\right) = \frac{1}{4}$

then find P(A),P(B)and P(C).

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4. Two persons A and B are rolling die on the condition that the person who gets 3 will win the game. If A starts the game, then find the probabilities of A and B respectively to win the game.

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5. There are 3 black and 4 white balls in one bag. 4 black and 3 white balls in the second bag. A die is rolled and the first bag is selected if it is 1 or 3 and the second bag for the rest. Find the probability of drawing a black ball from the bag thus selected.

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6. Three Urns have the following composition of balls.

Urn I : 1 white, 2 black

Urn II : 2 white, 1 black

III : 2 white, 2 black

One of the Urn is selected at random and a ball is drawn. It turns out to be white. Find the probability that it come from Urn III.

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7. (i) A shop-keeper buys a particular type of electric bulbs from three manfacturers M_1, M_2 and M_3. He buys $25\,\%$ of his requirement from M_1, $45\,\%$ from M_2 and $30\,\%$ from M_3. Based on the past experience, he found that $2\,\%$ of type M_3 bulbs are defective, where as only $1\,\%$ of type M_1 and Type M_2 are defective . If a bulb chosen by him at random is found defective find the probability that it was of type M_3.

(ii) In a certain college, $25\,\%$ of the boys and $10\,\%$ of the girls are studying mathematics. The girls constitute $60\,\%$ of the student strength . If a student is selected at random is found studying mathematics, find the probability that the student is a girl.

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8. A person secures a job in a construction company in which the probability that the workers go on strike is 0.65 and the probability that the construction job will be completed on time if there is no strike is 0.80. If the probability that the construction job will be completed on time even if there is a strike is 0.32, determine the probability that the constructed job will be completed on time.

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9. Out of 100 students, two sections of 40 are 60 an formed. If you and your friend are among the 100 students, find the probability that

i) You both enter the same section.

ii) You both enter the different sections.

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Additional Exercise

1. Find the probability of getting atmost 3 heads when 4 coins are tossed.

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2. Find the probability of getting sum atmost 10 when two dice are rolled.

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3. Find the probability of getting one king and one queen when two cards are drawn from pack of 52 cards.

Watch Video Solution

4. If 5 fair coins are tossed, find the probability of getting heads in majority.

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5. Two cards are drawn from a pack at a time. Find the probability that one of them is an ace of hearts.

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6. A determinant of second order is made with the elements 0 and 1. What is the probability that the determinant made is (i) non-negative (ii) non-zero

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7. If 7 squares are chosen at random on a chess board, the probability that they lie on a diagonal line is

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8. Find the probability that leap year contains 52 mondays and 52 Sundays

Watch Video Solution

9. If $P(A) = 0.5$, $P(B) = 0.3$ and $P(A \cap B) = 0.1$ then find the probability that exactly one of A, B happen.

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10. If two cards are drawn from a pack, find the probability of getting one king and one queen or both red.

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11. If 2 dice are rolled then find the probability that the dice show different numbers or sum 10.

Watch Video Solution

12. If 2 dice are rolled, find the probability of getting prime sum.

View Text Solution

13. If one card is drawn at random from a pack of cards then show that event of getting an ace and getting heart are independent events.

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14. Let A be the event of having 53 sundays and B be the event of having 53 Mondays in a leap year. Decide whether A and B are independent or not.

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15. If six coins are tossed then find the probability of getting atleast 4 heads, given that all the coins are not showing same result.

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16. Two dice are rolled and given that the sum of them is atmost 11. Find the probability that they show even on both dice.

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17. Two coins are tossed . The probability of getting 2 tails if it is known that there is atleast one tail on the coins is

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18. From 1,2,3,.....20 if two natural numbers are selected, find the probability of getting both even if sum of the selected numbers is even.

Watch Video Solution

19. Two cards are drawn from a pack of 52 cards . What is the probability of getting both kings if the card drawn in first draw is replaced before 2^{nd} draw.

Watch Video Solution

20. A speaks truth in 60% of the cases and B in 70% of the cases. What is the probability that (i) both speak truth (ii) both speak lie

(iii) their statements about an incident do not match.

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21. One die and a coin tossed simultaneously find the probability of getting 5 on the top of the die and a tail on the coin.

Watch Video Solution

22. A bag contains 4 white and 3 black balls. Another bag contains 5 white and 2 black balls. A pair of dice is rolled. If the sum on the dice is 10,1^{st} bag is selected. Otherwise 2^{nd} bag is selected. Find the probability of drawing white ball if one ball is drawn from the selected bag at random.

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23. If A, B, C are three mutually exclusive and exhaustive events such that 2P(A) = 3P(B) = 4P(C). Find the odds against $A \cup B$.

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24. Bag A contains 3 red and 2 balck balls and bag B contains 2 red and 3 black balls. One ball is drawn at random from box A and placed in B. Then again one ball is drawn at random from box B and placed in A. Find the probability that the composition of balls in the two boxes remains unaltered.

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25. A coin is biased such that the probability of getting head is thrice to that of getting a tail. If such coin is tossed twice find the probability of getting one head exactly.

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26. Two persons A and B toss a die. The person who first throws 6 first throws 6 wins . If A starts, then the probability of his winning is

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27. Three persons A,B,C in order cut a pack of cards replacing them after each cut. The person who first cuts a club shall win a prize. Find the probabilities of their winning.

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28. In a bag there are six balls of unknown colours. Three balls are drawn at random and found to be all black. Find the probability that the bag contains exactly 3 black balls.

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29. Assuming that each child is as likely to be a boy as it is to be a girl, what is the conditional probability that in a family of two children both are boys, given that the older child is a boy.

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Exercise-I

1. The probability that a leap year have 53 sundays is.....

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

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

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

D. $\frac{6}{7}$

Answer: B

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2. The probability that a leap year contains 53 Mondays and 53 Tuesdays is

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

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

C. $\frac{3}{7}$

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

Answer: A

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3. The probability that a leap year contains 53 sundays or 53 Mondays is

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

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

C. $\frac{3}{7}$

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

Answer: C

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4. The probability that a leap year contains 52 mondays and 52 wednesdays is

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

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

C. $\frac{3}{7}$

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

Answer: C

Watch Video Solution

5. A coin is tossed 3 times. The probability of getting head once and tail two times is

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

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

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

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

Answer: C

Watch Video Solution

6. In a family with 4 children, the probability that there are at least two girls is

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

B. $\frac{9}{16}$

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

D. $\frac{11}{16}$

Answer: D

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7. If n coins are tossed simultaneously, the probability of getting head an odd number of times is

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

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

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

D. $\frac{1}{2^{n-1}}$

Answer: C

View Text Solution

8. When a pair of six faced fair dice are thrown, the probability that the sum of the numbers on the two dice is greater than 7 , is

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

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

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

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

Answer: B

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9. Two fair dice are rolled . The probability of the sum of digits on their faces to be greater than or equal to 10 is

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

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

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

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

Answer: D

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10. Two dice are rolled simultaneously. The probability that the numbers on them are different is

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

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

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

D. $(9)(13)$

Answer: A

Watch Video Solution

11. Two dice are thrown simultaneously . The probability of getting even numbers on both the dice is

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

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

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

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

Answer: B

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12. Two dice are rolled, the probability of getting 6 as the product is

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

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

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

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

Answer: C

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13. When a die is rolled thrice. The probability of getting triplet is

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

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

C. $\frac{1}{26}$

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

Answer: B

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14. If two unbaised dice are rolled then the probability of getting a prime score is

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

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

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

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

Answer: A

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15. Two cards are drawn from a pack. The probability of getting two aces is

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

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

C. $\frac{1}{221}$

D. $\frac{1}{17}$

Answer: C

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16. Three dice are rolled simultaneously. The probability that the sum of the numbers on them is 16 is

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

B. $\frac{1}{108}$

C. $\frac{26}{51}$

D. $\frac{13}{34}$

Answer: A

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17. Six faces of a die are marked with numbers 1, -1, 0, -2, 2, 3 and the die is thrown thrice. The probability that the sum of the numbers thrown is six, is

A. $\frac{3}{216}$

B. $\frac{6}{216}$

C. $\frac{10}{216}$

D. $\frac{18}{216}$

Answer: C

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18. If two cards are drawn from a well shuffled pack , the probability that atleast one of the two is heart is

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

B. $\frac{11}{13}$

C. $\frac{55}{221}$

D. $\frac{15}{34}$

Answer: D

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19. While shuffling a pack of 52 playing cards, 2 are accidentally dropped. The probability of the two missing cards to be of different colours (colours may be taken as red and black) is

A. $\frac{15}{51}$

B. $\frac{1}{13 \times 51}$

C. $\frac{1}{26 \times 51}$

D. $\frac{26}{51}$

Answer: D

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20. If 5 cards are drawn from a pack, then the probability of selecting the cards of which four of them have same face value is

A. $\frac{.^{13}C_1 \times .^{48}C_1}{.^{52}C_5}$

B. $\frac{.^{13}C_4 \times .^{39}C_1}{.^{52}C_5}$

C. $\frac{.^{13}C_1 \times .^{39}C_4}{.^{52}C_5}$

D. $\frac{.^{13}C_1}{.^{52}C_5}$

Answer: A

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21. Two cards are drawn at random from a pack of 52 cards . The probability that one of them is black and other is red is

A. $\frac{13}{51}$

B. $\frac{26}{51}$

C. $\frac{13}{102}$

D. $\frac{13}{204}$

Answer: B

View Text Solution

22. Five cards are drawn at random from a pack. The probability that they are of the same colour is

A. $253/4998$

B. $2/4165$

C. $1/1325$

D. $1/4165$

Answer: A

Watch Video Solution

23. Card is drawn at random from a pocket of 100 cards numbered 1 to 100. The probability of drawing a number which is a cube is

A. $\frac{3}{100}$

B. $\frac{1}{25}$

C. $\frac{9}{100}$

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

Answer: B

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24. A bag contains 4 red, 3black and 2 white balls. If 3 balls are selected at random, the probability of selecting atleast one white ball is

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

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

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

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

Answer: A

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25. If two balls are drawn from a bag containing 3 white, 4 black and 5 red balls then the probability that the drawn balls are of different colours is

A. $1/66$

B. $3/66$

C. $19/66$

D. $47/66$

Answer: D

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26. A bag contains 50 tickets numbered 1,2,3,.....50 of which five are drawn at random and arranged in ascending order of magnitude ($x_1 < x_2 < x_3 < x_4 < x_5$). The probability that x_3=30 is

A. $\frac{.^{20}C_2}{.^{50}C_5}$

B. $\frac{.^{29}C_2}{.^{50}C_5}$

C. $\frac{.^{20}C_2 \times .^{29}C_2}{.^{50}C_5}$

D. $\frac{.^{20}C_2}{.^{45}C_2}$

Answer: C

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27. Seven balls are drawn simultaneously from a bag containing 5 white and 6 green balls. The probability of drawing 3 white and 4 green balls is

A. $\frac{7}{.^{11}C_7}$

B. $\frac{.^5C_3 + .^6C_4}{.^{11}C_7}$

C. $\frac{.^5C_2 \times .^6C_2}{.^{11}C_7}$

D. $\frac{.^6C_3 + .^5C_4}{.^{11}C_7}$

Answer: C

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28. A bag contains 6 white and 4 black balls. Two balls are drawn at random. The probability that they are of the same colour is

A. $1/15$

B. $2/5$

C. $4/15$

D. $7/15$

Answer: D

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29. In a bag there are 5 half rupee coins, 4 twenty paise coins and 4 ten paise coins. If two coins are drawn from the bag at random then the probability that the amount drawn to be minimum is

A. $9/13$

B. $4/13$

C. $2/13$

D. $1/13$

Answer: D

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30. At random all the letters of the word "ARTICLE" are arranged in all possible ways. The probability that the arrangement begins with vowel and ends with a consonant is

A. $1/7$

B. $2/7$

C. $3/7$

D. $4/7$

Answer: B

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31. The letters of the word "EAMCET" are arranged in all possible ways. The probability that no two vowels come together in that word is

A. $1/5$

B. $2/5$

C. $3/4$

D. $1/4$

Answer: A

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32. The letters of the word MISSISSIPI are arranged in a row at random . The probability that all S's come together is

A. $\frac{4}{35}$

B. $\frac{5}{28}$

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

D. $\frac{1}{30}$

Answer: D

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33. Three faces of a fair die are yellow, two faces are red and one face is blue. If the die is tossed 3 times, then the probability that thecolours yellow, red and blue appear is (need not be in that order)

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

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

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

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

Answer: B

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34. The probability that a number selected at random from the set of numbers $\{1, 2, 3, \ldots\ldots, 100\}$ is a square is

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

B. $\frac{2}{25}$

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

D. $\frac{4}{25}$

Answer: A

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35. One number is selected from the four digit numbers that can be formed from the digits 1,2,3,4,5,6,7. The probability that it is an odd number is

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

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

C. $\frac{7}{16}$

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

Answer: A

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36. Five digited numbers are formed using $\{0, 2, 4, 5, 7\}$ without repetetion. One number is selected at random. The probability that it is divisible by 5 is

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

B. $\frac{5}{16}$

C. $\frac{7}{16}$

D. $\frac{9}{16}$

Answer: C

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37. A five digited number without repetetion is formed by the digits 1,2,3,4,5,6,7,8. The probability that the number has even digits at both ends is

A. $\frac{3}{14}$

B. $\frac{3}{7}$

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

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

Answer: A

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38. Ten boys are arranged at random along a circle. The probability of arranging them so that two specified boys of those ten must come together is

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

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

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

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

Answer: B

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39. Two persons A, B have to speak at a function with 10 other persons. If the persons speak at random order, the probability that A speaks immediately before B is

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

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

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

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

Answer: A

Watch Video Solution

40. Seven persons sit in a row at random. The probability that three persons A, B,C sit together in a particular order is

A. $\frac{3!}{7!}$

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

C. $\frac{5!}{7!}$

D. $\frac{3!5!}{7!}$

Answer: C

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41. 7 red roses and 3 white roses of different sizes be strung in the form of a garland at random. The probability that no two white roses come together is

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

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

C. $\frac{5}{14}$

D. $\frac{1}{21}$

Answer: B

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42. There are 5 letters and 5 addressed envelopes. If the letters are placed at random in the envelopes. Find the chance that

atleast one letter goes into wrong envelope.

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43. Four frightened pigeons go into their holes at random. The probability that no pigeon goes into its actual hole is

A. $\frac{5}{24}$

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

C. $\frac{7}{24}$

D. $\frac{11}{24}$

Answer: B

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44. If 4 different biscuits are distributed among 3 children then the probability of receiving atleast one biscut by the 1^{st} child is

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45. If 4 different biscuts are distributed among 3 children at random, the probability that the first child receives exactly one biscut is

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

B. $\frac{27}{81}$

C. $\frac{17}{81}$

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

Answer: A

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46. If 10 sweets are to be distributed among 6 children, the probability that a particular child gets 4 sweets is

A. $\frac{.^{10}C_4}{6^{10}}$

B. $\frac{.^{10}C_4 \times 5^6}{6^{10}}$

C. $\frac{.^{10}C_4 + 5^6}{6^{10}}$

D. $\frac{5^6}{6^{10}}$

Answer: B

Watch Video Solution

47. The probability that in a group of a n people, atleast two of them will have the same, birthday is

A. $1 - \frac{.^{365}P_n}{(365)^n}$

B. $\frac{.^{365}P_n}{(365)^n}$

C. $\frac{1}{(365)^n}$

D. $\frac{365 \times 364}{(365)^n}$

Answer: A

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48. If 10 balls are to be distributed among 4 boxes, then the probability for the first box always to contain 4 balls is

A. $\frac{.^{10}C_4 \times 3^6}{4^{10}}$

B. $\frac{.^{10}C_4 \times 6^3}{4^{10}}$

C. $\frac{.^{10}C_4}{4^{10}}$

D. $\frac{.^{10}P_4}{4^{10}}$

Answer: A

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49. Two unit squares are chosen at random on a chess board. The probability that they have a side in common is

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

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

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

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

Answer: C

View Text Solution

50. Three squares of a chess board are chosen at random, the probability that two are of one colour and one of another is

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

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

C. $\frac{8}{64 \times 63 \times 62}$

D. $\frac{7}{21}$

Answer: A

Watch Video Solution

51. In a room, there are 6 couples .Out of them if 4 are chosen at random the probability that they may be 2 couples is

A. $\frac{2}{33}$

B. $\frac{1}{33}$

C. $\frac{1}{66}$

D. $\frac{32}{33}$

Answer: B

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52. From first 20 natural numbers if two numbers are selected at random then the probability of selecting them which are not consecutive is

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

B. $\frac{19}{20}$

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

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

Answer: A

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53. Four numbers are chosen at random from (1,2,3,.....40) . The probability that they are not consecutive is

A. $\frac{1}{2470}$

B. $\frac{4}{7969}$

C. $\frac{2469}{2470}$

D. $\frac{7965}{7969}$

Answer: C

Watch Video Solution

54. Two boys are asked to select each one number from 1 to 100, the probability that they select different numbers is

A. $\frac{99}{100}$

B. $\frac{1}{100}$

C. $\frac{.^{100}C_2}{100^2}$

D. $\frac{100 \times 99}{.^{100}C_2}$

Answer: A

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55. Three numbers are chosen at random from the first 20 natural numbers. Then the probability that their product is odd is

A. $\frac{.^{10}C_3}{.^{20}C_3}$

B. $1 - \frac{.^{10}C_3}{.^{20}C_3}$

C. $\frac{\left(.^{10}C_1\right)^3}{.^{20}C_3}$

D. $\frac{.^{10}C_1}{.^{20}C_3}$

Answer: A

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56. From first twenty natural numbers, 2 numbers are selected at random, the probability that the selected numbers are such that their sum is even is

A. $\frac{.^{10}C_2}{.^{20}C_2}$

B. $\frac{.^{10}C_2 + .^{10}C_2}{.^{20}C_2}$

C. $\frac{1}{.^{20}C_2}$

D. $\frac{10}{.^{20}C_2}$

Answer: B

Watch Video Solution

57. Three electric lamps are fitted in a room. 3 bulbs are chosen at random from 10 bulbs having 6 good bulbs. The probability that the room is lighted is

A. $\frac{29}{30}$

B. $\frac{49}{50}$

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

D. $\frac{43}{66}$

Answer: A

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58. A determinant is chosen at random from the set of all determinants of order 2 with elements 0 or 1 only. The probability that the value of the determinant chosen is positive and nonzero

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

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

C. $\frac{5}{8}$

D. $\frac{13}{16}$

Answer: B

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59. In the above problem the probability of selecting a determinant having non zero determinant value is

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

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

C. $\frac{5}{8}$

D. $\frac{13}{16}$

Answer: A

View Text Solution

60. The probability that in a family of 4 children there will be atleast one boy is

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

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

C. $\frac{13}{16}$

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

Answer: D

Watch Video Solution

61. There is a five volume dicitionary among 10 books arranged in a shelf in random order. The probability that these volumes stands in increasing order from left to right not necessarily kept side by side is

A. $1/100$

B. $1/110$

C. $1/90$

D. $1/120$

Answer: D

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62. Two friends A and B have equal number of sons. There are 3 cinema tickets which are to be distributed among the sons of A and B. The probability that all the tickets go to the sons of B is $1/20$. The no. of sons each of them having is

A. 2

B. 4

C. 5

D. 3

Answer: D

Watch Video Solution

63. A point is selected at random from the interior of a circle. The probability that the point is closer to the centre than the boundary of the circle is

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

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

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

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

Answer: C

Watch Video Solution

64. There are two circles in xy-plane whose equations are $x^2 + y^2 - 2y = 0$ and $x^2 + y^2 - 2y - 3 = 0$. A point (x, y) is choosen at random inside the larger circle. The the probability that the point has been taken from the smaller circle is

A. $1/2$

B. $1/4$

C. $1/6$

D. $1/16$

Answer: B

View Text Solution

65. If A and B are two events such that $P(A \cup B) = 0.65, P(A \cap B) = 0.15$ then $P(\overline{A}) + P(\overline{B})$=

A. 1.2

B. 0.2

C. 0.8

D. 0.6

Answer: A

Watch Video Solution

66. If 5 red roses and 5 white roses of different sizes are used in preparing a garland, the probability that red and white roses come alternately is

A. $\frac{1}{252}$

B. $\frac{1}{126}$

C. $\frac{1}{63}$

D. $\frac{5}{126}$

Answer: B

Watch Video Solution

67. There are eight different coloured balls and 8 bags having the same colours as that of the balls. If one ball is placed at random in each one of the bags, then the probability that 5 of the balls are placed in the respective coloured bags is

A. $\frac{1}{120}$

B. $\frac{1}{160}$

C. $\frac{1}{180}$

D. $\frac{1}{360}$

Answer: D

Watch Video Solution

68. $P(A \cap B) = \frac{1}{4}, P(\overline{A}) = \frac{1}{3}, P(B) = \frac{1}{2}$, then $P(\overline{A \cup B}) =$

A. $1/12$

B. $11/12$

C. $1/4$

D. $3/4$

Answer: A

Watch Video Solution

69. Suppose A and B are two events such that $P(A \cap B) = \frac{3}{25}$ and $P(B - A) = \frac{8}{25}$. Then $P(B) =$

A. $\frac{11}{25}$

B. $\frac{3}{11}$

C. $\frac{1}{11}$

D. $\frac{9}{11}$

Answer: A

Watch Video Solution

70. If $P(A \cap B) = \frac{1}{4}$, $P(\overline{A} \cap \overline{B}) = \frac{1}{5}$ and $P(A) = P(B) = P$ then the value of $P =$

A. $\frac{11}{40}$

B. $\frac{21}{40}$

C. $\frac{13}{40}$

D. $\frac{17}{40}$

Answer: B

Watch Video Solution

71. A bag contains 5 black balls 4 white balls and 3 red balls. If a ball is selected at random the probability that it is a black or a red ball is

A. $1/3$

B. $1/4$

C. $5/12$

D. $2/3$

Answer: D

Watch Video Solution

72. The probabilities of two events A and B are 0.25 and 0.40 respectively. The probability that both A and b occur is 0.15. The probability that neither A nor B occurs is

A. 0.35

B. 0.65

C. 0.5

D. 0.75

Answer: C

Watch Video Solution

73. A and B are mutually exclusive events with P(A) = $\frac{1}{2}P(B)$ and $A \cup B$ = S, the sample space then P(A) =

A. $2/3$

B. $1/3$

C. $1/4$

D. $3/4$

Answer: B

Watch Video Solution

74. Only one of the two events A and B must occur. If P(A) = $\frac{2}{3}P(B)$, the odds in favour of B are

A. $1:2$

B. $2:1$

C. $2:3$

D. $3:2$

Answer: D

Watch Video Solution

75. 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. Then the probability that A loses is

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

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

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

D. $\frac{3}{7}$

Answer: D

Watch Video Solution

76. A random variable X has the probability distribution:

$X:$	1	2	3	4	5	6	7	8
$p(X):$	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

For the events E={X is a prime number} and $F = \{X < 4\}$, the probability $P(E \cup F)$ is

A. 0.87

B. 0.50

C. 0.35

D. 0.77

Answer: D

Watch Video Solution

77. If A and B are two mutually exclusive events then

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

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

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

D. $P(A) \leq P(B)$

Answer: A

Watch Video Solution

78. If A and B are two events of a sample space then $P(A) - P(B) =$

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

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

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

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

Answer: B

Watch Video Solution

79. If a card is drawn from a pack of cards then the probability of selecting a club card or king card is

A. $\frac{17}{52}$

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

C. $\frac{14}{52}$

D. $\frac{15}{52}$

Answer: B

Watch Video Solution

80. If 2 cards are drawn from a pack of cards then the probability of getting both red or both kings is

A. $\frac{15}{221}$

B. $\frac{17}{221}$

C. $\frac{55}{221}$

D. $\frac{17}{521}$

Answer: C

Watch Video Solution

81. If two dice are rolled then the probability of getting both even or sum 10 is

A. $\frac{4}{18}$

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

C. $\frac{7}{18}$

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

Answer: B

Watch Video Solution

82. One hundred students appeared for two examinations 60 passed in first, 50 passed the second and 30 passed both. The probability that a student selected at random has failed in both examinations is

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

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

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

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

Answer: A

Watch Video Solution

83. If one ticket is randomly selected from, tickets numbered 1 to 30 then the probability that the number on the ticket is a multiple of 5 or 7 is

A. $1/3$

B. $1/5$

C. $5/12$

D. $1/6$

Answer: A

Watch Video Solution

84. A card is drawn at random from a pack of cards. The probability that the card is either a face card (Jack, Queen, King) or a six is

A. $5/32$

B. $4/13$

C. $1/13$

D. $1/14$

Answer: B

Watch Video Solution

85. If A and B are two events such that P(A) = 0.3 , P(B) =0.6 and P(B|A) = 0.5 , then P(A|B) =

A. $1/2$

B. $1/3$

C. $1/4$

D. $2/3$

Answer: C

Watch Video Solution

86. If A and B are two events such that P(A) = 0.3 , P(B) = 0.6 and P(B|A) = 0.5 , then $P(A \cup B)$ =

A. 0.5

B. 0.65

C. 0.75

D. 0.85

Answer: C

Watch Video Solution

87. If A and B are two events such that $P(A \mid B) = 0.6, P(B \mid A) = 0.3,$ $P(A) = 0.1$ then $P\left(\overline{A} \cap \overline{B}\right) =$

A. 0.88

B. 0.12

C. 0.6

D. 0.4

Answer: A

Watch Video Solution

88. Two events A and B are such that $P(A) = \frac{1}{2}, P(A \mid B) = \frac{1}{4}$ and $P(B \mid A) = \frac{1}{2}$ Consider the following statements :

(I) $P(\overline{A} \mid \overline{B}) = \frac{3}{4}$

(II) A and B are mutually exclusive

(III) $P(A \mid B) + P(A \mid B) = 1$. Then

A. Only I is correct

B. Only I and II are correct

C. Only I and III are correct

D. Only II and III are correct

Answer: A

Watch Video Solution

89. Suppose E and F are two events of a random experiment. If the probability of occurrence of E is $1/5$ and the probability of occurrence of

F given E is $1/10$. Then the probability of non-occurance of atleast one of the events E and F is

A. $1/18$

B. $1/2$

C. $49/50$

D. $1/50$

Answer: C

Watch Video Solution

90. A young couple has two children. The probability that both children are boys, if it is known that atleast one of the children is a boy is

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

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

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

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

Answer: B

Watch Video Solution

91. A couple has 3 children and it is known that atleast one of them is a boy. Then the probability that the couple will have exactly two boys is

A. $\frac{3}{7}$

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

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

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

Answer: A

View Text Solution

92. Two dice are thrown at a time and the sum of the numbers on them is 6. The probability of getting the number 4 on any of the dice is

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

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

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

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

Answer: D

Watch Video Solution

93. Two coins are tossed . The probability of getting 2 tails if it is known that there is atleast one tail on the coins is

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

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

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

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

Answer: A

Watch Video Solution

94. When a die is rolled, the probability of getting an odd prime number is .....

A. $2/3$

B. $1/3$

C. $1/4$

D. $3/4$

Answer: A

Watch Video Solution

95. In a class $40\,\%$ students study mathematics $25\,\%$ study chemistry and $15\,\%$ both mathematics and chemistry. If a student is chosen at random the probability that he studies mathematics , If it is known that he studies chemistry is

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

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

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

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

Answer: D

Watch Video Solution

96. Two integers are selected at random from integers 1 to 11. If the sum is even then the probability that both numbers are odd is

A. $\frac{6}{11}$

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

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

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

Answer: B

Watch Video Solution

97. The sum of two positive numbers is 10. The probability that their product is greater than 20 is

A. $1/9$

B. $4/9$

C. $5/9$

D. $19/20$

Answer: C

Watch Video Solution

98. Five persons A,B,C,D,E are contesting an election in which 3 persons are to be elected. If C is elected unanimously, the probability that D gets elected is

A. $1/8$

B. $1/6$

C. $1/3$

D. $1/2$

Answer: D

Watch Video Solution

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

A. independent

B. dependent

C. exclusive

D. cannot be decided

Answer: A

Watch Video Solution

100. One die and a coin are (both unbaised) tossed simultanuonly. The probability of getting 5 on the top of the die and tail on the coin is

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

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

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

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

Answer: B

Watch Video Solution

101. A coin and six faced die, both unbaised are thrown simultaneously . The probability of getting a head on the coin and an odd number on the die is

A. $1/2$

B. $3/4$

C. $1/4$

D. $2/3$

Answer: C

Watch Video Solution

102. If $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{5}$, A and B are independent events then $P\left(\frac{A}{A \cup B}\right) =$

A. $1/6$

B. $3/6$

C. $3/4$

D. $5/6$

Answer: D

Watch Video Solution

103. A and B are two possible events of an experiment such that $P(A) = 0.3$, $P(A \cup B) = 0.8$ and $P(B) = P$. The value of P if A and B are independent is

A. $\frac{2}{10}$

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

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

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

Answer: D

Watch Video Solution

104. If the probability for A to fail in one exam is 0.2 and that for B is 0.3 , then the probability that either A or B fails is

A. 0.14

B. 0.6

C. 0.44

D. 0.24

Answer: C

Watch Video Solution

105. The probability that a boy A will get a scholarship is 0.9 and that another boy B will get is 0.8. What is the probability that atleast one of them will get the scholarship?

A. 0.98

B. 0.89

C. 0.43

D. 0.34

Answer: A

Watch Video Solution

106. If A and B are two independent events such that $P(A \cap B) = 1/6$ and $P(A \cap B') = 1/3$ then $P(A) =$

A. $3/5$

B. $1/2$

C. $1/5$

D. $5/6$

Answer: B

Watch Video Solution

107. If A and B are two independent events of a random experiment such that $P(A \cap B) = \frac{1}{6}$ and $P(\overline{A} \cap \overline{B}) = \frac{1}{3}$, then P(A)=

A. $1/4$

B. $1/5$

C. $1/2$

D. $2/3$

Answer: C

Watch Video Solution

108. At a selection, the probability of selection of A is $\frac{1}{7}$ and that of B is $\frac{1}{5}$, The probability that both if them would not be selected is.....

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

B. $\frac{24}{35}$

C. $\frac{11}{35}$

D. $\frac{1}{24}$

Answer: B

Watch Video Solution

109. In the above problem, the probability that both are selected is

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

B. $\frac{24}{35}$

C. $\frac{11}{35}$

D. $\frac{1}{24}$

Answer: A

View Text Solution

110. At a selection, the probability of selection of A is 1/7 and that of B is 1/5. The probability that atleast one of them would be selected is

A. $2/7$

B. $1/7$

C. $3/7$

D. $4/7$

Answer: A

Watch Video Solution

111. Three cards are drawn from pack successively without replacement, the probability of getting first king, second queen and third Ace is

A. $\frac{16}{52 \times 51}$

B. $(64)\left((52)^3\right)$

C. $\frac{64}{52 \times 51 \times 50}$

D. $\frac{4 \times 3 \times 2}{52 \times 51 \times 50}$

Answer: C

Watch Video Solution

112. Three cards are drawn from pack successively without replacement, probability of getting one king, one queen and one Ace is

A. $\frac{16}{52 \times 51}$

B. $\frac{64 \times 6}{(52)^3}$

C. $\frac{64 \times 6}{52 \times 51 \times 50}$

D. $\frac{64 \times 3}{52 \times 51 \times 50}$

Answer: C

Watch Video Solution

113. Two dice are rolled and 3 coins are tossed. The probability of getting doublet on the dice and exactly 2 heads on the coins is

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

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

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

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

Answer: B

Watch Video Solution

114. From each of 3 married couples one partner is selected at random then the probability of the chosen ones being all of the same sex is

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

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

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

D. $\frac{4}{19}$

Answer: C

Watch Video Solution

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

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

B. $\frac{2}{8}$

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

D. $\frac{5}{8}$

Answer: C

Watch Video Solution

116. A bag contains 5 balls and it is not known how many of them are white. Two balls are drawn and these are found to be white. Find the probability that all the balls in the bag are white.

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

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

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

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

Answer: B

Watch Video Solution

117. Out of the first 25 natural numbers two are chosen at random. The probability for one of the numbers to be a multiple of 3 and the other to be a multiple of 5 is

A. $1/15$

B. $13/100$

C. $1/5$

D. $4/15$

Answer: B

Watch Video Solution

118. A fair die is tossed twice. The probability of getting 4, 5 or 6 on the first toss and 1,2,3 or 4 on the second toss is

A. $7/36$

B. $5/36$

C. $1/3$

D. $35/36$

Answer: C

Watch Video Solution

119. A bag contains 4 black , 5 white and 6 red balls. If 4 balls are drawn one by one with replacement the probability that none is red is

A. $81/625$

B. $27/125$

C. $81/125$

D. $27/625$

Answer: A

Watch Video Solution

120. Two persons A and B are rolling die on the condition that the person who gets 3 will win the game. If A starts the game, then find the probabilities of A and B respectively to win the game.

A. $\frac{6}{11}, \frac{5}{11}$

B. $\frac{5}{11}, \frac{6}{11}$

C. $\frac{8}{11}, \frac{3}{11}$

D. $\frac{3}{11}, \frac{8}{11}$

Answer: A

Watch Video Solution

121. An urn A contains 8 black balls and 5 white balls. A second urn B contains 6 black and 7 white balls. The probability that a blind folded person in one draw shall obtain a white ball

A. $5/13$

B. $7/13$

C. $6/13$

D. $5/26$

Answer: C

Watch Video Solution

122. A bag contains 5 red , 3 black ball, and another bag contains 4 red and 5 black balls. One of the bags is chosen at random and a draw of two balls is made from it . The chance that one is red and other is black is

A. $15/56$

B. $5/18$

C. $275/504$

D. $229/504$

Answer: C

Watch Video Solution

123. Box A contains 2 black and 3 red balls, while box B contains 3 black and 4 red balls . Out of these two boxes one is selected at random, and the proability of choosing box A is double that of box B. if a red ball is

drawn from the selected box then the proability that is has come from box B is

A. $21/41$

B. $10/31$

C. $12/31$

D. $13/41$

Answer: B

Watch Video Solution

124. Fpr L=1,2,3 the box B_k contains k red balls and (k+1) white balls . Let $P(B_1) = \frac{1}{2}$, $P(B_2) = \frac{1}{3}, P(B_3) = \frac{1}{6}$. A box is selected at random and a ball is drawn from it . If a red ball is drawn, then the probability that it has come from box B_2 is

A. $\frac{35}{78}$

B. $\frac{14}{39}$

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

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

Answer: B

Watch Video Solution

125. In a certain colleage, 4% of men and 1% of women are taller than 1.8m. Also, 60% of students are women. If a student selected at random is found to be taller than 1.8 m, then the probability that the student being a woman is

A. $3/11$

B. $5/11$

C. $6/11$

D. $8/11$

Answer: A

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Exercise-II

1. The probability that the month February in a leap year contain 5 mondays or 5 Sundays

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

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

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

D. $\frac{3}{7}$

Answer: B

Watch Video Solution

2. The probability that the 13th day of a randomly chosen month is a Friday , is

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

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

C. $\frac{1}{84}$

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

Answer: B

Watch Video Solution

3. In a non-leap year, the probability of getting 53 Sundays or 53 Tuesdays or 53 Thursdays is

A. $1/7$

B. $2/7$

C. $3/7$

D. $4/7$

Answer: C

Watch Video Solution

4. Six coins are tossed simultaneously . The probability of getting at least 4 heads is

A. $\frac{11}{64}$

B. $\frac{11}{32}$

C. $\frac{15}{44}$

D. $\frac{21}{32}$

Answer: B

Watch Video Solution

5. An unbaised coin is tossed five times. The odds in favour of getting atleast one tail is

A. $1:31$

B. $31:1$

C. $31:32$

D. $1:32$

Answer: B

Watch Video Solution

6. An unbaiseed coin is tossed to get 2 points for tunring up a head and one point for the tail. If three unbaised coins are tossed simultaneously , then the probability of getting a total of odd number of points is

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

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

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

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

Answer: A

Watch Video Solution

7. Two dice are rolled simultaneously . The probability of getting an even number and an odd number is

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

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

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

D. $\frac{9}{13}$

Answer: C

Watch Video Solution

8. A coin whose faces are marked 3 and 5 is tossed 4 times. The odds against the sum of the numbers thrown being less than 15 are

A. $11:5$

B. $5:11$

C. $11:16$

D. $5:16$

Answer: A

Watch Video Solution

9. If two dice are rolled, then the probability of getting 5 on none of them is

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

B. $\frac{11}{36}$

C. $\frac{25}{36}$

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

Answer: C

Watch Video Solution

10. When two dice are rolled simultaneously then the probability of getting the digits on them whose difference is 3 is

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

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

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

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

Answer: C

Watch Video Solution

11. Six faces of an unbaised die are numbered with 2,3,5,7,11 and 13. If two such dice are thrown , then the probability that the sum on the uppermost faces of the dice is an odd number is

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

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

C. $\frac{13}{18}$

D. $\frac{25}{36}$

Answer: A

Watch Video Solution

12. A six faced die is so baised that it is twice as likely to show an odd number as an even number when rolled. The probability that the sum of the numbers on the upturned faces is even when the die is thrown twice is

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

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

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

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

Answer: A

View Text Solution

13. A die is loaded so that the probability of a face i is proportional to i where $i = 1, 2, 3, 4, 5, 6$. The probability of an even number occuring when die is rolled is

A. $\frac{11}{21}$

B. $\frac{1}{21}$

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

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

Answer: C

Watch Video Solution

14. Two dice one green and the other red are rolled and separate scores recorded. The probability that the scores on the dice differ by not more than 2 is

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

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

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

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

Answer: A

Watch Video Solution

15. A and B throw a die each simultaneously. The odds infavour of A not throwing a number greater than the number thrown by B is

A. $4:5$

B. $5:7$

C. $7:5$

D. $7:4$

Answer: C

Watch Video Solution

16. A die is loaded such that 1 turning upwards is 2 times as often as 6 and 3 times as any other face (2 or 3 or 4 or 5). The probability that we get a face with 6 when we throw such a die is

A. $\frac{6}{17}$

B. $\frac{2}{17}$

C. $\frac{4}{17}$

D. $\frac{3}{17}$

Answer: D

Watch Video Solution

17. If three six faced dice are tossed together, then the probability that exactly two of the three numbers are equal is

A. $\frac{165}{216}$

B. $\frac{177}{216}$

C. $\frac{51}{216}$

D. $\frac{90}{216}$

Answer: D

Watch Video Solution

18. Four dice are rolled, then the probability that at least one digit on the dice must be repeated is

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

B. $\frac{13}{18}$

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

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

Answer: B

Watch Video Solution

19. Three faces of a fair die are yellow, two faces are red and one face is blue. If the die is tossed 3 times, then the probability that thecolours yellow, red and blue appear is (need not be in that order)

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

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

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

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

Answer: B

Watch Video Solution

20. An arbitrary cube has four blank faces, one face marked 2 and another marked 3. Then the probability of obtaining a total of exactly 12 in 5 throws is

A. $\frac{5}{1296}$

B. $\frac{5}{1944}$

C. $\frac{5}{2592}$

D. $\frac{11}{1294}$

Answer: A

View Text Solution

21. The coefficients b and c of the equation $x^2 + bx + c = 0$ are determined by throwing an ordinary die. The probability that the equation has equal roots is

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

B. $\frac{13}{18}$

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

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

Answer: A

Watch Video Solution

22. If m is a natural number such that $m \leq 5$, then the probability that the quadratic equation $x^2 + mx + \frac{1}{2} + \frac{m}{2} = 0$ has real roots is

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

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

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

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

Answer: C

View Text Solution

23. If two cards are selected from a pack of cards, the probability of getting the cards from the same suit is

A. $\frac{12}{51}$

B. $\frac{13}{51}$

C. $\frac{7}{51}$

D. $\frac{18}{27}$

Answer: A

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24. If 3 cards are drawn from a pack of 52 cards at random, then the probability of getting cards from one suit and one card from another suit is

A. $\frac{.^4C_2 \times .^{13}C_2 \times .^{13}C_1}{.^{52}C_3}$

B. $\frac{.^{4}P_{2} \times .^{13}C_{2} \times .^{13}C_{1}}{.^{52}C_{3}}$

C. $\frac{.^{13}C_{2} \times .^{13}C_{1}}{.^{52}C_{3}}$

D. $\frac{.^{13}C_{2} \times .^{13}C_{1}}{.^{52}C_{3}}$

Answer: B

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25. Two cards are drawn simultaneously from a pack of cards. Find the probability that none of them will be the ace of spade

A. $1/26$

B. $1/13$

C. $25/26$

D. $11/26$

Answer: C

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26. In a bag there are infinitely many red, white and black balls which are identical. If Ten balls are selected at random then the probability that selection at random then the probability that selection includes atleast one ball from each colour is

A. $\frac{5}{11}$

B. $\frac{6}{11}$

C. $\frac{7}{11}$

D. $\frac{4}{11}$

Answer: B

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27. The letters of the word 'QUESTION' are arranged in a row at random. The probability that there are exactly two letters between Q and S is

A. $\frac{5}{28}$

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

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

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

Answer: A

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28. The letters of the word "ARTICLE" are arranged in all possible ways at random. The probability of arranging them so that the vowels must occur in a specified order (need not come together) is

A. $1/2$

B. $1/6$

C. $1/8$

D. $1/4$

Answer: B

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29. In constructing a problem on vectors, the three components of a vector are randomly choosen from the digits 0 to 5 with replacement. The probability that the magnitude of vector is 5 is

A. $1/6$

B. $1/12$

C. $1/24$

D. $1/30$

Answer: C

Watch Video Solution

30. The probability of forming a three digit number with the same digits when three digit numbers are formed out of the digits 0,2,4,6,8 is

A. $1/16$

B. $1/12$

C. $1/645$

D. $1/25$

Answer: D

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31. A five digit number is formed by the digits 1,2,3,4,5 with no digit being repeated. The probability that the number is divisible by 4, is

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

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

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

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

Answer: A

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32. A 4 digit number made of digits 1,2,3,4,5 is wirtten down at random without repetition. The probability that the number so formed is divisible by 6 is

A. $1/20$

B. $1/10$

C. $3/20$

D. $3/10$

Answer: B

Watch Video Solution

33. A number n is chosen at random from (1,2,3,4,.....1000). The probability that n is a number that leaves remainder 1 when divided by 7 is

A. $\frac{71}{500}$

B. $\frac{143}{1000}$

C. $\frac{72}{500}$

D. $\frac{71}{1000}$

Answer: B

Watch Video Solution

34. If 5 boys and 4 girls are arranged in a row at random then the probability of arranging so that same sex do not come to gether is

A. $\frac{11}{126}$

B. $\frac{1}{126}$

C. $\frac{1}{125}$

D. $\frac{7}{126}$

Answer: B

Watch Video Solution

35. 5 boys and 5 girls sit in a row at random. The probability that the boys and girls sit alternatively is

A. $\frac{5}{14}$

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

C. $\frac{1}{126}$

D. $\frac{1}{11}$

Answer: C

Watch Video Solution

36. If 100 boys are arranged at random along a circle then the odds against to arrange two specified boys of those 100 come together is

A. $2:97$

B. $97:2$

C. $2:98$

D. $98:2$

Answer: B

Watch Video Solution

37. Ten boys are arranged at random along a circle. The probability that 2 specified boys of those ten must be separated by exactly 3 boys in any direction is

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

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

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

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

Answer: B

View Text Solution

38. Out of 10 persons sitting at a round table, two persons are selected at random then the probability that they are not adjacent to each other is

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

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

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

D. $\frac{7}{9}$

Answer: D

Watch Video Solution

39. The odds against sitting of two particular persons together out of n persons seated round a circular table is

A. $(n-3):2$

B. $2:(n-3)$

C. $(n-2):2$

D. $2:(n-2)$

Answer: A

Watch Video Solution

40. A set A contains 10 elements. A function from A to itself is formed . The probability that the function so formed is not on-to is

A. $\frac{\angle 10}{(10)^{10}}$

B. $\frac{1}{10^9}$

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

D. $1 - \frac{\angle 9}{(10^9)}$

Answer: D

View Text Solution

41. A mapping is selected at random from the set of all mappings from the set $A = \{1, 2, 3\}$ into $B = \{1, 2, 3, 4\}$. The probability that the mapping selected is many to-one, is

A. $\frac{5}{8}$

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

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

D. $\frac{24}{64}$

Answer: A

View Text Solution

42. S is a set containing n elements. If two subsets A and B of S picked at random from the set of all subset of S. Then the probability that A and B have no common element.

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

B. $(2/3)^n$

C. $(3/4)^n$

D. $(4/5)^n$

Answer: A

Watch Video Solution

43. If 6 letters are placed at random in 6 addressed envelopes. Then the odds in favour of arranging them such that no letter goes into correct envelope is

A. $53:91$

B. $91:53$

C. $97:64$

D. $64:97$

Answer: A

Watch Video Solution

44. $A = \{x_1, x_2, x_3, x_4, x_5\}, B = \{y_1, y_2, y_3, y_4, y_5\}$. A one one mapping is selected at random from the set of mappings from A to B, the probability that it satisfies the condition $f(x_i) \neq y_i, i = 1, 2, 3, 4, 5$ is

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

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

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

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

Answer: B

View Text Solution

45. If 10 identical coins are distributed among 4 children at random. The probability of distributing so that each child gets atleast one coin is

A. $\frac{12}{143}$

B. $\frac{42}{143}$

C. $\frac{17}{143}$

D. $\frac{101}{143}$

Answer: B

Watch Video Solution

46. There are 10 stations between two cities A and B . A train is to stop at three pf tjese 10 stations . The probability that no two of these three stations are consecutive is

A. $\frac{7}{15}$

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

C. $\frac{8}{15}$

D. $\frac{11}{15}$

Answer: A

Watch Video Solution

47. If 5 different things are placed at random in 3 different boxes then the probability of placing them such that no box remains empty is

A. $\frac{31}{81}$

B. $\frac{50}{81}$

C. $\frac{40}{81}$

D. $\frac{20}{81}$

Answer: B

Watch Video Solution

48. If three people are chosen ata random, then the probability that no two of them were born in the same date of the month of september is

A. $\frac{30}{49}$

B. $\frac{203}{225}$

C. $\frac{120}{343}$

D. $\frac{6}{49}$

Answer: B

Watch Video Solution

49. Four persons entered the lift cabin on the ground floor of a 5-floor house (Assume ground floor as also one floor). Assume that each of them independently and with equal probability can leave the cabin at any floor beginning from the first. Find the probability for all the four persons to leave the cabin at different floors :

A. $3/32$

B. $1/256$

C. $1/1024$

D. $5/1024$

Answer: A

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50. Three squares of a chess board are chosen at random, the probability that two are of one colour and one of another is

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

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

C. $\frac{32}{12}$

D. $\frac{16}{27}$

Answer: A

Watch Video Solution

51. If four squares are chosen at random on a chess board, then the probability that they lie in a diagonal line is

A. $\frac{4\sum_{n=4}^{8} .^{n}C_4}{.^{64}C_4}$

B. $\frac{2\sum_{n=4}^{8} .^{n}C_4}{.^{64}C_4}$

C. $\frac{2\sum_{n=4}^{7} .^{n}C_4 + .^{8}C_4}{.^{64}C_4}$

D. $\frac{2\sum_{n=4}^{7} .^{n}C_4 + 2\left(.^{8}C_4\right)}{.^{64}C_4}$

Answer: D

Watch Video Solution

52. There are 10 pairs of shoes in a cup board from which 4 shoes are picked at random. The probability that there is atleast one pair is

A. $\frac{99}{323}$

B. $\frac{224}{323}$

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

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

Answer: A

Watch Video Solution

53. There are 10 pairs of shoes in a cupboard from which 4 shoes are picked at random. In the above problem the probability that there is no pair is

A. $\frac{99}{323}$

B. $\frac{224}{323}$

C. $\frac{16}{53}$

D. $\frac{17}{323}$

Answer: B

Watch Video Solution

54. There are 10 pairs of shoes in a cupboard from which 4 shoes are picked at . In the above problem the probability that there is exactly one pair is

A. $\frac{99}{323}$

B. $\frac{224}{323}$

C. $\frac{96}{323}$

D. $\frac{95}{323}$

Answer: C

Watch Video Solution

55. There are 10 pairs of shoes in a cupboard from which 4 shoes are picked at random. In the above problem the probability that there are two pairs is

A. $\frac{3}{323}$

B. $\frac{95}{323}$

C. $\frac{96}{323}$

D. $\frac{320}{323}$

Answer: A

Watch Video Solution

56. There are 20 pairs of shoes in a closet. Out of them 4 shoes are selected at random. The probability that there is exactly one pair among the 4 shoes is

A. $\frac{.^{20}C_1 \times .^{38}C_2}{.^{20}C_2}$

B. $\frac{.^{20}C_1\left(.^{38}C_2 - .^{19}C_1\right)}{.^{40}C_4}$

C. $\frac{.^{20}C_1\left(.^{38}C_2 - .^{9}C_1\right)}{.^{20}C_2}$

D. $\frac{.^{20}C_1 \times .^{38}C_2}{.^{40}C_4}$

Answer: B

Watch Video Solution

57. 3 out of 6 vertices of a regular hexagon are chosen at a time at random. The probability that the triangle formed with these vertices is an equilateral triangle , is

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

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

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

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

Answer: C

Watch Video Solution

58. Using the vertices of a polygon having 12 sides a triangle is constructed at random. The probability that the triangle so formed is such that no side of the polygon is side of the triangle is

A. $\frac{18}{55}$

B. $\frac{28}{55}$

C. $\frac{17}{55}$

D. $\frac{7}{55}$

Answer: B

Watch Video Solution

59. Out of 10 persons sitting at a round table, three persons are selected at random then the probability that no two of them are consecutive is

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

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

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

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

Answer: D

Watch Video Solution

60. In a set of lottery Tickets 7 carry prizes and 25 are blank. If three tickets are drawn then the probability to get a prize is

A. $\frac{.^{7}C_{3}}{.^{32}C_{3}}$

B. $\frac{.^{25}C_{3}}{.^{32}C_{3}}$

C. $1-\frac{.^{25}C_{3}}{.^{32}C_{3}}$

D. cannot be decided

Answer: C

Watch Video Solution

61. If a number x is selected from natural numbers 1 to 100, then the probability for $x + 100/x > 29$ is

A. $\frac{41}{50}$

B. $\frac{47}{50}$

C. $\frac{39}{50}$

D. $\frac{37}{50}$

Answer: C

Watch Video Solution

62. A boy forgets the last two digits of his friend's telephone number. He however remembers that they are different numbers. If he dials at random, the probability that he dials correctly is

A. $\frac{1}{100}$

B. $\frac{1}{90}$

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

D. $\frac{8}{9}$

Answer: B

Watch Video Solution

63. Five horses are in a race. Mr. A selects two of the horses at random and bets on them. The probability that Mr. A selected the winning horse is

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

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

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

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

Answer: C

Watch Video Solution

64. From 6 men and 4 women a committee of 5 members is to be formed. The probability that this can be done so as to include atleast one woman always is

A. $\frac{1}{42}$

B. $\frac{3}{42}$

C. $\frac{13}{42}$

D. $\frac{41}{42}$

Answer: D

Watch Video Solution

65. 24 boys are divided randomly into two equal groups. The probability that two tallest boys are in the different groups is

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

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

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

D. $\frac{.^2C_2}{.^{24}C_{12}}$

Answer: A

Watch Video Solution

66. A determinant is chosen at random from the set of all determinants of order 2 with elements 0 or 1 only. The probability that the determinant chosen is nonzero is

A. $5/8$

B. $3/8$

C. $1/16$

D. $3/16$

Answer: D

Watch Video Solution

67. Let x be a non-zero real number. A determinant is chosen from the set of all determinants of order 2 with entries x or -x only. The probability that the value of the determinant is non-zero is

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

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

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

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

Answer: C

Watch Video Solution

68. A committee of five is to be chosen from a group of 8 people which included a married couple. The probability for the selected committee which may or may not have the married couple is

A. $\frac{13}{28}$

B. $\frac{5}{14}$

C. $\frac{1}{56}$

D. $\frac{3}{56}$

Answer: A

Watch Video Solution

69. Two players A and B each toss 10 coins. The probability that they show equal number is heads is

A. $\frac{.^{20}C_{10}}{2^{20}}$

B. $\frac{1}{2^{10}}$

C. $\frac{1}{2^{20}}$

D. $\frac{1}{2^9}$

Answer: A

Watch Video Solution

70. From the set of numbers $\{2, 3, 4, \ldots\ldots, 30\}$ a number is selected at random. If it is a composite number it is divided by 5 other wise it is divided by 3. The probability that the remainder is zero is

A. $\frac{6}{29}$

B. $\frac{5}{29}$

C. $\frac{4}{29}$

D. $\frac{7}{29}$

Answer: A

Watch Video Solution

71. If a is an integer and $a \in (-5, 30]$ then the probability that the graph of the function $y = x^2 + 2(a+4)x - 5a + 64$ is strictly above the x-axis is

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

B. $\frac{8}{25}$

C. $\frac{8}{35}$

D. $\frac{27}{35}$

Answer: A

Watch Video Solution

72. If A,B,C are mutually exclusive and exhaustive events such that $P(A) = 2P(B) = 3P(C)$ then $P(B \cup C) =$

A. $\frac{6}{11}$

B. $\frac{5}{11}$

C. $\frac{4}{11}$

D. $\frac{7}{11}$

Answer: B

View Text Solution

73. A college student has to appear for two examinations A and B. The probabilities that the student passes in A and B are $\frac{2}{3}$ and $\frac{3}{4}$ respectively. If it is known that the student passes at least one among the two examinations, then the probability that the student will pass both the examination is

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

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

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

D. $\frac{6}{11}$

Answer: D

View Text Solution

74. If $P(A) = 0.7, P(B) = 0.4$ then the interval in which $P(A \cap B)$ lies is

A. $[0.1, 0.4]$

B. $[0.1, 0.6]$

C. $[0, 04]$

D. $[0, 0.8]$

Answer: A

View Text Solution

75. 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 possible values of x are in the interval

A. $\left[\frac{1}{2}, \frac{2}{3}\right]$

B. $\left[\frac{1}{3}, \frac{13}{3}\right]$

C. $[0, 1]$

D. $\left[\frac{1}{3}, \frac{1}{2}\right]$

Answer: D

View Text Solution

76. If a number is a selected at random from first 100 natural numbers then the probabilitiy that the number is a two digited number with atleast one even digit either at the beginning or ending is

A. $\frac{13}{20}$

B. $\frac{69}{100}$

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

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

Answer: A

Watch Video Solution

77. If 3 dice are rolled then the probability of getting different numbers or sum 16 is

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

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

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

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

Answer: A

View Text Solution

78. The odds against an event are 5 to 2 and the odds in favour of another disjoint event are 3 to 5. Then the probability that one atleast of the event will happen is

A. $\frac{29}{30}$

B. $\frac{49}{50}$

C. $\frac{17}{50}$

D. $\frac{37}{56}$

Answer: D

Watch Video Solution

79. In a class there are 60 boys and 40 girls. Among the boys as well as girls, half of them are Tamilians. If a student is selected at random then the probability of selecting a boy or Tamilian is

A. $3/5$

B. $4/5$

C. $2/5$

D. $1/5$

Answer: A

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80. If three numbers are drawn at random successively without replacement from a set $S = \{1, 2, \ldots . .10\}$, then the probability that the minimum of the chosen numbers is 3 or their maximum is 7 is

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

B. $\frac{3}{40}$

C. $\frac{5}{40}$

D. $\frac{11}{40}$

Answer: D

View Text Solution

81. In a class there are 10 men and 20 women. Out of them half the number of men and half the number of women have brown eyes. Out of

them if a person is chosen at random the probability for the person chosen to be a man or a brown eyed person is

A. $1/3$

B. $1/15$

C. $2/3$

D. $2/5$

Answer: C

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82. An electric bulb will last 190 days or more with a probability 0.7 and it will last for atmost 200 days with a probability of 0.8. The probability that the bulb will last between 190 and 200 days is

A. 0.5

B. 0.56

C. 0.2

D. 0.3

Answer: A

Watch Video Solution

83. A and B seek admission in I.I.T. The probability that A is selected is 0.5 and the probability that both A and B are selected is atmost 0.3. The probability of B getting selected is atmost is

A. 0.5

B. 0.6

C. 0.7

D. 0.8

Answer: D

Watch Video Solution

84. Two dice are rolled and given that the sum is prime. The probability of getting sum more than 6 is

A. $\frac{7}{15}$

B. $\frac{8}{15}$

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

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

Answer: B

View Text Solution

85. Two numbers are chosen at random from (1,2,3,4,5,6,7,8) at a time. The probability that smaller of the two numbers is less than 4 is

A. $\frac{7}{14}$

B. $\frac{8}{14}$

C. $\frac{9}{14}$

D. $\frac{10}{14}$

Answer: C

Watch Video Solution

86. Two cards are drawn from pack and given that they are of different colours. The probability of getting one king and one Queen is

A. $\frac{1}{169}$

B. $\frac{2}{169}$

C. $\frac{4}{169}$

D. $\frac{5}{169}$

Answer: B

View Text Solution

87. 3 fair dice are rolled and given that atleast two of them show the same number. Find the probability that atleast one die show 4.

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

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

C. $\frac{1}{17}$

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

Answer: B

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88. A box contains 10 mangoes out of which 4 are spoiled. 2 mangoes are taken together at random. If one of them is found to be good, then the probability that the other is also good, is

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

B. $\frac{8}{13}$

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

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

Answer: A

Watch Video Solution

89. A box contains 100 tickets, numbered 1,2,....100. Two tickets are chosen at random . It is given that the maximum number on the two chosen tickets is not more than 10. The minimum number of them is 5 with probability

A. $11/15$

B. 13/17

C. $13/17$

D. $13/19$

Answer: B

Watch Video Solution

90. For a biased die the probability for different faces to turn up are given below.

Face	1	2	3	4	5	6
Probability	0.1	0.32	0.21	0.15	0.05	0.17

The die is tossed and you are told either face 1 or 2 has turned up. Then the probability that it is face 1 is

A. $5/21$

B. $6/23$

C. $5/23$

D. $16/21$

Answer: A

Watch Video Solution

91. If A and B are any two events such that $P(A) = \frac{2}{5}$ and $P(A \cap B) = \frac{3}{20}$, then the conditional probability, $P(A/(A' \cup B'))$, where A' denotes the complement of A, is equal to

A. $\frac{11}{20}$

B. $\frac{5}{17}$

C. $\frac{8}{17}$

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

Answer: B

Watch Video Solution

92. One ticket is selected at random from 50 tickets numbered 00, 01, 02, ...49. Then the probability that the sum of the digites on the selected ticket is 8, given that the product of these digits is zero, equals

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

B. $\frac{5}{14}$

C. $\frac{1}{50}$

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

Answer: D

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93. E_1, E_2 are events of a sample space such that $P(E_1) = \frac{1}{4}$, $P\left(\frac{E_2}{E_1}\right) = \frac{1}{2}, P\left(\frac{E_1}{E_2}\right) = \frac{1}{4}$ then $P\left(\frac{E_1}{E_2}\right) + P\left(\frac{E_1}{\overline{E}_2}\right) =$

A. $1/4$

B. $1/3$

C. $1/2$

D. $3/4$

Answer: C

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94. Two aeroplanes I and II bomb a target in succession. The probabilities of I and II scoring a hit correctly are 0.3 and 0.2 respectively. The second plane will bomb only if the first misses the target. The probability that the target is hit by the second plane is

A. 0.7

B. 0.06

C. 0.14

D. 0.2

Answer: C

Watch Video Solution

95. A bag P contains 5 white marbles and 3 black marbles. Four marbles are drawn at random form P and are put in an empty bag Q . If a marble

drawn at rnadom from Q is found to be black then the probabiity that all the three black marbles in P are transfered to the bag Q is

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

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

C. $\frac{6}{8}$

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

Answer: D

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96. Let A and B be two events such that $P(\overline{A} \cup B) = \frac{1}{6}$, $P(A \cap B) = \frac{1}{4}$ and $P(\overline{A}) = \frac{1}{4}$ where $\overline{A}$ stands for complement of event A. Then events A and B are

A. equally likely and mutually exclusive

B. equally likely but not independent

C. independent but not equally likely

D. mutually exclusive and independent

Answer: C

Watch Video Solution

97. If A and B are events such that $P(A \cup B) = \frac{5}{6}$, $P(\overline{A}) = \frac{1}{4}$, $P(B) = \frac{1}{3}$, then A and B are

A. mutually exclusive

B. independent

C. exhaustive events

D. exhaustive and independent

Answer: B

Watch Video Solution

98. If A(i=1,2,3....n) are n independent events with P(A) = $\frac{1}{1+i}$ for each i , then the probability that none of A, occur is :

A. $\frac{n-1}{n+1}$

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

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

D. $\frac{1}{n+1}$

Answer: D

Watch Video Solution

99. A and B are two independent events. The probability that both A and B occur, is $1/6$ and the probability that none of them occur, is $1/3$. The minimum value of probability of occurance of A is

A. $1/2$

B. $1/3$

C. $1/4$

D. $1/6$

Answer: B

Watch Video Solution

100. The probabilities of solving a problem by three students A,B,C independently are $\frac{1}{3}, \frac{1}{4}, \frac{1}{5}$. The probability that the problems will be solved is.....

A. $\frac{1}{60}$

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

C. $\frac{48}{60}$

D. $\frac{57}{60}$

Answer: B

Watch Video Solution

101. The odds against A solving a problem are 8 to 6 and the odds in favour of B solving the same problem are 14 to 10. Then the probability that the problem will be solved if both of them try the problem is

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

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

C. $\frac{4}{21}$

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

Answer: A

Watch Video Solution

102. A speaks truth in $75\ \%$ of the cases and B in $80\ \%$ of the cases. Then the probability that their statements about an incident do not match , is

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

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

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

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

Answer: A

Watch Video Solution

103. The probability that A speaks truth is 4/5 , while this probability for B is 3/4 . The probability that they contradict each other when asked to speak on a fact is

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

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

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

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

Answer: C

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104. There are 15 cards. Of these 10 have the letter 'I' printed on them and the other 5 have the letter 'T' printed on them. If three cards are picked up at random one after the other and kept in the same order, the probability of making the word IIT is

A. $\frac{15}{182}$

B. $\frac{15}{91}$

C. $\frac{90}{15 \times 14 \times 13}$

D. $\frac{15}{32}$

Answer: B

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105. A salesman has a $60\,\%$ chance of making a sale to each customer. The behaviour of successive customers is independent. If two customers

A and B enter. The probability that the salesman will make a sale to A or B is

A. 0.36

B. 0.84

C. 0.96

D. 0.74

Answer: B

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106. Mr. X is selected for interview for 3 posts. For the first post there are 5 candidates, for the second there are 4 and for the third there are 6. If the selection of each candidate is equally, likely, find the chance that Mr. X will be selected for atlest one post

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

B. $\frac{119}{120}$

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

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

Answer: D

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107. Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that all the three apply for the same house is

A. $2/9$

B. $1/9$

C. $8/9$

D. $7/9$

Answer: B

Watch Video Solution

108. One bag A contains 5 white and 3 black balls. Another bag B contains 6 white and 2 black balls. A card is drawn from pack of cards. If it is club card, a ball is drawn from bag A. If it is red card a ball is drawn from bag B. Otherwise he kept quiet. The probability of getting white ball is

A. $\frac{15}{32}$

B. $\frac{17}{32}$

C. $\frac{14}{32}$

D. $\frac{19}{32}$

Answer: B

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109. Three groups of children contain 3 girls and one boy , 2 girls and 2 boys , one girl and 3 boys. One child is selected at random from each

group . The probability that the three selected consist of 1 girl and 2 boys is

A. $13/32$

B. $16/32$

C. $19/32$

D. $3/12$

Answer: A

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110. Three persons A,B,C in order cut a pack of cards replacing them after each cut. The person who first cuts a spade shall win a prize. The probability that C wins the prize is

A. $\frac{16}{37}$

B. $\frac{9}{37}$

C. $\frac{12}{37}$

D. $\frac{1}{37}$

Answer: B

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111. In the above problem the ratio of the probabilities of their winning is

A. $16:12:9$

B. $12:16:9$

C. $9:12:16$

D. $4:3:2$

Answer: A

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112. A man alternately tosses a coin and throws a die continuously . The probability of his getting a head on the coin before he gets 4 on the die is

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

B. $\frac{6}{7}$

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

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

Answer: B

Watch Video Solution

113. A biased coin with probability p, $0 < p < 1$ of heads is tossed until a head appears for the first time. If the probability that the number of tosses required is even is $2/5$, then q equals

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

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

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

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

Answer: A

View Text Solution

114. On a toss of two dice, A throws a total of 5. Then the probability that he will throw another 5 before he throws 7 is

A. $\frac{2}{45}$

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

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

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

Answer: B

Watch Video Solution

115. A and B throw a pair of dice. A wins if the throws 6 before B throws 7 and B wins if he throws 7 throws 6. If A begins, his chance of winning is

A. $\frac{5}{61}$

B. $\frac{30}{61}$

C. $\frac{35}{61}$

D. $\frac{60}{61}$

Answer: B

Watch Video Solution

116. India plays two hockey matches each with Pakistan and England. In any match, the probabilities of India getting points 0,1,2 are $0.4, 0.1, 0.5$ respectively. Assuming that the outcomes are independent the probability of India getting 7 points is

A. 0.0125

B. 0.05

C. 0.250

D. 0.005

Answer: B

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117. An article manufactured by a company consists of two parts A and B. In the process of manufacture 13 out of 104 parts of A and 5 out of 100 parts of B may be defective then the probability that the assembled product is not defective is

A. $\frac{28}{160}$

B. $\frac{33}{160}$

C. $\frac{128}{160}$

D. $\frac{133}{160}$

Answer: D

Watch Video Solution

118. The probability of India winning a test match against West-Indies is $1/2$ assuming independence from match to match. The probability that in a match series India's second win occurs at the third test is

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

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

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

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

Answer: B

View Text Solution

119. The key for a door is in the bunch of 10 keys. A man attempts to open the door by trying keys at random discarding the wrong key. The probability that the door is opened in the 5th trial is

A. 0.1

B. 0.2

C. 0.5

D. 0.6

Answer: A

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120. A letter is known to have come either from 'TATANAGAR' or 'CALCUTTA' . On the envelope. Just two consecutive letter TA are visible . The probability that the letters comes from 'TATA NAGAR' is

A. $\frac{4}{11}$

B. $\frac{7}{11}$

C. $\frac{5}{11}$

D. $\frac{6}{11}$

Answer: B

Watch Video Solution

121. Three numbers are chosen at random without replacement from {1,2,3,....8}. The probability that their minimum is 3, given that their maximum is 6, is

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

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

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

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

Answer: B

Watch Video Solution

122. In the random experiment of tossing two unbiased dice, let E be the event of getting the sum 8 and F be the event of gettiing even numbers on both the dice . Then ,

Statement I Statement II

$P(E) = \frac{7}{36}$ $P(F) = \frac{1}{3}$

Which of the following is a correct statement ?

A. both I and II are true

B. neither I nor II is true

C. I is true, II is false

D. I is false II is true

Answer: B

Watch Video Solution

123. A number n is chosen at random from $S = \{1, 2, 3, \ldots . .50\}$. Let $A = \left\{n \in S : n + \frac{50}{n} > 27\right\}$, $B = \{n \in S : n \text{is a prime}\}$ and $C = \{n \in S : n \text{is a square}\}$ Then correct order of their probability is

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

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

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

D. $P(A) > P(C) > P(B)$

Answer: B

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124. Observe the following lists:

List I		List II
A) $\lim_{x\to 1} \frac{1-\cos(x^2-3x+2)}{(x-1)^2}$ =		I) $\log_e\left(\frac{2}{3}\right)$
B) $\lim_{x\to 0} \frac{2^x-3^x}{x}$		II) $\log_e\left(\frac{4}{3}\right)$
C) $\lim_{x\to 0} \frac{5^x+3^x-2^x-1}{x}$ =		III) $\log a$
D) $\lim_{x\to\infty} x(a^{1/x}-1)$ =		IV) $\frac{1}{2}$
		V) $\log_e\left(\frac{15}{2}\right)$

A. $\begin{matrix} A & B & C & D \\ 3 & 5 & 4 & 1 \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ 2 & 4 & 1 & 5 \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ 4 & 1 & 3 & 2 \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ 1 & 3 & 2 & 4 \end{matrix}$

Answer: C

Watch Video Solution

125. Suppose that E_1 and E_2 are two events of a random experiment such that $P(E_1) = \frac{1}{4}, P(E_2 \mid E_2) = \frac{1}{2}$ and $P(E_1 \mid E_2) = \frac{1}{4}$. Observe the lists given below :

List I	List II
A) $P(E_2)$	i) 1/4
B) $P(E_1 \cup E_2)$	ii) 5/8
C) $P(\overline{E_1} \mid \overline{E_2})$	iii) 1/8
D) $P(E_1 \mid E_2)$	iv) 1/2
	v) 3/8
	vi) 3/4

The correct matching of the list I from the list II is :

A. $\begin{matrix} A & B & C & D \\ ii & iii & vi & i \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ iv & v & vi & i \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ iv & ii & vi & i \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ i & ii & iii & iv \end{matrix}$

Answer: C

Watch Video Solution

126. Assertion (A) : The probability of getting exactly 2 heads in tossing a coind thrice is $\left(\frac{1}{2}\right)^3$

Reason (R) : The probability of getting exactly r heads in tossing n coins is $\frac{.^nC_r}{2^n}$.

The correct answer is

A. Both A and R are true, R is the correct explanation of A

B. Both A and R are true, R is not the correct explanation of A

C. A is true but R is false

D. A is false R is true

Answer: D

Watch Video Solution

127. Out of (2n+1) tickets consecutively numbered , three are drawn at random . The chance that the numbers on them are in A.P is

A. $\frac{n}{n^2-1}$

B. $\frac{3n}{n^2-1}$

C. $\frac{3n}{4n^2-1}$

D. $\frac{3n}{4n^2+2n-1}$

Answer: C

Watch Video Solution

128. A bag contains n coins of which five of them are counterfeit with heads on both sides and the rest are fair coins. If one coin is selected from the bag and tossed, the probability of getting head is $5/8$ then n=

A. 16

B. 20

C. 24

D. 28

Answer: B

Watch Video Solution

129. A is one of 5 horses that entered the race and for it to be rided by one of the two jokeys P & Q and odds in favour of P rides it is 2 to 1. If P rides, A, all the horses are likely to win. If Q rides A, A' s chance of winning is tripled. The odds in favour of A's winning is

A. $1:3$

B. $3:1$

C. $1:2$

D. $2:1$

Answer: C

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130. The probability that a teacher will conduct an unannounced test during any class meeting is $1/4$. If a student of the class is absent twice, then the probability for the student to miss atleast one test is

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

B. $\frac{6}{16}$

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

D. $\frac{7}{16}$

Answer: D

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Practise Exercise

1. The probability that a non leap year will have 53 Wednesdays is

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

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

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

D. $\frac{6}{7}$

Answer: A

Watch Video Solution

2. The probability for a randomly chosen month to have its 10^{th} day as Sunday is

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

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

C. $\frac{5}{42}$

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

Answer: A

View Text Solution

3. The probability that a leap year selected at random contains 53 Mondays and 52 Tuesdays is

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

B. $\frac{3}{7}$

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

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

Answer: D

Watch Video Solution

4. The probability of getting atleast two heads, when tossing a coin three times is.....

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

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

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

D. $\frac{5}{8}$

Answer: C

Watch Video Solution

5. A fair coin is tossed 100 times. The probability of getting tails an odd number of times is

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

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

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

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

Answer: A

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6. The probability of getting atmost 4 heads when tossing 7 coins is

A. $\frac{57}{64}$

B. $\frac{99}{128}$

C. $\frac{5}{16}$

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

Answer: B

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7. Six coins are tossed simultaneously . The odds in favour of getting 2 heads is

A. $10:11$

B. $6:5$

C. $5:3$

D. $15:49$

Answer: D

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8. Five coins whose face are marked 3, 4 are thrown. The chance of obtaining a total of 18 is

A. $\frac{1}{32}$

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

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

D. $\frac{5}{16}$

Answer: D

Watch Video Solution

9. The probability of getting a total score of 7 when two unbaised dice are thrown simultaneously is

A. $\frac{7}{36}$

B. $\frac{29}{36}$

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

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

Answer: C

Watch Video Solution

10. If two dice are thrown the probability that atleast one of the dice shows a number greater than or equal to 4 is

A. $9/36$

B. $3/4$

C. $1/9$

D. $4/9$

Answer: B

View Text Solution

11. If three dice are rolled, the probability of getting sum 12 is

A. $\frac{15}{216}$

B. $\frac{25}{216}$

C. $\frac{5}{216}$

D. $\frac{7}{216}$

Answer: B

View Text Solution

12. In an experiment of rolling 2 dice, the probability that, the dots on the second die is less than that on the first die is

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

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

C. $\frac{11}{36}$

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

Answer: A

Watch Video Solution

13. If two dice are rolled then the probability of getting 4 or more on both the dice is

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

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

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

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

Answer: C

View Text Solution

14. A cubical die is loaded so that the probability of face K is proportional to K, $K = 1, 2, 3, 4, 5, 6$. It is rolled. The probability of getting an odd integer face

A. $1/7$

B. $4/7$

C. $3/7$

D. $2/7$

Answer: C

Watch Video Solution

15. Two dice are rolled. The probability that the maximum of the two numbers is greater than 4 is

A. $8/9$

B. $1/9$

C. $4/9$

D. $5/9$

Answer: D

View Text Solution

16. Three dice are rolled simultaneously . The probability that the sum of the numbers on them is 6 is

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

B. $\frac{5}{108}$

C. $\frac{26}{51}$

D. $\frac{13}{34}$

Answer: B

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17. The probability of choosing randomly a number c from the set (1,2,3,....9) such that the quadratic equation $x^2 + 4x + c = 0$ has real roots is :

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

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

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

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

Answer: D

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18. Three dice are thrown. The probability of getting a total of atleast 5 is

A. $\frac{1}{54}$

B. $\frac{53}{54}$

C. $\frac{5}{216}$

D. $\frac{211}{216}$

Answer: B

View Text Solution

19. Two cards are drawn from a pack. The probability that one of them is a club and the other is not a club is

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

B. $\frac{5}{108}$

C. $\frac{26}{51}$

D. $\frac{13}{34}$

Answer: D

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20. Two cards are selected at random from 52 playing cards then the probability of selecting one king and one Queen is

A. $\frac{4^2}{.^{52}C_2}$

B. $\frac{4}{.^{52}C_2}$

C. $\frac{1}{.^{52}C_2}$

D. $\frac{4 \times 3}{.^{52}C_2}$

Answer: A

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21. If two cards are drawn from a pack then the probability of getting same colour is

A. $\frac{25}{51}$

B. $\frac{24}{51}$

C. $\frac{23}{51}$

D. $\frac{1}{51}$

Answer: A

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22. When a card is drawn from a pack, then the probability of getting a number card is

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

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

C. $\frac{9}{13}$

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

Answer: C

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23. Card is drawn at random from a packet of 100 cards numbered 1 to 100. The probability of drawing a number which is a square is.....

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

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

C. $\frac{2}{25}$

D. $\frac{23}{25}$

Answer: A

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24. When two balls are drawn from a bag containing 2 white, 4 red and 6 black balls, the chance for both of them to be red is.....

A. $\frac{1}{11}$

B. $\frac{6}{11}$

C. $\frac{3}{11}$

D. $\frac{4}{12}$

Answer: A

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25. Three balls are drawn at random from collection of 7 white, 12 green and 4 red balls, The probability that each ball is of different colours is.....

A. $\frac{.^{7}C_{1} \times .^{12}C_{1} \times .^{4}C_{1}}{.^{23}C_{3}}$

B. $\frac{8}{253}$

C. $\frac{4}{253}$

D. $\frac{1}{253}$

Answer: A

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26. Three mangoes and three apples are in a box. IF two fruits are chosen at random the probability that one is a mango and the other is an apple is.....

A. $\frac{2}{6}$

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

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

D. $\frac{3}{6}$

Answer: C

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27. The probability of drawing 3 white and 4 green balls from a bag containing 5 white and 6 green balls if the seven balls are drawn at random simultaneously is

A. $\frac{5}{11}$

B. $\frac{6}{11}$

C. $\frac{7}{11}$

D. $\frac{8}{11}$

Answer: A

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28. From a bag containing 4 white balls and 5 black balls a person draws 3 balls at random. The odds in favour of these 3 balls being black are

A. $3:5$

B. $3:9$

C. $37:5$

D. $5:37$

Answer: C

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29. A box contains 5 white socks and 5 blue socks well mixed. A man picks 2 socks at random. The probability for both socks to match is

A. $4/9$

B. $2/9$

C. $1/45$

D. $2/45$

Answer: A

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30. A card is taken out of a pack of 52 cards numbered 2 to 53. The probability that the number on the card is a prime less than 20 is.....

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

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

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

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

Answer: B

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31. Three cards are drawn at random from pack of 52 cards. The probability that they are a king, a Queen and an even numbered card is

A. $\frac{1}{1105}$

B. $\frac{4}{1105}$

C. $\frac{16}{1105}$

D. $\frac{64}{1105}$

Answer: C

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32. Two cards are randomly selected from a pack of 52 playing cards. The probability that both cards are greater than 3 and lessthan 8 is

A. $\frac{20}{221}$

B. $\frac{45}{221}$

C. $\frac{16}{169}$

D. $(81)(169)$

Answer: A

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33. At random the letters of the word "ARTICLE" are arranged in all possible ways then the probability that the arrangement begins with a vowel is

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

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

C. $\frac{3}{7}$

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

Answer: C

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34. If the letters of the word "ATTEMPT" are written down at random. The probability that all the T's come together is

A. $\frac{1}{21}$

B. $\frac{6}{7}$

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

D. $\frac{1}{42}$

Answer: C

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35. The letters of the word SUCCESS are arranged in a row at random. The probability that no two S's may come together is

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

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

C. $\frac{3}{7}$

D. $\frac{1}{30}$

Answer: B

Watch Video Solution

36. The letters of the word TRIANGLE are arranged at random. The probability that the word so formed starts with T and ends with R is

A. $\frac{2}{8!}$

B. $\frac{6}{8!}$

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

D. $\frac{1}{56}$

Answer: D

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37. The probability that a vowel selected at random from an English book is 'u' is

A. $\frac{5}{26}$

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

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

D. $\frac{21}{26}$

Answer: B

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38. The letters of the word VICTORY are arranged in a row at random. The probability that no two vowels may come together is

A. $\frac{3}{7}$

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

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

D. $\frac{6}{7}$

Answer: C

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39. Five digit numbers can be formed from the digits 1,2,3,4,5. If one number is selected at random , the probability that it is an even number is

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

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

C. $\frac{7}{16}$

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

Answer: B

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40. Using $\{1, 2, 3, 4, 5\}$ foure digited numbers are formed without repetation at random. The probability that the number so formed is not divisible by 5 is

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

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

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

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

Answer: D

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41. Seven persons sit in a row at random. The probability that three persons A, B,C sit together in a particular order is

A. $\frac{3!}{7!}$

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

C. $\frac{5!}{7!}$

D. $\frac{3!5!}{7!}$

Answer: D

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42. Six boys and six girls sit at a round table. The probability that the boys and girls sit alternatively is

A. $\frac{1}{462}$

B. $\frac{2}{462}$

C. $\frac{1}{460}$

D. $\frac{3}{460}$

Answer: A

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43. If n letters are placed at random in n addressed envelops then the probability that all the letters are placed in correct envelops is

A. $\frac{1}{\angle n}$

B. $1-\frac{1}{\angle n}$

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

D. $1-\frac{1}{n}$

Answer: A

Watch Video Solution

44. Five balls of different colours are placed at random in fives boxes having colours as that of the balls. The probability that no ball goes into the box of same colour is

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

B. $\frac{119}{120}$

C. $\frac{1}{120}$

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

Answer: A

View Text Solution

45. The letters of the word "VICTORY" are arranged in a row at random. The probability that the vowels may be in the even places is

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

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

C. $\frac{3}{7}$

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

Answer: A

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46. Using $\{0, 2, 3\}$ at randomm six digited numbers are formed. The probability that the number so formed is even number is

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

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

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

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

Answer: B

View Text Solution

47. Five digit numbers can be formed by using 0,2,3,4,5,. One number is selected at random. The probability that it is a divisible by 5 is

A. $\frac{7}{16}$

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

C. $\frac{1}{26}$

D. $\frac{7}{26}$

Answer: A

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48. 4 digit number are formed using each of the digits 1 to 8 only out of them one number is picked at random. The probability that the selected number contains 3 is

A. $1/2$

B. $1/3$

C. $1/4$

D. $1/8$

Answer: A

View Text Solution

49. In a row 10 person are arranged at random. The probability of arranging them in such a way that two specified persons of those ten are exactly separated by 3 persons is

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

B. $\frac{2}{15}$

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

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

Answer: B

Watch Video Solution

50. Two persons A, B have to speak at a function with 10 other persons. If the persons speak at random order, the probability that A speaks immediately before B is

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

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

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

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

Answer: A

View Text Solution

51. 6 boys and 5 girls are arranged in a random order. The probability of arranging the girls as neighbours in specified order is

A. `(/_6)/(/_11)

B. `(/_7/_5)/(/_11)

C. `(/_7)/(/_11)

D. `(/_5)/(/_11)

Answer: C

View Text Solution

52. Fifteen person, among whom are A and B , sit down at random at a round table, the probability that there are exactly are 4 persons between A and B is

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

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

C. $\frac{3}{7}$

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

Answer: A

Watch Video Solution

53. A set A contains m elements another set B contains n elements. A relation is formed from A to B. Then the probability that the relation is a function is

A. $\frac{{}^{n}P_{m}}{2^{mn}}$

B. $\frac{n^{m}}{2^{mn}}$

C. $\frac{m^{n}}{2^{mn}}$

D. $\frac{m+n}{2^{mn}}$

Answer: B

View Text Solution

54. A set A contains 4 elements another set B contains 5 elements . If a function from A to B is formed then the probability that the function is one one is

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

B. $\frac{24}{125}$

C. $\frac{12}{125}$

D. $\frac{6}{125}$

Answer: B

View Text Solution

55. A mapping is selected at random from the set of all the mappings of the set of A= {1,2,3,4} into itself. The probability that the mapping selected is a bijection is

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

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

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

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

Answer: C

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56. $A = \{a_1, a_2, a_3\}$, $B = \{b_1, b_2, b_3\}$. A one-one mapping is selected at random from the set of mappings from A to B. The probability that it satisfies the condition $f(a_i) \neq b_i$ is

A. $1/3$

B. $1/6$

C. $1/2$

D. $1/24$

Answer: A

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57. There are 10 stations on a railway. A train has to stop at three of these stations. The probability that no two of them are consecutive is

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

B. $\frac{7}{15}$

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

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

Answer: B

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58. If 7 squares are chosen at random on a chess board, the probability that they lie on a diagonal line is

A. $\frac{10}{{}^{64}C_7}$

B. $\frac{12}{{}^{64}C_7}$

C. $\frac{20}{{}^{64}C_7}$

D. $\frac{24}{.^{64}C_7}$

Answer: C

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59. Using the vertices of a polygon having 8 sides a triangle is constructed at random. The probability that the triangle so formed is such that no side of the polygon is side of the triangle is

A. $\frac{18}{55}$

B. $\frac{28}{55}$

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

D. $\frac{3}{7}$

Answer: C

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60. Out of 12 persons sitting at a round table three persons are chosen at random. The probability that no two of them are consecutive is

A. $\frac{18}{55}$

B. $\frac{28}{55}$

C. $\frac{17}{55}$

D. $\frac{7}{55}$

Answer: B

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61. In a room there are 5 couples. Out of them if four persons are chosen at random. The probability that no two of them are consecutive is

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

B. $\frac{1}{21}$

C. $\frac{1}{33}$

D. $\frac{3}{11}$

Answer: B

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62. A book containing 100 pages is opened at random. The probability that on that page a doublet is found is

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

B. $\frac{9}{101}$

C. $\frac{9}{100}$

D. $\frac{1}{11}$

Answer: C

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63. 3 numbers are chosen at random from the first 20 natural numbers. Then the probability that the product is even is

A. $\frac{.^{10}C_3}{.^{20}C_3}$

B. $1-\frac{.^{10}C_3}{.^{20}C_3}$

C. $\frac{10}{.^{20}C_3}$

D. $\frac{1}{.^{20}C_3}$

Answer: B

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64. Entries of a 2×2 matrix are chosen from the set $\{0,1\}$. The probability that the determinant has zero value is

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

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

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

D. $\frac{5}{8}$

Answer: D

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65. The probability of getting a number between 1 and 100 which is divisible by one and itself only is.....

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

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

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

D. $\frac{25}{98}$

Answer: D

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66. The probability that in a family of 5 children there will be atleast a girl is

A. $\frac{1}{32}$

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

C. $\frac{29}{32}$

D. $\frac{31}{32}$

Answer: D

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67. In a lottery with 30 tickets numbered 1 to 30, two tickets are drawn simultaneously. The probability that atleast one of the two tickets drawn is not a prime number is

A. $\frac{3}{29}$

B. $\frac{5}{29}$

C. $\frac{25}{29}$

D. $\frac{26}{29}$

Answer: D

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68. Three electric lamps are fitted in a room. 3 bulbs are chosen at random from 20 bulbs having 16 good bulbs. The probability that the room is lighted is

A. $\frac{282}{285}$

B. $\frac{283}{285}$

C. $\frac{284}{285}$

D. $\frac{281}{285}$

Answer: C

View Text Solution

69. Three numbers are chosen from 1 to 20. The probability that they are not consecutive is

A. $\frac{186}{190}$

B. $\frac{187}{190}$

C. $\frac{188}{190}$

D. $\frac{189}{190}$

Answer: B

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70. If x is an integer and $x \in [1, 5]$ then the probability that $x^2 - 3x + 2 > 0$

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

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

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

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

Answer: D

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71. There are two circles in xy-plane whose equations are $x^2 + y^2 - 2x - 3 = 0$ and $x^2 + y^2 - 2x = 0$. A point (x, y) is choosen at random inside the larger circle. The the probability that the point has been taken from the smaller circle is

A. $1/4$

B. $3/4$

C. $1/2$

D. $1/3$

Answer: A

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72. Four tickets marked 00, 01, 10 , 11 respectively are placed in a bag. A ticket is drawn at random five times being replaced each time. The probability that the sum of the numbers on the tickets is 22 is

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

B. $\frac{25}{256}$

C. $\frac{231}{256}$

D. 0

Answer: B

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73. S is a sample sapce. $S = \{x \in N : 1 < x \leq 100\}$ and $E = \{x : (x+1)(x-1) \in S\}$. Then $P(E) =$

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

B. $\frac{2}{25}$

C. $\frac{99}{100}$

D. $\frac{1}{11}$

Answer: D

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74. A has 3 shares in a lottery containing 3 prizes and 6 blanks . B has two shares in a lottery containing 2 prizes and 6 blanks . The ratio of their chances of success is

A. $952:715$

B. $274:659$

C. $113:907$

D. $64:39$

Answer: D

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75. Suppose $n(\geq 3)$ persons are sitting in a row. Two of them are selected at random. The probability that they are not together is

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

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

C. $1-\frac{1}{n}$

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

Answer: A

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76. A natural number is chosen at random from the first 100 natural numbers. The probability that $x+\frac{100}{x}>50$ is

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

B. $\frac{11}{50}$

C. $\frac{11}{20}$

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

Answer: C

View Text Solution

77. A number lock contains 4 rings each ring containing 6 numbers . All the possible attempts of opening the lock are made but the lock opens in only one way. The probability for the lock to open is

A. $\frac{4}{6!}$

B. $\frac{4!}{6!}$

C. $\frac{1}{6^4}$

D. $\frac{4}{6^4}$

Answer: C

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78. In an examination paper there are 10 questions. Their answers shall be given as yes or no only. The probability of writing correct answers for atleast 9 questions is

A. `(11)/(20)~

B. $\frac{11}{1024}$

C. $\frac{9}{1024}$

D. $\frac{5}{512}$

Answer: B

View Text Solution

79. There are 2 red, 4 white and 5 blue balls. Also balls of the same colour are identical . The balls are placed in a line at random. The probability that no two blue balls are consecutive is

A. $\frac{1}{22}$

B. $.^{7}C_{5} \times \frac{6!}{11!}$

C. $\frac{5! \times 6!}{11!}$

D. $\frac{.^{7}C_{5}}{11!}$

Answer: A

View Text Solution

80. Out of 13 applicants for a job, there are 5 women and 8 men. It is desired to select 2 persons for the job. The probability that atleast one of the selected persons will be a woman is

A. $10/13$

B. $5/13$

C. $14/39$

D. $25/39$

Answer: D

Watch Video Solution

81. A point is taken at random from inside of the circumcircle of an equilateral triangle. The probability that it lies inside the circumcircle but outside the incircle is

A. $1/4$

B. $3/4$

C. $1/2$

D. $1/3$

Answer: B

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82. If P(A) =0.25 , P(B)=0.5, $P(A \cap B) = 0.14$ then $P(\overline{A} \cap \overline{B})$=

A. 0.61

B. 0.39

C. 0.19

D. 0.29

Answer: B

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83. If A and B are mutually exclusive such that $P(A) = 0.4$, $P(A \cup B) = 0.7$ then $P(B) =$

A. 0.3

B. 0.2

C. 0.1

D. 0.7

Answer: A

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84. If $P(A) = \frac{1}{3}P(B)$ and $P(A \cup B) = 0.5$. When A, B are mutually exclusive events. Then $P(A) =$

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

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

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

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

Answer: A

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85. If $P(A \cup B) = 0.8$, $P(A \cap B) = 0.3$ then $P(\overline{A}) + P(\overline{B})$=

A. 0.3

B. 0.5

C. 0.7

D. 0.9

Answer: D

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86. If $P(A) = x, P(B) = y$ and $P(A \cap B) = z$ then $P\left(\overline{A} \cap \overline{B}\right) =$

A. $x + y - z$

B. $x - z$

C. $1 - x - y + z$

D. $1 - x - z$

Answer: C

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87. If $P(A \cup B) = 3/4$ and $P(A) = 1/3$ then $P\left(\overline{A} \cap B\right) =$

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

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

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

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

Answer: C

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88. If A and B are events such that $P(A) = p_1$, $P(B) = p_2$ and $P(A \cap B) = p_3$ then $P\left(\overline{A} \cup B\right) =$

A. $1 - p_1 + p_2$

B. $1 - p_1 + p_3$

C. $1 - p_1 - p_2$

D. $p_1 + p_2 - 1$

Answer: B

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89. If A and B are two events such that $P(A) = \frac{1}{2}$ and $P(B) = \frac{2}{3}$ then

A. $P(A \cup B) \geq 2/3$

B. $P(A \cup B) \leq 2/3$

C. $P(A \cup B) \geq 1/2$

D. $P(A \cup B) \leq 1/2$

Answer: A

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90. If $\frac{1+3P}{3}, \frac{1-2P}{2}$ are probabilities of two mutually exclusive events, then P lies in the interval.

A. $\left[-\frac{1}{3}, \frac{1}{2}\right]$

B. $\left(-\frac{1}{2}, \frac{1}{2}\right)$

C. $\left[-\frac{1}{3}, \frac{2}{3}\right]$

D. $\left[-\frac{1}{2}, \frac{2}{3}\right]$

Answer: A

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91. If $P(A) = x$, $P(B) = 2x$, $P(A \cap B) = \frac{1}{2}$, $P\left(\overline{A} \cap \overline{B}\right) = 2/3$, then x=

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

B. $\frac{6}{36}$

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

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

Answer: C

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92. If A and B are events of a random experiment such that $P(A \cup B) = \frac{4}{5}, P(\overline{A} \cup \overline{B}) = P(\overline{A} \cap \overline{B}) \frac{7}{10}$ and $P(B) = \frac{2}{5}$, then P(A) equal

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

B. $\frac{8}{10}$

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

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

Answer: C

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93. From a set of 20 cards numbered from 1 to 20 one is drawn at random. Then the probability of selecting that the number is divisible by 3 or 5 is

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

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

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

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

Answer: C

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94. The probability of choosing at random a number divisible by 6 or 8 from among 1 to 90 is

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

B. $\frac{1}{90}$

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

D. $\frac{23}{90}$

Answer: D

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95. A card is drawn at random from a normal pack of cards. The probability that it is either red or number card is

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

B. $\frac{11}{13}$

C. $\frac{55}{221}$

D. $\frac{55}{34}$

Answer: B

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96. In a town $40\,\%$ people read Eenadu. $25\,\%$ people read Jyothi and $15\,\%$ people read both. A person chosen at random from the town. The probability that the person chosen read Jyothi but not Enadu is

A. `(1)/(10)

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

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

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

Answer: A

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97. In the above problem the probability that the person chosen read exactly one paper is

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

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

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

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

Answer: A

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98. In the above problem the probability that the person chosen read atleast one paper is

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

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

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

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

Answer: C

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99. The probability of the event A occuring is 0.5 and of B occurring is 0.3. If A and B are mutually exclusive events then the probability of neither A nor B occuring is

A. 0.6

B. 0.5

C. 0.7

D. 0.2

Answer: D

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100. A card is drawn at random from a pack, the probability that it may be either king or queen is

A. $\frac{11}{13}$

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

C. $\frac{1}{26}$

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

Answer: D

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101. The probability that a student passes a physics test is $2/3$ and the probability that he passes both a physics test and an English test is $14/45$. The probability that passes atleast one test is $4/5$. The probability that he passes the English test is

A. $4/9$

B. $1/20$

C. $4/5$

D. $16/45$

Answer: A

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102. If 2 cards are drawn from a pack of cards then the probability of selecting both from same suit or both kings is

A. $\frac{53}{221}$

B. $\frac{55}{221}$

C. $\frac{15}{221}$

D. $\frac{17}{221}$

Answer: A

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103. If two cards are drawn from a pack then the probability of getting different colour or both kings is

A. $\frac{113}{221}$

B. $\frac{107}{221}$

C. $\frac{105}{221}$

D. $\frac{117}{221}$

Answer: A

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104. If two dice are rolled then the probability of getting exactly one six on the dice or sum 8 is

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

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

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

D. $\frac{11}{36}$

Answer: A

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105. 2 dice are rolled then the probability of getting both even or different is

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

B. $\frac{11}{12}$

C. $\frac{8}{11}$

D. $\frac{7}{11}$

Answer: B

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106. When a die is thrown the probability of getting an even number or a multiple of 3 is

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

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

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

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

Answer: D

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107. One card is drawn from each of two sets of playing cards (containing 52). The probability that atleast one of them is the king of spade is

A. $\frac{2}{52}$

B. $\frac{4}{52}+\frac{4}{52}-\frac{1}{52}$

C. $\frac{103}{52\times 52}$

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

Answer: C

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108. The odds infavour of drawing a king or a diamond from a well shuffled pack are

A. $9:4$

B. $4:9$

C. $5:9$

D. $9:5$

Answer: B

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109. In a class there are 60 boys and 20 girls. Half the boys and girls have merit scholarships. If a student is chosen at random the probability that the student be either a boy or a student with scholarship is

A. $1/8$

B. $2/8$

C. $6/8$

D. $7/8$

Answer: D

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110. If A and B are mutually exclusive events with P(B) $\neq 1$ then $P\left(A \mid \overline{B}\right)$ is equal to {Here $\overline{B}$ is the complement of the event B)

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

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

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

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

Answer: D

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111. If A and B are two independent events such that P(B) = 2/7, $P(A \cup B) = 0.8$, then P(A)=

A. 0.1

B. 0.2

C. 0.3

D. 0.4

Answer: C

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112. If $P(\overline{A})$ = 0.7, P(B) = 0.7 and P(B|A) = 0.5, then $P(A \cup B) =$

A. 0.5

B. 0.65

C. 0.75

D. 0.85

Answer: D

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113. If two dice are thrwon simultaneously, then the sum of the numbers on them is 7. The probability that 2 is on any one of them is

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

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

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

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

Answer: A

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

A. dependent events

B. independent events

C. mutually exclusive events

D. mutually exclusive and independent events

Answer: B

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115. If A and B are mutually exclusive and exhaustive events with $P(A) = \frac{2}{3}P(B)$ then odds in favour of B are

A. $1:2$

B. $2:1$

C. $2:3$

D. $3:2$

Answer: D

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116. The probability of getting qualified in IIT JEE and EAMCET by a student are respectively $\frac{1}{5}$ and $\frac{3}{5}$. The probability that the student gets qualified for atleast one of these tests is

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

B. $\frac{17}{25}$

C. $\frac{22}{25}$

D. $\frac{8}{25}$

Answer: B

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117. The probability of A solving a problem is 0.3 and the probability of B solving the problem is 0.6 . The probability that A solves the problem and B does not solve it is

A. 0.18

B. 0.12

C. 0.4

D. 0.7

Answer: B

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118. A man and a woman appear in an interview for vacancies in the same post. The probability of man's selection is 1/4 and that of the woman's selection is 1/3. The probability that none of them will be selected is

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

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

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

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

Answer: A

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119. A letter is taken out at random from the word RANGE and another is taken out from the word PAGE. The probability that they are the same letters is :

A. $3/5$

B. $3/4$

C. $1/20$

D. $3/20$

Answer: D

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120. One hundred tickets are numbered as 00,01,02,.....,09,10,11,.....,99 and one ticket is drawn at random from them. If A is the event of getting 9 as

the sum of the numbers on the ticket and B is the event of getting 0 as the product of the numbers on the tickets then $P(A \cap B) =$

A. $\frac{1}{100}$

B. $\frac{2}{100}$

C. $\frac{10}{100}$

D. $\frac{19}{100}$

Answer: B

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121. Two unbaised dice are rolled and given that they are showing different digits. The probability of getting both even is

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

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

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

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

Answer: A

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122. Two dice are rolled and given that both faces are showing even numbers. The probability that their sum is more than 9 is

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

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

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

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

Answer: A

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123. Three dice are rolled and told that exactly two of them are showing the same number. The probability of getting sum 16 is

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

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

C. $\frac{1}{17}$

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

Answer: B

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124. Given that a throw of three unbaised dice shows different faces, the probability that one face shows 6 is

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

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

C. $\frac{91}{216}$

D. $\frac{13}{18}$

Answer: C

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125. In a class $60\ \%$ are boys and rest are girls . $50\ \%$ of boys and $25\ \%$ of girls known cricket. If a student is selected at random and given that the selected student is a circketer. The probability that the selected student is a girl is

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

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

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

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

Answer: A

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126. Out of numbers 1,2,3,....9, two numbers are chosen at random, so that their sum is an even number. The probability for the two chosen numbers to be odd is

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

B. $\frac{5}{8}$

C. $\frac{3}{55}$

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

Answer: B

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127. A biased die is tossed and the respective probabilities for the face to turn up are given below :

Face	1	2	3	4	5	6
Probability	0.1	0.24	0.19	0.18	0.14	0.15

If an odd face has turned up, then the probability for the face turned up is 3 or 5 is

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

B. $\frac{30}{43}$

C. $\frac{33}{43}$

D. $\frac{10}{43}$

Answer: C

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128. Suppose E and F are two events of a random experiment. If the probability of occurrence of E is $1/5$ and the probability of occurrence of F given E is $1/10$. Then the probability of non-occurance of atleast one of the events E and F is

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

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

C. $\frac{49}{50}$

D. $\frac{1}{50}$

Answer: C

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129. E_1, E_2 are events of a sample space such that $P(E_1) = \frac{1}{4}$, $P\left(\frac{E_2}{E_1}\right) = \frac{1}{2}, P\left(\frac{E_1}{E_2}\right) = \frac{1}{4}$ then $P\left(\frac{\overline{E}_1}{E_2}\right) =$

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

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

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

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

Answer: D

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130. In a certain college , $40\,\%$ of the men and $10\,\%$ of the women are taller than 2 meters. Further more in the college $60\,\%$ of the students

are women. If a student selected at random is found to be taller than 2 meters, the probability that the selected student is a woman is

A. $\frac{3}{11}$

B. $\frac{8}{11}$

C. $\frac{5}{11}$

D. $\frac{6}{11}$

Answer: A

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131. If A and B are two events of a random experiment such that $P(A) = 0.6, P(B) = 0.3$ and $P(A/B) = 0.5$ then $P(\overline{B}/\overline{A}) =$

A. 0.75

B. 0.625

C. 0.525

D. 0.4

Answer: B

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132. If two events A and B are such that $P(\overline{A}) = 0.3$, $P(B) = 0.4$ and $P(A \cap \overline{B}) = 0.5$ then $P\left(\frac{B}{A \cup \overline{B}}\right) =$

A. $1/3$

B. $1/4$

C. $1/2$

D. $1/5$

Answer: B

View Text Solution

133. 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 occur, is $1/3$. Then the probability of occurance of A is

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

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

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

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

Answer: A

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134. For a person of age 50 years the probability of his living upto 70 years is $\frac{5}{12}$. For a person of age 60 years the probability of his living upto 70 years $\frac{2}{7}$. The probability that atleast one of them to live upto 70 years is

A. $\frac{35}{84}$

B. $\frac{45}{84}$

C. $\frac{49}{84}$

D. $\frac{54}{84}$

Answer: C

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135. A problem is EAMCET examination is given to 3 students A, B, and C whose chances of solving it are 1/2, 1/3 , and 1/4 respectively. The probability that the problem will be solves is

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

B. $\frac{1}{24}$

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

D. $\frac{23}{24}$

Answer: A

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136. An unbaised coin is tossed five times. The odds in favour of getting atleast one tail is

A. $335:8$

B. $8:335$

C. $335:343$

D. none

Answer: A

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137. Three cards are drawn from pack successively with replacement then the probability of getting first king, Second Queen and third Ace is

A. $\frac{1}{13^2}$

B. $\frac{1}{13^3}$

C. $\frac{1}{4^2}$

D. $\frac{1}{4^3}$

Answer: B

View Text Solution

138. In the above problem the probability of getting one king, one Queen and one Ace is

A. $\frac{6}{13^3}$

B. $\frac{2}{13^3}$

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

D. $\frac{16}{13^3}$

Answer: A

View Text Solution

139. A bag contains 19 Tickets numbered 1to 19. A ticket is drawn first and later another ticket is drawn without replacement. The probability that both tickets show even number is

A. $1/19$

B. $2/19$

C. $3/19$

D. $4/19$

Answer: D

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140. From each of the three married couples one partner is selected at random. The probability of selecting two males and one female is

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

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

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

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

Answer: C

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141. A speaks truth in $80\,\%$ cases and B in $70\,\%$ cases. The probability that they will contradict each other in a single event is

A. 0.12

B. 0.38

C. 0.36

D. 0.40

Answer: B

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142. A bag contains 3 white, 3 black and 2 red balls. One by one 3 balls are drawn without replacing them. For only the third ball to be red the probability is

A. $5/28$

B. $3/28$

C. $3/56$

D. $1/28$

Answer: A

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143. The odds against A solving a problem are 8 to 6 and the odds in favour of B solving the same problem are 14 to 10. Then the probability that the problem will be solved if both of them try the problem is

A. $31/32$

B. $16/21$

C. $5/21$

D. $1/32$

Answer: B

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144. In a class $\frac{2}{3}$ of it are boys and $\frac{1}{3}$ of it are girls. The probability for a boy to get first class is 0.28 and the probability for a girl to get a first class is 0.25. If a person is choosen at random, the probability for the chosen person to get first class is

A. 0.47

B. 0.53

C. 0.27

D. 0.71

Answer: C

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145. Bag A contain 4 white and 5 blank balls. Bag B contains 5 white and 6 black balls. One bag is selected at random and a ball is drawn from it. The probability that is is white is

A. $\frac{97}{198}$

B. $\frac{89}{198}$

C. $\frac{47}{198}$

D. $\frac{17}{198}$

Answer: B

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146. One compartment of a purse contains three 25 paise coins and 2 one rupee coins and the other compartment contains two 25 ps. Coins and 3 one rupee coins. The probability of drawing a rupee from the purse is

A. $1/5$

B. $2/5$

C. $3/5$

D. $1/2$

Answer: D

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147. 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, the probability that both are white

A. $2/3$

B. $3/8$

C. $1/4$

D. $25/48$

Answer: C

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148. A,B,C are tossing a coin on the condition that the person who gets a head first wins the game. If A starts the game then the probability that B wins the game is

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

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

C. $\frac{3}{7}$

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

Answer: B

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149. There are two bags one of which contains 3 black and 4 white balls, while the other contains 4 black and 3 white balls. A die is 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. The probability of choosing a black ball is

A. $11/21$

B. $10/21$

C. $9/21$

D. $8/21$

Answer: A

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150. There are two boxes. In the first box there are 4 white, 5 black balls. In the second box there are 5 white, 4 black balls. A ball at random is drawn from the first box and transferred to the second box. Then if a ball is drawn at random from the second box, the probability for the drawn ball to be white is

A. $2/81$

B. $59/90$

C. $49/90$

D. $41/90$

Answer: C

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151. Two persons A and B toss two coins one after another. The person who throws one head and one tail is the winner. If A starts the game the probability that B wins the game is

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

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

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

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

Answer: C

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152. A,B,C are aiming to shoot a balloon. A will succeed 4 times out of 5 attempts. The change of B to shoot the balloon is 3 out of 4 and that of C is 2 out of 3. If three aim the balloon simultaneously, then find the probability that atleast two of them hit the balloon.

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

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

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

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

Answer: A

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153. A and B each throw a die. The probability that A's throw is not greater than B's is

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

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

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

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

Answer: C

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154. Um A contains 6 red and 4 black balls and um B contains 4 red and 6 black balls. One ball is drawn at random from um A and placed in um B.

Then one ball is drawn at random from um B and placed in um A . If one ball is now drawn from um A, the probability that it is found to be red is

A. $32/55$

B. $42/55$

C. $36/55$

D. none

Answer: A

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155. 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 getting atleast 7 points is

A. 0.8750

B. 0.0875

C. 0.0625

D. 0.0250

Answer: B

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156. The probability of India winning a test match against West-Indies is $1/2$ .Assuming independence from match to match the probability that in 5 match series India's 2nd win occurs at the third test is

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

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

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

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

Answer: B

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157. A pair of fair dice is rolled together till a sum either 5 or 7 is obtained. The probability that a sum of 5 is thrown before 7 is

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

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

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

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

Answer: B

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158. The probability that an event A happens in one trial of an experiment is 0.4. Three independent trials of the experiment are performed. The probability that the event A happens atleast once is

A. 0.784

B. 0.904

C. 0.916

D. 0.936

Answer: A

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159. Suppose there are 3 urns containing 2 white, 3 black balls, 4 white 1 black and 3 white, 2 black balls respectively. There is equal chance for selecting an urn. One ball is drawn from an urn chosen at random and it is found to be white. The prob. That it was drawn from the first urn is

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

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

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

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

Answer: C

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160. In an entrance test there are multiple choice questions. There are four possible answers to each equation, of which one is correct. The probability that a student knows the answer to a question is $9/10$. If he gets the correct answer to a question, then the probability that the was guessing is

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

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

C. $\frac{36}{37}$

D. $\frac{1}{37}$

Answer: D

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161. A letter is known to have come either from LONDON or CLIFTON, on the postmark only the two consecutive letters ON are legible . The probability that is come from London is

A. $\frac{12}{17}$

B. $\frac{5}{17}$

C. $\frac{3}{17}$

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

Answer: A

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162. Observe the following statements :

Statement-1 : The probabilities of the events A,B and C are respectively $\frac{2}{3}$, $\frac{1}{4}$ and $\frac{1}{6}$ then A,B,C are exhaustive

Statement-2 : If the probability 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 0.5

Statement-3 : If A and B are two independent events then $P\left(A \cap \overline{B}\right) + P(A)P(B) = P(A)$

Which of the above are false

A. S_1, S_2

B. S_2, S_3

C. S_1, S_3

D. all the above

Answer: A

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163. If 5 letters are placed in 5 addressed envelopes and A,B,C defines the events that Exactly one letter is placed wrongly, atleast one placed wrongly, all are placed wrongly. Then the descending order of their probabilities is

A. $p(A), p(B), p(C)$

B. $p(B), p(C), p(A)$

C. $p(C), p(B), p(A)$

D. $p(A), p(C), p(B)$

Answer: B

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164. Assertion (A) : A fair coin is tossed n times. If the probablities of getting 4,5 and 6 heads be in A.P then n is equal to 7,14

Reason (R) : If $.^{n}C_{r+1}, .^{n}C_{r}, .^{n}C_{r+1}$ are in A.P then $(n-2r)^2 = n+2$

The correct answer is

A. Both A and R are true, R is the correct explanation of A

B. Both A and R are true, R is not the correct explanation of A

C. A is true but R is false

D. A is false R is true

Answer: A

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165. Assertion (A) : The unknown coefficient of the equation $x^2 + bx + 3 = 0$ is determined by throwing an ordinary six faced die. Then the prob. That the equation has real roots is $1/2$

Reason (R) : For the quadratic equation $ax^2 + bx + c = 0$, condition for real roots is $b^2 - 4ac \geq 0$. Then the correct answer is

A. Both A and R are true, R is the correct explanation of A

B. Both A and R are true, R is not the correct explanation of A

C. A is true but R is false

D. A is false R is true

Answer: A

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SOLVED EXAMPLES

1. In the experiment of throwing a die,consider the following events:

A={1,3,5}, B={2,4,6}, C={1,2,3}

Are these events equally likely?

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2. In the experiment of throwing a die, consider the following events:

A={1,3,5}, B={2,4},C={6}

Are these events ,mutually exclusive ?

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3. Suppose $S = \{0, 1, 2, 3\}$ be a sample space of a randomm experiment. $P(0) = 0.1$, $P(1) = 0.3$, $P(2) = 0.3$ and $P(3) = 0.3$ and $P(A) = \sum_{a \in A} P(a)$ for any subset A of S. Is P a probability function or not.

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4. Find the probability of throwing a total score 8 with 2 dice.

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5. A page is opened at random from a book containing 600 pages. What is the probability that the number on the page is a perfect square.

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6. If two cards are drawn from pack of 52 cards at random. Find the probability of getting both club cards.

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7. If 4 fair coins are tossed find the probability of getting 2 heads and 2 talls.

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8. If three dice are rolled, find the probability of showing all different numbers.

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9. Find the probability that a leap year will have 53 sundays.

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10. 4 boys and 4 girls are arranged in a row at random. Find the probability that the boys and girls sit alternatively.

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11. If 4 people are chosen at random, then find the probability that no two of them were born on the same day of the week.

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12. If the letters of the word 'QUESTION' are arranged at random. What is the probability that there are exactly two letters between Q and U.

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13. Two numbers are selected at random from 1,2,3,.....100 and multiplied. Find the probability that the product thus obtained is divisible by 3.

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14. Two squares are chosen at random from the small squares on a chess board. What is the chance that the two squares have exactly one common corner.

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15. A and B are among 20 persons sit at random along a round table. Find the probability that there are any 6 persons between A and B.

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16. If 10 coins are tossed, find the odds against the event of getting atleast 2 heads.

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17. Five coins are tossed whose faces are marked 2 and 3 . Find the probability of getting sum 12.

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

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19. A natural number x is chosen at random from the first 100 natural numbers. Find the probability that $\frac{(x-20)(x-40)}{(x-30)} < 0.$

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20. Two fair dice are rolled. Find the probability that the difference between the numbers is atleast 2.

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21. Two numbers are selected at random from 1, 2, 3,...., 100 without replacement. Find the probability that the minimum of the two numbers is less than 70.

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22. Three fair dice are rolled. Find the probability that the greatest number on the dice must exceed 3.

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23. There are 100 stations between two stations A and B. A train is to stop at ten of these 100 stations. What is the probability that no two of these ten stations are consecutive.

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24. Let F be the set of all 4 digited numbers whose sum is 34. If a number is selected from F then find the probability that the selected number is even.

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25. From a heap containing 10 pairs of shoes 6 shoes are selected at random. Find the probability that

(i) There is no complete pair in the selected shoes

(ii) atleast one correct pair in the selected shoes

(iii) 2 correct pairs in the selected shoes.

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26. If A and B are two events then show that

(i) $(P(A \cap B^c)) = P(A) - P(A \cap B)$

(ii) The probability that exactly one of them occurs is given by $P(A) + P(B) - 2P(A \cap B)$

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27. If three dice are rolled. Find the probability of getting sum 16 or getting 6 on first die.

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28. If 2 cards are drawn from a pack of cards then the probability of getting both red or both kings is

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29. The probability of the event A occuring is 0.5 and of B occurring is 0.3. If A and B are mutually exclusive events then the probability of neither A nor B occuring is

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30. A number is chosen from the first 100 natural numbers. Find the probability that it is a multiple of 4 or 6.

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31. A box contains 2 red, 3 blue and 4 black balls. Three balls are drawn at random. What is the probability that two balls are of the same colour and the third of a different colour.

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32. Three electric bulb holders are fixed in a room. 3 bulbs are chosen at random from a set of 20 bulbs of which 16 are good and fitted to the holders. What is the probability that the room is lighted.

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33. A contractor submitted tenders for 2 works. If 0.4, 0.6, 0.1 are the respective probabilities that his first tender, atleast one tender, both the tenders are accepted, what is the probability that his second tender is accepted.

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34. A and B are seeking admission into I.I.T. If the probability for A to be selected is 0.5 and that both to be selected is 0.3. Is it possible that the probability of B to be selected is 0.9?

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35. A,B,C are three horses in a race. The probability of A to win the race is twice that of B and probability of B is twice that of C. What are the probability of A,B and C to win the race?

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36. Three students A,B,C are to take part in a swimming competition. The probabilities of A's winning or the probability of B's winning is 3 times the probability of C's winning. The probability of the event of either B or C to win is

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37. If P(A) = 0.3, P(B) = 0.4, P(C) = 0.8, $P(A \cap B) = 0.08$, $P(A \cap C) = 0.28$, $P(A \cap B \cap C) = 0.09$, $P(A \cup B \cup C$ then show $P(B \cap C)$ lies in [0.23, 0.48].

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38. Two dice are rolled. Let A be the event of getting sum 10 and B be the event of getting even on both the dice. Find whether A, B are independent or not.

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39. A box contains 4 defective and 6 good bulbs. Two bulbs are drawn at random without replacement. Find the probability that the both the bulbs drawn are good.

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40. If $P(\overline{A})$ = 0.7, P(B) = 0.7 and P(B|A) = 0.5, then $P(A \cup B) =$

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41. The probabilities of a problem being solved by three students are 1/3 , 1/4 and 1/6 . The probability of the problem being solved is

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42. A couple has two children. Find the probability that both are male if it is known that atleast one of them is a male child.

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43. If A, B, C are any three events in an experiment then show that

(i) $P\left(A/B^C\right) = \frac{P(A) - P(A \cap B)}{1 - P(B)} \text{if P}\left(B^C\right) > 0$

(ii) $A \subseteq B \Rightarrow P(A/C) \leq P(B/C) \text{if P(C)} > 0$

(iii) If A, B are mutually exclusive, then $P\left(A/B^C\right) = \frac{P(A)}{1 - P(B)} \text{if P(B)} \neq 1$

(iv) If A, B are mutually exclusive and $P(A \cup B) \neq 0 \text{then} P(A/A \cup B) = \frac{P(A)}{P(A) + P(B)}$

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44. If A and B are any two events of a random experiment then show that

(i) $P\left(A^C \cap B^C\right) = P\left(A^C\right) - P(B) \text{if A} \cap B = \phi$

(ii) $P\left(A^C / B^C\right) = \dfrac{1 - P(A \cup B)}{1 - P(B)} \text{with P(A)} \neq 0 \text{ and } P(B) \neq 1$

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45. What is the probability that 6 is obtained on one of the dice in a throw of two dice, given that the sum is 7.

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46. For any two event A, B show that

$P\left(A^C\right)P(B) - P\left(A^C \cap B\right) = P(A \cap B) - P(A)P(B)$

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47. The probability that Australia wins a match against India in a cricket game is given to be $\frac{1}{3}$. If india and Australia play 3 matches, what is the probability that,

i) Australia will loose all the three matches ? ii) Australia will win atleast one match ?

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48. A person secures a job in a construction company in which the probability that the workers go on strike is 0.65 and the probability that the construction job will be completed on time if there is no strike is 0.80. If the probability that the construction job will be completed on time even if there is a strike is 0.32, determine the probability that the constructed job will be completed on time.

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49. For any two events A, B show that $P(A \cap B) - P(A)P(B) = P\left(A^C\right)P(B) - P\left(A^C \cap B\right) = P(A)P\left(B^C\right)$

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50. A single die is rolled twice in succession. What is the probability that the number showing on the second toss is greater than that on the first rolling?

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51. In a certain college, 25% of the boys and 10% of the girls are studying mathematics.

The girls constitute 60% of the student strength. If a student selected at random is found studying mathematics, find the probability that the students is a girl.

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52. A die is thrown 3 times. Find the probability of the event of getting the sum of the numbers thrown as 15 when it is known that first throw was a five.

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53. Find the probability of drawing 2 red balls in succession from a bag containing 4 red balls and 5 black balls when the ball that is drawn first is (i) not replaced (ii) replaced.

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54. If A and B are two independent events, and $P(A) = 1/4$, $P(B) = 1/3$ then find $P(A - B) \cup (B - A))$. i.e., propbability of occurrence of exactly one of the events A and B.

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55. Three cards are drawn from pack of 52 cards one after another without replacement. Find the probability of getting king in 1^{st} draw, queen in 2^{nd} draw and ace in 3^{rd} draw.

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56. A card is selected at random from a pack of 52 cards. Let A be the event that the card is a face card and B be the event that the card is a heart card show that A and B are independent.

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57. Bag A contains 4 white and 7 black balls. Bag B contains 5 white and 6 black balls. A die is rolled . If 2 or 5 turns up then choose bag A otherwise choose bag B. If one ball is drawn at random from the selected bag, then find the probability that it is black.

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58. Bag A contains 4 white and 3 black balls. Bag B contains 3 white and 2 black balls. One ball is transferred from bag A to bag B. Now one ball is drawn from bag B. Find the probability that it is white.

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59. Two events A and B have the probabilities 0.25 and 0.5 respectively. The probability that both A and B occur simultaneously is 0.14. Find the probability that neither A nor B occurs.

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60. If $\frac{1 \div 3p}{3}, \frac{1-p}{4}, \frac{1-2p}{2}$ are the probabilities of 3 mutually exclusive events then find the set of all values of p.

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61. If A, B, C are mutually exclusive and exhaustive events such that $P(B) = \frac{3}{2}P(A)$ and $P(C) = \frac{1}{3}P(B)$. Find odds in favour of $(A \cup B)$.

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62. A die is loaded so that six turns up twice as often as one and three times as often as any other face. Find the probability of getting an even number on the die if the die is rolled once.

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63. Four persons A, B, C, D cut a pack of 52 cards successively in that order given. If the person who cuts a spade first wins, find their probability of winning.

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64. A survey shows that in a certain village 2 out of every 100 men and 1 out of every 100 women have strength ulcers. A person selected at random from the village is found to have stomach ulcer. Find the probability that the person is a male, given that the probability of selecting a male from the village is 0.55.

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65. If A,B,C are three independent events of an experiment. Such that $P\left(A \cap B^C \cap C^C\right) = \frac{1}{4}$

$P\left(A^C \cap B \cap C^C\right) = \frac{1}{8}, P\left(A^C \cap B^C \cap C^C\right) = \frac{1}{4}$

then find P(A),P(B)and P(C).

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66. An urn contains 10 white balls and 5 black balls. Two players Q and R alternatively draw a ball with replacement from the urn. The player that

draws a white ball first wins the game. If Q begins the game, find the probability of his winning the game.

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67. Three boxes numbered, I, II, III contain balls as follows

	White	Black	Red
I	1	2	3
II	2	1	1
III	4	5	3

One box is randomly selected and a ball is drawn from it. If the ball is red, then the probability that it is from box II.

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68. A bag contain 5 balls. Two balls are drawn and found them to be red. Find the probability that all the balls are red.

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69. A bag contains 10 White and 3 black balls. Balls are drawn one by one without replacement till all the black balls are drawn. What is the probability that this procedure will come to an end at the seventh draw.

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70. A consignment of 15 record players contains 4 defective. The record players are selected at random one by one and examined. The ones examined are not placed back. What is the probability that the 9^{th} one examined is the last defective.

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71. A bag contains 6 white balls and 4 black balls. A ball is drawn and is put back in the bag with 5 balls of the same colour as that of the ball drawn. A ball is drawn again at random. What is the probability that the ball drawn now is white.

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

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73. A card from pack of 52 cards is lost. From the remaining cards of pack, two cards are drawn and are found to be spades. Find the probability of the missing card to be a spade.

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74. A letter is known to have come from either 'MAHARASTRA' or 'MADRAS' on the post mark only conseutive letter 'RA' can be read clearly. What is the chance that the letter came from 'MAHARASTRA'.

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75. Two integers x and y are chosen one by one with replacement at random from the set {x =0 $\leq$ x $\leq$ 10 and x is an integer}. Find the probability that $|x-y| \leq 5$.

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76. A is a set containing 'n' elements . A subset P of A is chosen at random . The set A is reconstructed by replacing the elements of the subset of P, a subset Q of A is again chosen at random. Find the probability that (i) $P \cap Q = \phi \, (ii) P \cup Q = A$

$(iii) P \cup Q = A$ and $P \cap Q = \phi \, (iv)$ Q is subset of P

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77. A is a set containing n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of P. A subset Q of A is again chosen at random. Find the probability that (i) Q is subset of P(ii) the number of elements in P is more than the number of elements in Q.

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78. A pair of fair dice is rolled repeatedly. Find the probability of getting doublet 4th time in the 9th trail.

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79. If a pair of dice is rolled until sum more than 10 appears first time. Find the probability of getting different numbers in last throw.

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80. A bag contains 'a' white and 'b' black balls. Two players A and B alternately draw a ball from the bag, replacing the ball each time after the draw till one of them drawn a white ball and wins the game. If the probability of A winning the game is three times that of B, then find the ratio a : b.

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81. A baised coin with probability p,$0 < p <$ of heads is tossed until a head appears for the first time. If the probability that the number of tosses required is even is 2/5, then p is equal to

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82. Let F be the set of all on-to functions from a set $A = \{a_1, a_2, a_3, a_4, a_5, a_6\}$ to another set $B = \{b_1, b_2, b_3, b_4, b_5\}$. If a function f is selected from F at random, then find the probability that the selected function f is such that $f^{-1}(b_1) = \{a_1\}$

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83. Ten rupee coins are distributed among 5 children at random. Find the probability that the first child gets atmost 3 coins.

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84. A determinant is chosen at random from the set of all 2×2 determinants with elements -1, 0, 1 only. Find the probability that the determinant chosen is positive.

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85. Two numbers x and y are chosen at random from {1, 2, 3,...,5n} where $n \geq 2$, show that the probability $x^4 - y^4$ is divisible by 5 is $\frac{17n - 5}{5(5n - 1)}$.

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86. Two natural numbers a and b are selected at random, find the probability that $a^2 + b^2$ is divisible by 7.

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87. Seven digits from the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 are written in random order. Find the probability that the seven digited number is divisible by 9.

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88. If the sum of five natural numbers is 50. Find the probability that the five numbers are even.

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89. Out of (4n + 1) tickets numbered m, m+1, m+2, ..., m + 4n, five tickets are chosen at random without replacement. Find the probability that these tickets are in A.P.

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90. A special die with numbers 1, -1, 2, -2, 0 and 3 is thrown thrice. What is the probability that the total is 0.

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91. Five ordinary dice are rolled at random and 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, 5.

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92. A coin is tossed 20 times. Find the probability of getting atleast 12 consecutive heads.

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93. If 10 coins are tossed, find the probability that no two or more consecutive heads occur.

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94. Suppose two persons A and B each toss 11 coins and 10 coins respectively. Show that the probability that A gets more heads than B is $\frac{1}{2}$.

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95. n different letters are placed in n different addressed envelopes at random. Find the probability that (i) no letter is placed in right envelope i.e., all the letters are placed in wrong envelopes. (ii) atleast one letter is placed in right envelope.

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96. A bag contains 3 white and black balls. A person draws 3 balls at random from it. He then drops 3 red balls in the bag and again draws out 3 balls at random. What is the chance that the later 3 balls will be of different colours.

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97. A bag contains 5 white and 4 black balls. 3 balls are drawn and laid aside. Without noting their colour. Then one more ball is drawn. Find the probability that it is white.

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98. A bag contains 10 white and 15 black balls. The balls are drawn one at a time until only those of the same colour are left. Show that the probability that they are all black is 3/5.

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99. Eighteen rupee coins are distributed among 6 children at random in such a way that each child receives atleast one coins. Find the probability that the total number of coins received by first five children is atleast 8 and atmost 12.

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100. Let A, B, C be three events. If the probability of exactly one event of A and B is 1 - x, out of B and C is 1 - 2x and out of A and C is 1 - x. The probability that the three events occur simultaneously is x^2 then prove that the probability that atleast one out of A, B, C will occur is greater than $\frac{1}{2}$.

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101. Three are two balls in an urn whose colours are not known (each ball can be either white or black). A white ball is put in the urn. A ball is drawn from the urn. Find the probability that it is white.

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102. In a bag there are six balls of unknown colours. Three balls are drawn at random and found to be all black. Find the probability that the bag contains exactly 3 black balls.

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103. A bag contains 6 black balls and unknown number (≤ 6) of white balls. Three balls are successively drawn and not replaced and are all found to be white. Prove that the chance that a black ball will be drawn in the next draw is $\frac{677}{909}$.

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104. A man has 3 coins A, B, C. The coin A is unbiased. The probility that a head will show when B is tossed is 2/3. White it is 1/3 in case of the coin C.

A coin is chosen at random and tossed 3 times giving 2 heads and one tall. Find the probability that the coin A was chosen.

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105. A and B are two independent witnesses in a case. The probability that A will speak truth is 3/5 and the probability that B will speak truth is 1/4. A and B agree in a certain statement. Find the probability that the statement is true.

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EXERCISE - 3.1

1. In the experiment of throwing a die, consider the events.

A={2,4,6}, B={3,6},C={1,5,6}

Are these events exhaustive?

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2. Give two examples of mutually exclusive and exhaustive events

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3. Give examples of two events that are neither mutually exclusive nor exhaustive ?

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4. Give two examples of events that are neither equally likely nor exhaustive ?

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5. Find the probability of getting

2 heads when 4 coins are tossed

Watch Video Solution

6. Find the probability of getting

atleast one head when 5 coins are tossed

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7. Find the probability of getting atmost 3 heads when 4 coins are tossed.

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8. Find the probability of getting

2 tails and 1 head when 3 coins are tossed.

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9. Find the probability of getting

a prime number when a die is rolled

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10. Find the probability of getting

both even if two dice are rolled

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11. Find the probability of getting

sum 7 when two dice are rolled

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12. Find the probability of getting sum atmost 10 when two dice are rolled.

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13. Find the probability of getting

equal numbers, when two dice are rolled.

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14. Find the probability of getting

Two dice are rolled. What is the probability that none of the dice shows the number 2 ?

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15. Find the probability of getting

hearts cards, when a card is drawn from pack of 52 cards.

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16. Find the probability of getting

two aces when two cards are drawn from pack of 52 cards.

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17. Find the probability of getting one king and one queen when two cards are drawn from pack of 52 cards.

Watch Video Solution

18. Find the probability of getting

atleast one club card when two cards are drawn from pack of 52 cards.

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19. If 5 boys and 5 girls sit in a row at random what is the prbability that no two of the same sex come together.

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20. If 3 boys and 3 girls are arranged along a row at random. Find the probability that all the girls sit together.

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21. One number is selected at random from 1 to 500. Find the probability that it is a perfect square.

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22. If three numbers are chosen from 1 to 200. Find the probability for the three chosen numbers to be not consecutive.

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23. If a number x is selected from natural numbers 1 to 100 find the prbability for $x + \frac{100}{x} > 29$.

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24. A coin is tossed 'n' times. Find the probability of getting head an odd number of times.

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25. A coin whose faces are marked 3 and 4 is tossed five times. Find the probability of getting sum atleast 17.

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26. Find the probability that in a family of 5 children, there will be exactly 3 male children.

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27. If 5 fair coins are tossed, find the probability of getting heads in majority.

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28. Two cards are drawn from a pack at a time. Find the probability that

(a) one of them is an ace of hearts

(b) atleast one of them is ace.

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29. Four cards are accidentally dropped from a pack of playing cards. What is the probability that they are one from each suit.

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30. 13 persons sit a round a table. Find the odds in favour of two specified persons sitting together.

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31. Two persons A and B stand in a row with 10 other persons. What is the probability that three are exactly two persons between A and B.

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32. 12 persons attend a dinner party round a table. Out of them 2 are ladies. Find the probability that three are 3 men between the ladies.

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33. A determinant of second order is made with the elements 0 or 1. What is the probability that the determinant made is (i) non-negative (ii) non-zero

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34. If 7 squares are chosen at random on a chess board, the probability that they lie on a diagonal line is

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35. 3 small squares 1×1 size are selected from a chess board. Find the probability that the selected 3 squares are not in the colour.

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36. Two unit squares are chosen at random on a chess board. Find the probability that they have a side in common.

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37. Find the probability that a non leap year contains exactly (i) 53 Sundays (ii) 52 Sundays ?

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38. Find the probability that a leap year contains

(a) 52 mondays and 52 Sundays

(b) 52 Mondays and 52 Wednesdays

(c) 52 Sundays and 53 Mondays

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39. The letters of the word 'EQUATION' are arranged in a row at random. Find the probability that the consonants may be in even places.

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40. The letters of the word 'SUCCESS' are arranged in a row at random. Find the probability that all 'S's may come together.

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41. The letters of the word 'MISSISSIPI' are arranged in a random. Find the probability that all 'S's come together.

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42. A box contains 12 two rupee coins, 7 one rupee coins and 4 half rupee coins. If 3 coins are selected at random, find the probability that

(i) sum of three coins is maximum

(ii) each coin is of different value

(iii) selection contains atleast one rupee coin

(iv) all selected 3 coins have same value

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43. A box contains 12 two rupee coins, 7 one rupee coins and 4 half rupee coins. If 3 coins are selected at random, find the probability that

(i) sum of three coins is maximum

(ii) each coin is of different value

(iii) selection contains atleast one rupee coin

(iv) all selected 3 coins have same value

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44. There are 5 letters and 5 addressed envelopes. If the letters are placed at random in the envelopes. Find the chance that

all letters go into correct envelopes.

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45. There are 5 letters and 5 addressed envelopes. If the letters are placed at random in the envelopes. Find the chance that

atleast one letter goes into wrong envelope.

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46. There are 5 letters and 5 addressed envelopes. If the letters are placed at random in the envelopes. Find the chance that

exactly 3 letters go into correct envelopes.

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47. Out of 20 consecutive integers two are drawn at random. Then find the probability that

the sum is odd.

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48. Out of 20 consecutive integers two are drawn at random. Then find the probability that

the sum is even.

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49. Find the probability that in a family having 4 children, girls are in majority.

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50. On her vacations Veena visits four cities(A, B, C and D) in random order. What is the probability that she visits

(i) A before B? (ii) A before B and B before C?

(iii) A fist and B last? (iv) A either first or second? (v) A just before B?

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51. A page is opened at random from a book containing 600 pages. What is the probability that the number on the page is a perfect square.

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EXERCISE - 3.2

1. If $P(A) = 0.25, P(B) = 0.5, P(A \cap B) = 0.16$ then find $P(A \cup B)$.

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2. If A and B are two events such that $P(A \cup B) = 0.65, P(A \cap B) = 0.15$ then $P(\overline{A}) + P(\overline{B})$=

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3. If P(A) =0.25 , P(B)=0.5, $P(A \cap B) = 0.14$ then $P(\overline{A} \cap \overline{B})$=

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4. Suppose A and B are events with P(A)=0.5, P(B)=0.4 and $P(A \cap B) = 0.3$. Find the probability that i) A does not occur,

ii) neither A nor B occurs.

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5. A and B are two events such that $P(A) = p_1, P(B) = p_2, P(A \cap B) = p_3$ then find

(a) $P\left(A^C \cap B\right)$ (b) $P\left(A^C \cup B\right)$

(c) $P\left(A^C \cap B^C\right)$ (d) $P\left(A^C \cup B^C\right)$

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6. If $P(A) = 4/5, P(B) = 2/4, P(A \cap B) = 3/5$, then find $P\left(\overline{A \cup B}\right)$.

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7. If P is a probability function, then show that for any two events A and B.

$P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$

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8. For any two events A and B, shows that

$$P\left(A^C \cap B^C\right) = 1 \ + P(A \cap B) - P(A) - P(B).$$

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9. If A, B are two mutually exclusive and exhaustive events such that 2P(B) = 3P(A) find odds infavour of A.

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10. If a card is drawn from pack, find the probability that the card is Ace or spade.

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11. If two cards are drawn from pack, find the probability atleast one king card.

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12. If two cards are drawn from a pack, find the probability of getting one king and one queen or both red.

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13. In an experiment of drawing a card at random from a pack, the event of getting a spade is denoted by A and getting a picture card (king, Queen or jack) is denoted by B. Find the probabilities of $A, B, A \cap B$ and $A \cup B$.

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14. If one ticket is randomly selected from tickets numbered 1 to 30. Then find the probability that the number on the ticket is.

i) a multiple of 5 or 7

ii) a multiple of 3 or 5

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15. There are 200 tickets numbered 1 to 200. A ticket is drawn at random. Find the probability that the number on the drawn ticket is either multiple of 4 or 6.

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16. If 2 dice are rolled then find the probability that the dice show different numbers or sum 10.

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17. If 2 dice are rolled, find the probability of getting prime sum.

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18. If 3 dice are rolled, find the probability that either sum is 16 or they show different numbers.

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19. In a class of 60 boys and 20 girls, half of the boys and half of the girls know cricket.

Find the probability of the event that a person selected from the class is either a boy or girl who knows cricket.

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20. A,B,C are 3 newspaper from a city. 20% of the population red A, 16% read B, 14% read C, 8% both A and B, 5% both A and C, 4% both B and C, 2% all the three. Find the percentage of the populations who read atleast one newspaper.

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21. In a committee of 25 members, each member is proficient either in Mathematics or in Statistics or in both. If 19 of these are proficient in Mathematics, 16 in statistics, find the probability that a person selected from the committee is proficient in both.

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22. A,B,C are three horses in a race. The probability of A to win the race is twice that of B and probability of B is twice that of C. What are the probability of A,B and C to win the race?

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23. If A, B, C are mutually exclusive and exhaustive events such that P(B) = $\frac{3}{2}P(A), P(C) = \frac{1}{3}P(B)$ then P(A) =

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24. If P(A) = 0.4, P(B)=0.5, P(C) =0.6, $P(A \cap B) = 0.2$, $P(B \cap C) = 0.3$, $P(C \cap A) = 0.25$, $P(A \cap B \cap C) = 0.1$ then $P(A \cup B \cup C) =$

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25. In a box containing 15 bulbs, 5 are defective.

If 5 bulbs are selected at random from the box, find the probability of the event, that

(i) None of them is defective

(ii) Only one of them is defective.

(iii) Atleast one of them is defective.

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26. A box contains 12 two rupee coins, 7 one rupee coins and 4 half rupee coins. If 3 coins are selected at random, find the probability that

(i) sum of three coins is maximum

(ii) each coin is of different value

(iii) selection contains atleast one rupee coin

(iv) all selected 3 coins have same value

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27. If $P(A) = 0.5, P(A \cap B) = 0.3$ then find the max possible value of P(B).

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28. A game consists of tossing a coin 3 times and nothing its outcome. A boy wins if all tosses give the same outcomes and losses otherwise. Find the probability that the boy losses the game.

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29. If E_1, E_2 are two events with $E_1 \cap E_2 = \phi$ then show that $P\left(E_1^C \cap E_2^C\right) = P\left(E^C\right) - P(E_2)$

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30. A pair of dice rolled 24 times. A person wins by not getting a pair of 6's on any of the 24 rolls. What is the probability of his winning?

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31. From the employees of a company, 5 persons are selected to represent then in the managing committee of the company. The particulars of 5 persons are as follows :

S.No.	Name	Sex	Age in years
1	Harish	M	30
2	Rohan	M	33
3	Sheetala	F	46
4	Alis	F	28
5	Salim	M	41

A person is selected at random from this group to act as spokesperson. Find the probability that the spokesperson will be either male or above 35 years.

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32. Out of 100 students, two sections of 40 and 60 are formed. If you and your friend are among the 100 students, find the probability that (i) you both enter the same section (ii) you both enter the different sections.

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33. On her vacations Veena visits four cities(A, B, C and D) in random order. What is the probability that she visits

(i) A before B? (ii) A before B and B before C?

(iii) A fist and B last? (iv) A either first or second? (v) A just before B?

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EXERCISE - 3.3

1. A fair die is rolled, consider the events A = {1, 3, 5}, B = {2, 3} and C = {2, 3, 4, 5}. Find

(a) P(A/B)

(b) P(B/A)

(c) P(C/A)

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2. Given $P(A \cap B) = \frac{1}{10}$ and $P(B) = \frac{1}{5}$ then find P(A/B).

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3. A and B are two events of a trial, $P(A) = 0.4, P(B) = p, P(A \cup B) = 0.7$. Find p if A and B are independent.

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4. Suppose A and B are independent events with P(A) = 0.6, P(B) = 0.7. Then compute

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

(iii) $P(B/A)$ (iv) $P(A^c \cap B^c)$

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5. If one card is drawn from a pack of 52 cards then show that the event of getting an ace and getting a heart are independent events.

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6. Let A be the event of having 53 sundays and B be the event of having 53 Mondays in a leap year. Decide whether A, B are independent or not.

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7. If six coins are tossed then find the probability of getting atleast 4 heads, given that all the coins are not showing same result.

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8. Two dice are rolled and given that the sum of them is atmost 11. Find the probability that they show even on both dice.

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9. Two coins are tossed find the conditional probability that two tails result, given that there is atleast one tail.

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10. A pair of dice is thrown. Find the probability that the sum is 10 or greater if 5 appears on atleast one of the dice.

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11. From 1,2,3,.....20 if two natural numbers are selected, find the probability of getting both even if sum of the selected numbers is even.

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12. A pair of dice is rolled. What is the probability that they sum to 7 given that neither die shows a 2.

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13. A pair of dice is rolled. What is the probability that neither die shows a 2 given that they sum to 7.

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14. Three fair dice are rolled. What is the probability of getting different numbers on the dice such that 1^{st} die show show bigger number than the remaining two dice.

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15. Two dice are thrown. Find the conditional probability that two fives occur, if it is known that the total is divisible by 5.

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16. Suppose that an unbaised pair of dice is rolled. Let A denote the event that the same number shows on each die. Let B denote the event that the sum is greater than 7. Find (i) $P\left(\frac{A}{B}\right)$ ii) $P\left(\frac{B}{A}\right)$

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17. Suppose there are 12 boys and 4 girls in a class. If we choose three children one after another in succession, what is the probability that all the three are boys ?

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18. A bag contains 5 red balls, 6 green balls and 7 white balls. If three balls are drawn at random, one after another with replacement, then find the probability that these are green, red and white in order.

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19. Two cards are drawn from a pack of 52 cards . What is the probability of getting both kings if the card drawn in first draw is replaced before 2^{nd} draw.

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20. An urn contains 12 red balls and 12 green balls. Suppose two balls are drawn one after another without replacement . Find the probability that the second ball drawn is green given that the first ball drawn is red.

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21. The probability that a boy will get a scholarship is 0.7 and that another boy will get is 0.8. What is the probability that atleast one them will get scholarship.

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22. Suppose there are 15 boys and 5 girls in a class. If we choose 4 students one after another in succession, find the probility that all the 4 are boys.

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23. (i) A problem is Calculus is given to two students A and B whose chances of solving it are $\frac{1}{3}$ and $\frac{1}{4}$. Find the probability of the problem being solved if both of them try independently.

(ii) A problem is given to three students A, B and C. The chances of their solving the same are $1/3, 1/4, 1/5$ respectively. Then find the probability that the problem will be solved.

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24. A speaks truth in 75% of the cases and B in 80% of the cases. What is the prbability that

(a) both speak truth

(b) both speak lie

(c) their statements about an incident do not match.

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25. The odds against A solving a problem are 3 to 2 and the odds in favour of B solving the same problem are 5 to 4. Then the probability that the problem will be solved if both of them try the problem is

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26. Two fair dice are rolled. Find the probability of getting even number on the first die and odd number on the 2nd die.

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27. One die and a coin tossed simultaneously find the probability of getting 5 on the top of the die and a tail on the coin.

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28. The probabilities of two events A and B and 0.25 and 0.40 respectively. The probability that both A and B occur is 0.15. Find the probability neither A nor B occurs.

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29. A bag contains 2 white and 3 black balls and another bag contains 4 white and 2 black balls. One bag is selected at random and a ball is drawn from it. Find the probability that the colour of the ball is white.

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30. A bag contains 4 white and 3 black balls. Another bag contains 5 white and 2 black balls. A pair of dice is rolled. If the sum on the dice is 10,1^{st} bag is selected. Otherwise 2^{nd} bag is selected. Find the probability of drawing white ball if one ball is drawn from the selected bag at random.

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31. There are 3 black and 4 white balls in one bag. 4 black and 3 white balls in the second bag. A die is rolled and the first bag is selected if it is 1 or 3 and the second bag for the rest. Find the probability of drawing a black ball from the bag thus selected.

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32. If A, B, C are three mutually exclusive and exhaustive events such that 2P(A) = 3P(B) = 4P(C). Find the odds against $A \cup B$.

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33. A coin is biased such that the probability of getting head is thrice to that of getting a tail. If such coin is tossed twice find the probability of getting one head exactly.

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34. Only 3 students A, B, C appear at a competetive examination. The probability of A coming first isthree times that of B and the probaility of B coming first is 3 times that of C. Find the probability of each coming first.

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35. Three screws are drawn at random from a lot of 50 screws, 5 of which are defective. Find the probability of the event that all 3 screws are non-defective, assuming that the drawing is

(a) with replacement

(b) without replacement

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36. A, B, C are aiming to shoot a baloon. A will succeed 4 times out of 5 attempts. The chance of B to shoot the baloon is 3 out of 4 and that of C is 2 out of 3. If the three aim the baloon simultaneously, then find the probability that atleast two of them hit the baloon.

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37. The probability that A hits a target is 1/4 and the probability that B hits the target is 1/3. If each of them fired once, what is the probability that the target will be hit atleast once.

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38. Two persons A and B toss a die. The person who first throws 6 wins. If A starts then find the probability of A winning the game.

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39. Three persons A,B,C in order cut a pack of cards replacing them after each cut. The person who first cuts a club shall win a prize. Find the probabilities of their winning.

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40. An urn contains w white balls and b black balls. Two players Q and R alternately draw a with replacement from the urn. The player that draws a white ball first wins the game. If Q begins the game, find the probability that Q wins the game.

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41. Three urns have the following composition of balls.

urn I	1 white	2 black
urn II	2 white	1 black
urn III	2 white	2 black

One of the urns is selected at random and a ball is drawn. It turns out to be white. Find the probability that it came from urn III.

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42. Three boxes B_1, B_2, B_3 contain with different colours as shown below.

	White	black	red
B_1	2	1	2
B_2	3	2	4
B_3	4	3	2

A die is thrown. B_1 is chosen if either 1 or 2 turns up. B_2 is chosen if 3 or 4 turns up and B_3 is chosen if 5 or 6 turns up. Having chosen a box in this way, a ball is chosen at random from this box. If the ball found to be red, find the probability that it is drawn from box B_2.

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43. 4 A person is known to speak truth 2 out of 3 times. He throws a die and reports that it is 1. Find the probability that it is actually 1.

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44. In a shooting test the probability of A,B,C hitting the targets are $\frac{1}{2}, \frac{2}{3}$ and $\frac{3}{4}$ are respectively. If all of them first at the same target. Find the probability that

i) Only one of them hits the target,

ii) atleast one of them hits the target.

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45. In a certain college, 25% of the boys and 10% of the girls are studying mathematics. The girls constitute 60% of the student strength. If a student selected at radom is found studying mathematics, find the probability that the student is a girl.

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EXERCISE - 3.4

1. If four whole numbers taken at random are multiplied together. Then the chance that the last digit in the product is 1 or 3 or 7 or 9 is.

(A) $\frac{16}{625}$

(B) $\frac{16}{125}$

(C) $\frac{16}{625}$

(D) NONE OF THESE

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2. If four whole numbers taken at random are multiplied together, show that the probability that the last digit of the product is 5 is $\frac{369}{10^4}$.

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3. Two numbers are selected at random from 1,2,3,.....100 and multiplied. Find the probability that the product thus obtained is divisible by 3.

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4. A positive divisor of integer 60 is selected at random. Find the probability that selected divisor is an even integer but not divisible by 4.

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5. 20 persons are arranged along a row and 4 of them are selected at random. Find the probability that

(a) all the selected 4 are not consecutive

(b) no two of the selected 4 are consecutive.

(c) the first person of the linear arrangement must be selected and no two of the selected 4 are consecutive.

(d) exactly three persons of the selected 4 are consecutive.

(e) exactly two persons of the selected 4 are consecutive.

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6. 20 persons are arranged along a round circle. If 4 persons are selected at random, find the probability that

(a) all the selected 4 are not consecutive

(b) no two of the selected 4 are consecutive

(c) a specified person must always be selected and no two of the selected 4 are consecutive.

(d) exactly two persons of the selected 4 are consecutive.

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7. If four fair dice are rolled, find the probability that exactly three of them show the same number.

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8. If 4 fair dice are rolled, find the probability that they show different numbers in increasing order.

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9. If 4 fair dice are rolled, find the probability that the greatest number on the dice is 4.

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10. If 9 fair dice are each thrown 4 times, then find the probability that the scores 1, 2, 3, 4, 5 and 6 each appear 6 times.

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11. fair coin is tossed 5 times. Find the probability that number of heads on the coins is more than the number of tails.

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12. Two players A and B each toss 5 coins. Find the probability that A and B get the same number of heads.

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13. Two players A and B each toss 5 coins. Find the probability that A gets more heads than B.

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14. 4 fair coins are tossed and given that the first coin shows head. Find the probability that no two consecutive heads occur on the four coins.

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15. A coin whose faces are marked 3 and 5 is tossed 4 times. The odds against the sum of the numbers thrown being less than 15 are

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16. If 5 coins are tossed find the probability that no two or more consecutive heads occur.

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17. Let F denote the set of all onto functions from $A = \{a_1, a_2, \ldots, a_{10}\}$ to B = {x, y}. A function f is chosen at random from F. Find the probabiltiy that the function f is such that $f(a_1) = x$.

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18. Let F be the set of all onto functions from $A = \{a_1, a_2, \ldots., a_6\}$ to $B = \{b_1, b_2, b_3, b_4, b_5\}$. If a function is selected at random from F then find the probability that the selected function f is such that $f^{-1}(b_1)$ is not a singleton.

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19. In the above problem find the probability that the selected function f is such that $f^{-1}(b_1) = \{a_1, a_2\}$.

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20. An unbiased die with faces 1, 2, 3, 4, 5, 6 is thrown n times and the list of 'n' numbers showing up is noted. What is the probability that among the numbers 1, 2, 3, 4, 5, 6 exactly two numbers appear in this list.

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21. Using the letters of the word 'RAM' 5 letter words are formed in such a way R, A, M each appears atleast once in each word. If a word is selected from these words find the probability that A appears exactly once in the selected word.

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22. If 3 fair dice are rolled, find the probability of getting sum 12.

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23. If 3 fair dice are rolled show that the probability that the sum of the numbers on the dice is k where $3 \leq k \leq 8$ is $\frac{(k-1)(k-2)}{432}$

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24. Eight fair dice are thrown at random at a time. Find the probability of getting sum 24.

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25. 3 fair dice are rolled and given that atleast two of them show the same number. Find the probability that atleast one die show 4.

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26. Two cards are drawn from pack of cards at random and given that those two cards belong to different suits. Find the probability of getting one king and one queen.

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27. 3 dice are rolled and given that one or more dice shows 6. Find the probability that atleast one die shows 5.

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28. If a leap year is having 53 sundays then find the probability that leap year contains 52 Mondays only.

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29. 5 coins are tossed whose faces are marked 2 and 3. If sum of these 5 numbers on the coins is even. Find the probabiltiy that the sum is not less than 12.

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30. Four fair dicew are rolled and found that the numbers on the dice are in ascending order. Find the probability that one die shows 4.

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31. A positive divisor of 1800 is selected at random and given that the selected divisor is a multiple of 10. Find the probability that it is a multiple of 25.

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32. From pack of cards, 3 cards are drawn at random and given that they belong to different suits. Find the probabilty of getting two kings and one queen.

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33. A die is thrown 3 times. Find the probability of the event of getting the sum of the numbers thrown as 15 when it is known that first throw was a five.

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34. From first 20 natural numbers 1, 2, ..., 20. Three are selected at random and found that they are in A.P., find the probability that the selected 3 numbers are in A.P.

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35. A number is selected from the set of all 4 digited numbers and found that the sum of the 4 digits of the selected number is 33. Find the probabiltiy that the selected number is divisible by 4.

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36. 6 boys and 6 girls are randomly divided into two equal groups. Find the probability that each group contains same number of boys and girls.

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37. 40 boys of a class are divided into two equal group. Find the probability that the 2 tallest boys are in two different groups.

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38. 5 letters are placed at random in 5 addressed envelopes. Find the probability that

(a) no letter is placed in its correct envelope.

(b) exactly three letters are placed in correct envelopes.

(c) atleast one letter is placed in correct envelope.

(d) 2 specified letters are placed in wrong envelopes.

(e) 2 specified letters are placed in correct envelopes.

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39. A is a set containing n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of P. A subset Q of A is again chosen at random. Find the probability that

$P \cup Q = A$

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40. A is a set containing n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of P. A subset Q of A is again chosen at random. Find the probability that

$P \cup Q$ contains exactly r elements

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41. A is a set containing n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of P. A subset Q of A is again chosen at random. Find the probability that

$P \cap Q$ contains exactly two elements

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42. A is a set containing n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of P. A subset Q of A is again chosen at random. Find the probability that (i) Q is subset of P(ii) the number of elements in P is more than the number of elements in Q.

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43. A is a set containing n elements. A subset P of A is chosen at random. The set A is reconstructed by replacing the elements of P. A subset Q of A

is again chosen at random. Find the probability that (i) Q is subset of P(ii) the number of elements in P is more than the number of elements in Q.

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44. From first 100 natural numbers five are selected at random. Find the probability that

all the five are not consecutive

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45. From first 100 natural numbers five are selected at random. Find the probability that

no two of them are consecutive

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46. Out of (2n+1) tickets consecutively numbered , three are drawn at random . The chance that the numbers on them are in A.P is

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47. From 1^{st} 101 natural numbers, 4 numbers are selected at random. Find the probability that the selected numbers are in A.P. with greatest possible common difference.

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48. Out of 21 tickets numbered 10, 11, 12,..., 30, three tickets are drawn at random. Find the probability that the numbers on these tickets are in A.P.

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49. Four small square on a chess board are selected at random. Find the probability that they form a square of the size 2×2

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50. If 9 squares are choosen at random on a chess board. What is the probability that they form a square of size 3×3

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51. 5 different toys are distributed among 6 children at random. Find the probability that atleast one child receives more than one toy.

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52. 5 different toys are distributed among 6 children at random. Find the probability that atleast one child receives more than one toy.

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53. If 4 different biscuts are distributed among 3 children at random, the probability that the first child receives exactly one biscut is

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54. Twenty identical rupee coins are distributed among 5 children at random. Find the probability that the total number of coins received by first two children is exactly 15 coins.

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55. 9 different pens and 3 different books are distributed randomly to 3 students giving 4 things to each. Find the probability that every student must receive atleast one book.

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56. The number of ways in which ten candidates $A_1, A_2, A_3, A_4, \ldots\ldots, A_{10}$ can be arranged in a row

if A_1 is just above A_2 then the number of ways are

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57. A five digited number is written at random. Find the probability that the number written is such that when the digits are put in reverse order, the new number is also a five digited number equal to the original number.

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58. There are 10 seats in the 1st row of a movie theatre. 4 persons enter and take seats randomly in this row. Find the probability that out of any two seats located symmetrically about the middle of the row, atleast one is empty.

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59. If 4 boys and 20 girls are arranged along a row at random. Find the probability that atmost 28 girls may be seated together.

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60. Two numbers x and y are chosen at random without replacement from the numbers 1, 2, 3,..., 3n. Find the probability that $x^3 + y^3$ is divisible by 3.

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61. Two numbers x and y are selected at random from the set {1, 2, 3,... 3n}. Find the probability that $x^2 - y^2$ is divisible by 3.

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62. Two numbers x and y are selected at random from the set {1, 2, 3,... 3n}. Find the probability that $x^2 - y^2$ is divisible by 3.

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63. Two non negative integers are chosen at random, find the probability that the sum of the squares is divisible by 11.

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64. Two numbers x and y are selected at random from {1, 2, 3, ..., 5n} without replacement. Find the probability that $\frac{1}{5}(x^2 + y^2)$ is a natural number.

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65. Two non negative integers are chosen at random. Find the probability that sum of their squares is divisible by 5.

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

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67. If p and q are chosen randomly from the set {1, 2, 3, 4, 5} with replacement. Find the probability that the roots of the equation $x^2 + px + q = 0$ are equal.

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68. A number x is chosen at random from first 100 natural numbers.

$(a)\quad x^2-25x-150\leq 0 \quad (b)\quad x^2-30x>0$

$(c)\quad x+\frac{30}{x}\geq 17 \quad (d)\quad x+\frac{100}{x}>50$

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69. Two fair dice are rolled at random. The probability that the difference between the numbers is

(a) exactly 2

(b) atmost one

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70. Two integers x and y are chosen one by one with replacement from 0, 1, 2,...,100. Find the probability that $|x-y|\leq 3$.

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71. Two integers x and y are chosen one by one with replacement from 1, 2, 3, 4, 5,...., 10. Find the probability that $0 < |x - y| < 5$.

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72. If two fair dice are rolled find the probability that the minimum number on the dice is less than 4.

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73. If 4 fair dice are rolled, find the probability that the greatest number on the dice is 4.

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74. An urn contains two balls each of which is either white or black. A white ball is added to the urn. What is the probability of drawing a white

ball from the bag now.

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75. A bag contains 10 coins of which atleast 2 are one - rupee coins. Two coins are drawn and both are found to be not one-rupee coins. What is the probability of the bag to contain exactly 2 one rupee coins.

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76. A bag contains 5 balls and it is not known how many of them are white. Two balls are drawn and these are found to be white. Find the probability that all the balls in the bag are white.

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77. An unbiased coin is tossed. If the result is head, a pair of unbiased dice is rolled and the number obtained by adding the numbers shown on the

two faces is noted. If the result is tail, a card from a well shuffled pack of eleven cards numbered 2, 3, 4, ..., 12 is picked and the number on the card is noted. Find the prbability that noted number is either 7 or 8.

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78. In a test a candidate may have answered a question in 3 ways. The question is a multiple choice question with 4 choices one of which is the correct answer. He might have guessed the answer for which the probability is 1/3. He might have copied the answer for which the probability is 1/6. He might have known the answer. If he copied the answer the probability that his answer is correct is 1/8. Find the probability that he knew the answer given that he correctly answerd it.

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79. Three groups A, B, C are contesting for positions on the board of directors of a company. The probabilities of their winning are 0.5, 0.3 and 0.2 respectively. If the group A wins the probability of introducing a new

product is 0.7 and the corresponding probabilities for group B and C are 0.6 and 0.5 respectively. Find the probability that the new product will be introduced.

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80. A bag contains 2 white and 2 black balls. A ball is drawn at random. If it is white, it is not replaced in to the bag otherwise it is replaced along with another ball of the same colour. The process is repeated. Find the probability that the third ball drawn is black.

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81. A and B are two independent witnesses in a case. The probability that A will speak truth is 2/3 and the probability that B will speak truth in 3/4. A and B agree in a certain statement. Find the probability that the statement is true.

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

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83. There are four machines and it is known that exactly two of them are faulty . They are tested one by one, in a random order till the faulty machines are identified . The the probability that only two tests are needed is

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84. Cards are drawn one by one from pack of 52 cards without replacement until 3 aces are obtained for the first time. Find the probability of drawing 3rd ace first time in the 10th draw.

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85. Cards are drawn from pack of 52 cards one by one with replacement. Find the probability that exactly 10 cards will be drawn before the first ace.

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86. A man throws a die until he gets a number bigger than 3. The probability that he gets another 5 in last throw

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87. A man throws a pair of fair dice until he gets a doublet for the first time. Find the probability of getting sum 10 in last throw.

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88. Cards are drawn one by one with replacement from pack of cards until red card appears. Find the probability of getting king card in last draw.

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89. A pair of fair dice are rolled till a sum of 2 or 3 is obtained. Find the probability of getting sum 2 before getting sum 3.

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90. Two fair dice are rolled, until doublet appears for the first time. Find the probability that the number of trails required is even.

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91. A pair of biased diced is rolled until sum 10 appears for the first time. Given that the probability of getting sum 10 on the biased dice is

$p(0 < p < 1)$. If the probability that the number of trails required to get sum 10 is odd is 5/9 then find the value of p.

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92. Numbers are selected at random one at a time from the two digit numbers 00, 01, 02, 03 ....99 with replacement . An event E occurs if the product of the 2 digits of a selected number is 18. If four numbers are selected, the probability that the event E occurs atleast 3 times is

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93. Three players A, B and C toss a coin cyclically in that order (that is A, B, C, A, B, C, A, B,...) till a head shows. Let p be the probability that he coin shows a head. Let $\alpha, \beta \text{ and } \gamma$ be respectively the probabilities that A, B and C gets the first head. Prove that $\beta = (1-p)\alpha$. Determine, $\alpha, \beta \text{ and } \gamma$ (in terms of p).

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94. A coin has probability p of showing head when tossed. It is tossed n times. Let P_n denote the probabilty that no two (or more) consecutive heads occur. Prove that $P_1 = 1, P_2 = 1 - P^2$ and $P_n = (1 - P)P_{n-1} + P(1 - P)P_{n-2}$ for all $n \geq 3$.

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95. A box contains N coins, m of which are fair and the rest are biased. The probability of getting a head when a fair coin is tossed is 1/2, while it is 2/3 when a biased coin is tossed. A coin is drawn from the box at random and is tossed twice. The first time it shows head and the second time it shows tail. What is the probability that the coin drawn is fair ?

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