MATHS

BOOKS - CENGAGE MATHS (HINGLISH)

PROBABILITY I

Examples

1. A coin is tossed three times, consider the following events. A : No head appears, B: Exactly one head appears and C: Atleast two appear. Do they form a set of mutually exclusive and exhaustive events?

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2. Find the probability of getting more than 7 when two dice are rolled.

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3. A die is loaded so that the probability of a face i is proportional to $i, i = 1, 2, 6.$ Then find the probability of an even number occurring when the die in rolled.

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

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5. Four candidates A, B, C, D have applied for the assignment ot coach a school cricket team. If A is twice as likely to be selected as B, and B and C are given about the same chance of being selected, while C is twice as likely to be selected as D, what are the probability that (i) C will be selected ? (ii) A will not be selected?

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

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7. A determinant is chosen at random from the set of all determinant of order 2 with elements 0 or 1 only. Find the probability that the determinant chosen is nonzero.

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8. A dice is rolled three times, find the probability of getting a larger number than the previous number each time.

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9. If a coin is tossed n times, then find the probability that the head appears odd number of times.

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10. A card is drawn at random from a pack of cards. What ist the probability that the drawn card is neither a heart nor a king?

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11. Card is drawn from a pack of 52 cards. A persons bets that it is a spade or an ace. What are the odds against him of winning this bet?

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12. A fair dice is thrown three times. If p, q and r are the numbers obtained on the dice, then find the probability that $i^p + i^q + i^r = 1$, where $I = \sqrt{-1}$.

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13. A mapping is select at random from the set of all the mappings of the set $A = \{1, 2, n\}$ into itself. Find the probability that the mapping selected is an injection.

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14. Two integers $xandy$ are chosen with replacement out of the set $\{0, 1, , 2, 3, 10\}$. Then find the probability that $|x - y| > 5$.

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15. Find the probability that the 3Ns come consecutively in the arrangement of the letters of the word CONSTANTINOPLE.

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16. Out of $3n$ consecutive integers, there are selected at random. Find the probability that their sum is divisible by 3.

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17. Find the probability that a randomly chosen three-digit number has exactly three factors.

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

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19. An integer is chosen at random and squared. Find the probability that the last digit of the square is 1 or 5.

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20. Four fair dices are thrown simultaneously. Find the probability that the highest number obtained is 4.

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21. An unbiased dice, with faces numbered 1, 2, 3, 4, 5, 6, is thrown n times and the list of n numbers shown up is noted. Then find the probability that among the numbers 1, 2, 3, 4, 5, 6 only three numbers appear in this list and each number appears at least once.

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22. Six points are there on a circle from which two triangles drawn with no vertex common. Find the probability that none of the sides of the triangles intersect.

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23. Balls are drawn one-by-one without replacement from a box containing 2 black, 4 white and 3 red balls till all the balls are drawn. Find the probability that the balls drawn are in the order 2 black, 4 white and 3 red.

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24. In how many ways, can three girls can three girls and nine boys be seated in two vans, each having numbered seats, 3 in the and 4 at the back? How many seating arrangements are possible if 3 girls should sit together in a back row on adjacent seats? Now, if all the seating arrangements are equally likely, what is the probability of 3 girls sitting together in a back row on adjacent seats?

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25. Find the probability that the birth days of six different persons will fall in exactly two calendar months.

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26. If ten objects are distributed at random among ten persons, then find the probability that at least one of them will not get any object.

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27. 2^n players of equal strength are playing a knock out tournament. If they are paired at randomly in all rounds, find out the probability that out of two particular players $S_1 and S_2,$ exactly one will reach in semi-final $(n \in N, n \geq 2)$.

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28. Fourteen numbered balls (1, 2, 3, ..., 14) are divided in 3 groups randomly. Find the probability that the sum of the numbers on the balls, in each group, is odd.

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29. Five different digits from the set of numbers {1, 2, 3, 4, 5, 6, 7} are written in random order. Find the probability that five-digit number thus formed is divisible by 9.

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30. Three married couples sit in a row. Find the probability that no husband sits with his wife.

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

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32. The probability that at least one of the events $A and B$ occurs is 0.6. If $A and B$ occur simultaneously with probability 0.2, then find $P(A) + P(B)$.

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33. If $P(A \cup B) = 3/4 and P(A) = 2/3$, then find the value of $P(A \cap B)$.

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

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35. Let A and B be any two events such that P(A) = $\frac{1}{2}$ and P(B) = $\frac{1}{3}$. Then find the value of $P(A' \cap B')' + P(A' \cup B')'$.

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36. If A and B are events such that $P(A' \cup B') = \frac{3}{4}$, $P(A' \cap B') = \frac{1}{4}$ and $P(A) = \frac{1}{3}$, then find the value of $P(A' \cap B)$

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37. A sample space consists of 9 elementary outcomes outcomes E_1, E_2,..., E_9 whose probabilities are:

P(E_(1))=P(E_(2)) = 0.09, P(E_(3))=P(E_(4))=P(E_(5))=0.1P(E_(6)) = P(E_(7)) = 0.2, P(E_(8)) = P(E_(9)) = 0.06IfA = {E_(1), E_(5), E_(8)}, B= {E_(2), E_(5), E_(8), E_(9)} $then(a)Calc\underline{a}teP(A), P(B),$ and $P(A$nn $B). (b)U\sin gtheadditionlawofprobability, calc\underline{a}te$P(A uu B) $. (c)Listthecompositionoftheevent$A uu B, and $calc\underline{a}te$P(A uu B) $byadd \in gtheprobabilitiesofthee \leq mentaryoutcomes. (d)Calc\underline{a}te$ P(barB)$\text{ø}mP(B), alsocalc\underline{a}te$P(barB)` directly from the elementarty outcomes of B.

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38. The following Venn diagram shows three events, A, B, and C, and also the probabilities of the various intersections.

Determine

(a) P(A)

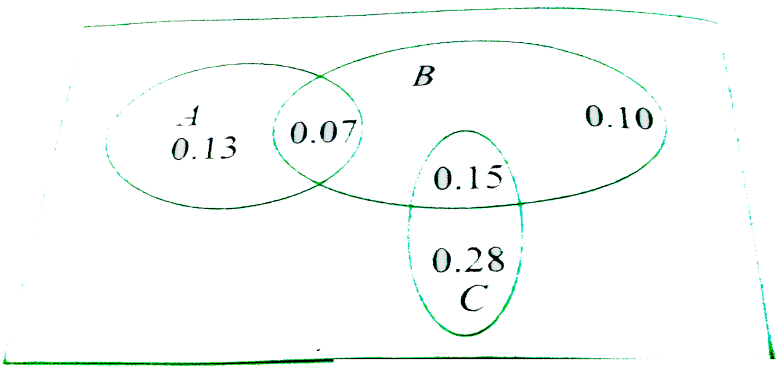
(b) $P(B \cap \overline{C})$

(c) $P(A \cup B)$

(d) $P(A \cap \overline{B})$

(e) $P(B \cap C)$

(f) Probability of the event that exactly one of A, B, and C occurs.



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39. Three numbers are chosen at random without replacement from {1,2,3,....10}. The probability that the minimum of the chosen number is 3 or their maximum is 7 , is:

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40. If A and B are two events such that P(A) = $\frac{1}{2}$ and P(B) = $\frac{2}{3}$, then show that

(a) $P(A \cup B) \geq \frac{2}{3}(b)\frac{1}{6} \leq P(A \cap B) \leq \frac{1}{2}$

(c) $P\left(A \cap \overline{B}\right) \leq \frac{1}{3}(d)\frac{1}{6} \leq P\left(\overline{A} \cap B\right) \leq \frac{1}{2}$

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41. Given two events $AandB$. If odds against A are as 2:1 and those in favour of $A \cup B$ are 3:1, then find the range of $P(B)$.

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42. The probabilities of three events $A, B, andC$ are $P(A) = 0.6, P(B) = 0.4, andP(C) = 0.5.$ If $P(A \cup B) = 0.8, P(A \cap C) = 0.3, P(A \cap B \cap C) = 0.2, andP(A \cup B \cup$

then find the range of $P(B \cup C)$.

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43. Let $A = \{0.5, 10, 15, ..., 951\}$ Let B be any subset of A,with at least elements. What is thehas at least one pair of elements whose sum is divisibleby 15?

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44. The sum of two positive quantities is equal to $2n$. the probability that their product is not less than 3/4 times their greatest product is $3/4$ b. $1/4$ c. $1/2$ d. none of these

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45. Two natural numbers x and y are chosen at random. What is the probability that $x^2 + y^2$ is divisible by 5?

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46. If a fair coin is tossed 5 times, the porbability that heads does not occur two or more times in a row is

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47. Let P(x) denote the probability of the occurrence of event x. Plot all those point (x y) = (P(A), P(B)) in a plane which satisfy the conditions, $P(A \cup B) \geq 3/4 \text{ and } 1/8 \leq P(A \cap B) \leq 3/8$

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48. In a certain city only two newspapers A and B are published, it is known that 25% of the city population reads A and 20% reads B, while 8% reads both A and B. It is also known that 30% of those who read A but not B look int advertisements and 40% of those who read B bu not A look into advertisements while 50% of those who read both A and B look into advertisements What is the percentage of the population reads an advertisement? [1984]

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49. A box contains two 50 paise coins, five 25 paise coins and a certain fixed number $N(\geq 2)$ of 10 and 5-paise coins. Five coins are taken out of the box at random. Find the probability that the total value of these 5 coins is less than 1 rupee and 50 paise.

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50. Eight players $P_1, P_2, P_3, \dots\dots\dots. P_8$, play a knock out tournament. It is known that whenever the players P_i and P_j, play, the player P_i will win if $i < j$. Assuming that the players are paired at random in each round, what is the probability that the players P_4, reaches the final ?

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Exercise 9 1

1. Which of the following cannot be valid assignment of probabilities for outcomes of sample space $S = \{W_1, W_2, W_3, W_4, W_5, W_6, W_7\}$

Assignment	W_1	W_2	W_3	W_4	W_5	W_6	W_7
(a)	0.1	0.01	0.05	0.03	0.01	0.2	0.6
(b)	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$
(c)	0.1	0.2	0.3	0.4	0.5	0.6	0.7
(d)	–0.1	0.2	0.3	0.4	–0.2	0.1	0.3
(e)	$\frac{1}{14}$	$\frac{2}{14}$	$\frac{3}{14}$	$\frac{4}{14}$	$\frac{5}{14}$	$\frac{6}{14}$	$\frac{15}{14}$

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2. Consider the following assignments of probabilities for outcomes of sample space S = {1, 2, 3, 4, 5, 6, 7, 8}.

Number (X)	1	2	3	4	5	6	7	8
Probability, P(X)	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

Find the probability that

X is a prime number

(b) X is a number greater than 4.

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3. Find the probability that a leap year will have 53 Friday or 53 Saturdays.

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4. A die is loaded so that the probability of a face i is proportional to $i, i = 1, 2, 6.$ Then find the probability of an even number occurring when the die in rolled.

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5. Find the probability of drawing either an ace or a king from a pack of card in a single draw.

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6. Three faces of a fair dice are yellow, two are red and one is blue. Find the probability that the dice shows (a) yellow, (b) red and (c) blue face.

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Exercise 9 2

1. If two fair dices are thrown and digits on dices are a and b, then find the probability for which $\omega^{ab} = 1$, (where ω is a cube root of unity).

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2. There are n letters and n addressed envelopes. Find the probability that all the letters are not kept in the right envelope.

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3. Find the probability of getting total of 5 or 6 in a single throw of two dice.

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4. Two integers are chosen at random and multiplied. Find the probability that the product is an even integer.

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5. If out of 20 consecutive whole numbers two are chosen at random, then find the probability that their sum is odd.

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6. A bag contains 3 red, 7 white, and 4 black balls. If three balls are drawn from the bag, then find the probability that all of them are of the same color.

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7. An ordinary cube has 4 blank faces, one face mark 2 and another marked 3, then the probability of obtaining 12 in 5 throws is

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8. If the letters of the word REGULATIONS be arranged at random, find the probability that there will be exactly four letters between the R and the E.

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9. A five-digit number is formed by the digit 1, 2, 3, 4, 5 without repetition. Find the probability that the number formed is divisible by 4.

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10. Five persons entered the lift cabin on the ground floor of an 8-floor house. Suppose that each of them independently and with equal probability can leave the cabin at any floor beginning with the first. Find out the probability of all five persons leaving at different floors.

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11. Two friends $A and B$ have equal number of daughters. There are three cinema tickets which are to be distributed among the daughters of $A and B$. The probability that all the tickets go to the daughters of A is 1/20. Find the number of daughters each of them have.

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12. A bag contains 12 pairs of socks. Four socks are picked up at random. Find the probability that there is at least one pair.

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13. There are eight girls among whom two are sisters, all of them are t sit on a round table. Find the probability that the two sisters do not sit together.

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14. 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

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15. A pack of 52 cards is divided at random into two equals parts. Find the probability that both parts will have an equal number of black and red cards.

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16. Let the nine different letters $A, B, C...I \in \{1, 2, 3, ..., 9\}$. Then find the probability that product $(A-1)(B-1)...(I-9)$ is an even number.

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17. If two distinct numbers m and n are chosen at random form the set {1, 2, 3, ..., 100}, then find the probability that $2^m + 2^n + 1$ is divisible by 3.

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18. Two number $a and b$ aer chosen at random from the set of first 30 natural numbers. Find the probability that $a^2 - b^2$ is divisible by 3.

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

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Exercise 9 3

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

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2. If A and B are events such that $P(A \cup B) = (3)/(4), P(A \cap B) = (1)/(4)$ and $P(A^c) = (2)/(3)$, then find

(a) P(A) (b) P(B)

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

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3. If $P(A \cap B) = \frac{1}{2}, P(A \cap B) = \frac{1}{3}, P(A) = p, P(B) = 2p,$ then find the value of p.

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4. In a class of 125 students 70 passed in Mathematics, 55 in statistics, and 30 in both. Then find the probability that a student selected at random from the class has passes in only one subject.

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5. In a certain population, 10% of the people are rich, 5% are famous, and 3% are rich and famous. Then find the probability that a person picked at random from the population is either famous or rich but not both.

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6. Three students $A and B and C$ are in a swimming race. $A and B$ have the same probability of winning and each is twice as likely to win as $C.$ Find the probability that the $B \text{ or } C$ wins. Assume no two reach the winning point simultaneously.

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7. Let A, B, C be three events such that $P(A) = 0.3, P(B) = 0.4, P(C) = 0.8, P(A \cap B) = 0.88, P(A \cap C) = 0$

If $P(A \cup B \cup C) \geq 0.75,$ then show that $0.23 \leq P(B \cap C) \leq 0.48.$

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Exercise Single

1. A sample space consists of 3 sample points with associated probabilities given as $2p, p^2, 4p - 1$. Then the value of p is

A. $p = \sqrt{11} - 3$

B. $\sqrt{10} - 3$

C. $\frac{1}{4} < p < \frac{1}{2}$

D. none of these

Answer: A

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2. Let E be an event which is neither a certainty nor an impossibility. If probability is such that $P(E) = 1 + \lambda + \lambda^2$ and $P(E') = (1 + \lambda)^2$ in terms of an unknown λ. Then $P(E)$ is equal to

A. 1

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

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

D. none of these

Answer: B

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3. Three balls marked with 1, 2 and 3 are placed in an urn. One ball is drawn, its number is noted, then the ball is returned to the urn. This process is repeated and then repeated once more. Each ball is equally likely to be drawn on each occasion. If the sum of the number noted is 6, then the probability that the ball numbered with 2 is drawn at all the three occassion, is

A. $\frac{1}{27}$

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

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

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

Answer: B

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4. A draws a card from a pack of n cards marked $1, 2, ;\cdot n\cdot$ The card is replaced in the pack and B draws a card. Then the probability that A draws a higher card than B is $(n+1)2n$ b. $1/2$ c. $(n-1)2n$ d. none of these

A. $(n+1)/2n$

B. $1/2$

C. $(n-1)/2n$

D. none of these

Answer: C

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5. South African cricket captain lost toss of a coin 13 times out of 14. The chance of this happening was $7/2^{13}$ b. $1/2^{13}$ c. $13/2^{14}$ d. none

A. $7/2^{13}$

B. $1/2^{13}$

C. $13/2^{14}$

D. $13/2^{13}$

Answer: A

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6. The probability that in a family of 5 members, exactly two members have birthday on sunday is:-

A. $\dfrac{12 \times 5^3}{7^5}$

B. $\dfrac{10 \times 6^2}{7^5}$

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

D. $\frac{10 \times 6^3}{7^5}$

Answer: D

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7. Three houses are available in a locality. Three persons apply for the houses. Each applies for one houses without consulting others. The probability that all three apply for the same houses is

A. $1/9$

B. $2/9$

C. $7/9$

D. $8/9$

Answer: A

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8. The numbers 1, 2, 3, ..., n are arrange in a random order. The probability that the digits 1, 2, 3, ..., `k(k

A. $1/n!$

B. $k!/n!$

C. $(n-k)!/n!$

D. $(n-k+1)!/n!$

Answer: D

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9. Words from the letters of the word PROBABILITY are formed by taking all letters at a time. The probability that both $B's$ are not together and both $I's$ are not together is $52/55$ b. $53/55$ c. $54/55$ d. none of these

A. $52/55$

B. $53/55$

C. $54/55$

D. none of these

Answer: B

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10. There are only two women among 20 persons taking part in a pleasure trip. The 20 persons are divided into two groups, each group consisting of 10 person. Then the probability that the two women will be in the same group is $9/19$ b. $9/38$ c. $9/35$ d. none

A. $9/19$

B. $9/38$

C. $9/35$

D. none of these

Answer: A

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11. Five different games are to be distributed among 4 children randomly. The probability that each child get at least one game is $1/4$ b. $15/64$ c. $5/9$ d. $7/12$

A. $1/4$

B. $15/64$

C. $21/64$

D. none of these

Answer: B

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12. A drawer contains 5 brown socks and 4 blue socks well mixed a man reaches the drawer and pulls out socks at random. What is the probability that they match? $4/9$ b. $5/8$ c. $5/9$ d. $7/12$

A. $4/9$

B. $5/8$

C. $5/9$

D. $7/12$

Answer: A

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

A. $3/4$

B. $1/4$

C. $1/8$

D. none of these

Answer: B

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14. Twelve balls are placed in three boxes. The probability that the first box contains three balls is

A. $\frac{110}{9}\left(\frac{2}{3}\right)^{10}$

B. $\frac{9}{110}\left(\frac{2}{3}\right)^{10}$

C. $\frac{.^{12}C_3}{12^3}\times 2^9$

D. $\frac{.^{12}C_3}{3^{12}}$

Answer: A

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15. A cricket club has 15 members, of them of whom only 5 can bowl. If the names of 15 members are put into a box and 11 are drawn at random, then the probability of getting an eleven containing at least 3 bowlers is

A. $7/13$

B. $6/13$

C. $11/15$

D. $12/13$

Answer: D

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16. Seven girls $G_1, G_2, G_3, ..., G_7$ are such that their ages are in order $G_1 < G_2 < G_3 < \ldots < G_7$. Five girls are selected at random and arranged in increasing order of their ages. The probability that G_5 and G_7 are not consecutive is

A. $\frac{20}{21}$

B. $\frac{19}{21}$

C. $\frac{17}{21}$

D. $\frac{13}{21}$

Answer: C

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17. A local post office is to send M telegrams which are distributed at random over N communication channels, $(N > M)$. Each telegram is sent over any channel with equal probability. Chance that not more than one telegram will be sent over each channel is:

A. $\frac{.^{N} C_{M} \times N!}{M^{N}}$

B. $\frac{.^{N} C_{M} \times M!}{N^{M}}$

C. $1 - \frac{.^{N} C_{M} \times M!}{M^{N}}$

D. $1 - \frac{.^{N} C_{M} \times N!}{N^{M}}$

Answer: B

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18. Dialling a telephone number an old man forgets the last two digits remembering only that these are different dialled at random. The probability that the number is dialled correctly is $1/45$ b. $1/90$ c. $1/100$ d. none of these

A. $1/45$

B. $1/90$

C. $1/100$

D. none of these

Answer: B

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19. $AandB$ toss a fair coin each simultaneously 50 times. The probability that both of them will not get tail at the same toss is $(3/4)^{50}$ b. $(2/7)^{50}$ c. $(1/8)^{50}$ d. $(7/8)^{50}$

A. $(3/4)^{50}$

B. $(2/7)^{50}$

C. $(1/8)^{50}$

D. $(7/8)^{50}$

Answer: A

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20. In a game called odd man out $m(m > 2)$ persons toss a coin to determine who will but refreshments for the entire group. A person who gets an outcome different from that of the rest of the members of the group is called the odd man out. The probability that there is a loser in any game is $1/2m$ b. $m/2^{m-1}$ c. $2/m$ d. none of these

A. $1/2m$

B. $m/2^{m-1}$

C. $2/m$

D. none of these

Answer: B

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21. $2n$ boys are randomly divided into two subgroups containint n boys each. The probability that eh two tallest boys are in different groups is $n/(2n-1)$ b. $(n-1)/(2n-1)$ c. $(n-1)/4n^2$ d. none of these

A. $n/(2n-1)$

B. $(n-1)(2n-1)$

C. $(n-1)/4n^2$

D. none of these

Answer: A

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22. If the papers of 4 students can be checked by any one of the 7 teachers, then the probability that all the 4 papers are checked by exactly 2 teachers is $2/7$ b. $12/49$ c. $32/343$ d. none of these

A. $2/7$

B. $12/49$

C. $32/343$

D. $6/49$

Answer: D

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23. If the events A and B are mutually exclusive events such that P(A) = $\frac{3x+1}{3}$ and P(B) = $\frac{1-x}{4}$, then the set of possible real values of x lies in the interval

A. [0, 1]

B. $\left[-\frac{1}{3}, \frac{5}{9}\right]$

C. $\left[-\frac{7}{9}, \frac{4}{9}\right]$

D. $\left[\frac{1}{3}, \frac{2}{3}\right]$

Answer: B

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24. A natural number is chosen at random from the first 100 natural numbers. The probability that $x + \frac{100}{x} > 50$ is $1/10$ b. $11/50$ c. $11/20$ d. none of these

A. $1/10$

B. $\frac{11}{50}$

C. $\frac{11}{20}$

D. none of these

Answer: C

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

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

B. $\frac{25}{216}$

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

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

Answer: C

Watch Video Solution

26. If a is an integer lying in $[-5, 30]$, then the probability that the probability the graph of $y = x^2 + 2(a+4)x - 5a + 64$ is strictly above the x-axis is

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

B. $\frac{7}{36}$

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

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

Answer: C

Watch Video Solution

27. Four die are thrown simultaneously. The probability that 4 and 3 appear on two of the die given that 5 and 6 have appeared on other two die is

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

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

C. $\frac{12}{151}$

D. none of these

Answer: C

Watch Video Solution

28. A $2n$ digit number starts with 2 and all its digits are prime, then the probability that the sum of all 2 consecutive digits of the number is prime is

A. 4×2^{-3n}

B. 4×2^{-3n}

C. 2^{-3n}

D. none of these

Answer: B

Watch Video Solution

29. In a $n-$ sided regular polygon, the probability that the two diagonal chosen at random will intersect inside the polygon is $\frac{2^n C_2}{\hat{}\,(\hat{}\,(nC_{2-n}))C_2}$

b. $\frac{\hat{}\,(n(n-1))C_2}{\hat{}\,(\hat{}\,(nC_{2-n}))C_2}$ c. $\frac{\hat{}\,nC_4}{\hat{}\,(\hat{}\,(nC_{2-n}))C_2}$ d. none of these

A. $\frac{2^n C_2}{.^{\left(.^n C_{2-n} \right)} C_2}$

B. $\frac{.^{n(n-1)} C_2}{.^{\left(.^n C_2 - n \right)} C_2}$

C. $\frac{.^n C_4}{.^{\left(.^n C_2 - n \right)} C_2}$

D. none of these

Answer: C

Watch Video Solution

30. A three-digit number is selected at random from the set of all three-digit numbers. The probability that the number selected has all the three digits same is $1/9$ b. $1/10$ c. $1/50$ d. $1/100$

A. $1/9$

B. $1/10$

C. $1/50$

D. $1/100$

Answer: D

Watch Video Solution

31. Two numbers a, b are chosen from the set of integers 1, ,2 3, ..., 39. Then probability that he equation $7a - 9b = 0$ is satisfied is $1/247$ b. $2/247$ c. $4/741$ d. $5/741$

A. $1/247$

B. $2/247$

C. $4/741$

D. $5/741$

Answer: C

Watch Video Solution

32. One mapping is selected at random from all mappings of the set $S = \{1, 2, 3, n\}$ into itself. If the probability that the mapping is one-one is $\frac{3}{32}$, then the value of n

A. 2

B. 3

C. 4

D. none of these

Answer: C

Watch Video Solution

33. A composite number is selected at random from the first 30 natural numbers and it is divided by 5. The probability that there will be remainder is $14/19$ b. $5/19$ c. $5/6$ d. $7/15$

A. $14/19$

B. $5/19$

C. $5/6$

D. $7/15$

Answer: A

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34. Forty team play a tournament. Each team plays every other team just once. Each game results in a win for one team. If each team has a 50% chance of winning each game, the probability that he end of the tournament, every team has won a different number of games is $1/780$ b. $40!/2^{780}$ c. $40!/2^{780}$ d. none of these

A. $1/780$

B. $40!/2^{780}$

C. $36/.^{64}C_3$

D. $98/.^{64}C_3$

Answer: B

Watch Video Solution

35. If three square are selected at random from chess board. then the probability that they form the letter 'L' is (a) $\frac{196}{64C_3}$ (b) $\frac{49}{64C_3}$ (c) $\frac{36}{64C_3}$ (d) $\frac{98}{64C_3}$

A. $196/.^{64}C_3$

B. $49/.^{64}C_3$

C. $36/.^{64}C_3$

D. $98/.^{64}C_3$

Answer: A

Watch Video Solution

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

A. $5/21$

B. $2/21$

C. $7/21$

D. $3/21$

Answer: A

Watch Video Solution

37. Find the probability that a randomly chosen three-digit number has exactly three factors.

A. $2/225$

B. $7/900$

C. $1/800$

D. none of these

Answer: B

Watch Video Solution

38. Let p,q be chosen one by one from the set $\{1, \sqrt{2}, \sqrt{3}, 2, e, \pi\}$ with replacement. Now a circle is drawn taking (p,q) as its centre. Then the probability that at the most two rational points exist on the circle is (rational points are those points whose both the coordinates are rational)

A. $2/3$

B. $7/8$

C. $8/9$

D. none of these

Answer: C

View Text Solution

39. Three integers are chosen at random from the set of first 20 natural numbers. The chance that their product is a multiple of 3 is $194/285$ b. $1/57$ c. $13/19$ d. $3/4$

A. $194/285$

B. $1/57$

C. $13/19$

D. $3/4$

Answer: A

Watch Video Solution

40. Five different marbles are placed in 5 different boxes randomly. Then the probability that exactly two boxes remain empty is (each box can hold any number of marbles) $2/5$ b. $12/25$ c. $3/5$ d. none of these

A. $2/5$

B. $12/25$

C. $3/5$

D. none of these

Answer: C

Watch Video Solution

41. There are 10 prizes, five As, there Bs and two Cs, placed in identical sealed envelopes for the top 10 contestants in a mathematics contest. The prizes are awarded by allowing winners to select an envelope at random from those remaining. Then the 8th contestant goes to select the prize, the probability that the remaining three prizes are once $AandB$ and one C is $1/4$ b. $1/3$ c. $1/12$ d. $1/10$

A. $1/4$

B. $1/3$

C. $1/12$

D. $1/10$

Answer: A

Watch Video Solution

42. A car is parked among N cars standing in a row, but not at either end. On his return, the owner finds that exactly r of the N places are still occupied. The probability that the places neighboring his car are empty is $\dfrac{(r-1)!}{(N-1)!}$ b. $\dfrac{(r-1)!(N-r)!}{(N-1)!}$ c. $\dfrac{(N-r)(N-r-1)}{(N-1)(N+2)}$ d. $\dfrac{\hat{}\,(N-r)C_2}{\hat{}\,(N-1)C_2}$

A. $\dfrac{(r-1)!}{(N-1)!}$

B. $\dfrac{(r-1)!(N-r)!}{(N-1)!}$

C. $\dfrac{(N-r)(N-r-1)}{(N+1)(N+2)}$

D. $\dfrac{.^{N-r}C_2}{.^{N-1}C_2}$

Answer: D

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43. Let A be a set containing elements. A subset P of the set A is chosen at random. The set A is reconstructed by replacing the elements of P, and another subset Q of A is chosen at random. The probability that $P \cap Q$ contains exactly $m(m < n)$ elements, is

A. $\frac{3^{n-m}}{4^n}$

B. $\frac{.^n C_m . 3^m}{4^n}$

C. $\frac{.^n C_m . 3^{n-m}}{4^n}$

D. none of these

Answer: C

Watch Video Solution

44. Consider $f(x) = x^3 + ax^2 + bx + c$ Parameters a, b, c are chosen as the face value of a fair dice by throwing it three times Then the probability that $f(x)$ is an invertible function is (A) $\frac{5}{36}$ (B) $\frac{8}{36}$ (C) $\frac{4}{9}$ (D) $\frac{1}{3}$

A. $5/36$

B. $8/36$

C. $4/9$

D. $1/3$

Answer: C

Watch Video Solution

45. If a and b are chosen randomly from the set consisting of number 1, 2, 3, 4, 5, 6 with replacement. Then the probability that $\lim_{x \to 0} [(a^x + b^x)/2]^{2/x} = 6$ is

A. $1/3$

B. $1/4$

C. $1/9$

D. $2/9$

Answer: C

Watch Video Solution

46. Mr. A lives at origin on the Cartesian plane and has his office at $(4, 5)$. His friend lives at $(2, 3)$ on the same plane. Mrs. A can go to his office travelling one block at a time either in the $+y$ or $+x$ idrectin. If all possible paths are equally likely then the probability that Mr. A passed his friends house is (shortest path for any event must be consider4ed) $1/2$ b. $10/21$ c. $1/4$ d. $11/21$

A. $1/2$

B. $10/21$

C. $1/4$

D. $11/21$

Answer: B

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Exercise Multiple

1. If A and B are two events, the probability that exactly one of them occurs is given by

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

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

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

D. $P(\overline{A}) + P(\overline{B}) - 2P(\overline{A} \cap \overline{B})$

Answer: A::B::C::D

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

A. are real is 33/50

B. are imaginary is 19/50

C. are real and equal is 3/50

D. are real and distinct is 3/5

Answer: B::C::D

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3. If A and B are two events such that P(A) = 3/4 and P(B) = 5/8, then

A. $P(A \cup B) \geq 3/4$

B. $P(A' \cap B) \leq 1/4$

C. $1/8 \leq P(A \cap B') \leq 3/8$

D. $3/8 \leq P(A \cap B) \leq 5/8$

Answer: A::B::C::D

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4. If A and B are mutually exclusive events, then

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

B. $P(A) > P(B)$

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

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

Answer: A::C

Watch Video Solution

5. Probability if n heads in $2n$ tosses of a fair coin can be given by $\prod_{r=1}^{n}\left(\frac{2r-1}{2r}\right)$ b. $\prod_{r=1}^{n}\left(\frac{n+r}{2r}\right)$ c. $\sum_{r=0}^{n}\left(\frac{\hat{\ } nC_r}{2^n}\right)$ d. $\frac{\sum r = 0n(\hat{\ } nC_r)^2}{\sum r = 02n(\hat{\ } (2n)C_r)^{\square}}$

A. $\prod_{r=1}^{n}\left(\frac{2r-1}{2r}\right)$

B. $\prod_{r=1}^{n}\left(\frac{n+r}{2r}\right)$

C. $\sum_{r=0}^{n}\left(\frac{.^{n}C_r}{2^n}\right)^2$

D. $\frac{\sum_{r=0}^{n}(.^{n}C_r)^2}{\left(\sum_{r=0}^{2n}.^{2n}C_r\right)}$

Answer: A::C::D

Watch Video Solution

6. The chance of an event happening is the square of the chance of a second event but the odds against the first are the cube of the odds against the second. The chances of the events are

A. $P_1 = 1/9$

B. $P_1 = 1/16$

C. $P_2 = 1/3$

D. $P_2 = 1/4$

Answer: A::C

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7. A bag contains b blue balls and r red balls. If two balls are drawn at random, the probability drawing two red balls is five times the probability of drawing two blue balls. Furthermore, the probability of drawing one ball of each color is six times the probability of drawing two blue balls. Then

A. b + r = 9

B. br = 18

C. $|b - r| = 4$

D. $b/r = 2$

Answer: A::B

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8. Two numbers are chosen from {1, 2, 3, 4, 5, 6, 7, 8} one after another without replacement. Then the probability that

A. the smallest value of two is less than 3 is $13/28$

B. the bigger value of two is more than 5 is $9/14$

C. product of two number is even is $11/14$

D. none of these

Answer: A::B::C

Watch Video Solution

Exercise Comprehension

1. A shoping mall is running a scheme: Each packet of detergent SURF contains a coupon which bears letter of the word SURF, if a person buys at least four packets of detergent SURF, and produce all the letters of the word SURF, then he gets one free packet of detergent.

If a person buys 8 such packets at a time, then the number of different combinations of coupon he has is

A. 4^8

B. 8^4

C. $.^{11}C_3$

D. $.^{12}C_4$

Answer: C

Watch Video Solution

2. A shoping mall is running a scheme: Each packet of detergent SURF contains a coupon which bears letter of the word SURF, if a person buys at least four packets of detergent SURF, and produce all the letters of the word SURF, then he gets one free packet of detergent.

If person buys 8 such packets, then the probability that he gets exactly one free packets is

A. $7/33$

B. $102/495$

C. $13/55$

D. $34/165$

Answer: D

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3. A shoping mall is running a scheme: Each packet of detergent SURF contains a coupon which bears letter of the word SURF, if a person buys at least four packets of detergent SURF, and produce all the letters of the word SURF, then he gets one free packet of detergent.

If a person buys 8 such packets, then the probability that he gets two free packets is

A. $1/7$

B. $1/5$

C. $1/42$

D. $1/165$

Answer: D

Watch Video Solution

4. There are two die A and B both having six faces. Die A has three faces marked with 1, two faces marked with 2, and one face marked with 3. Die B has one face marked with 1, two faces marked with 2, and three faces marked with 3. Both dices are thrown randomly once. If E be the event of getting sum of the numbers appearing on top faces equal to x and let $P(E)$ be the probability of event E, then $P(E)$ is maximum when x equal to

A. 5

B. 3

C. 4

D. 6

Answer: C

Watch Video Solution

5. There are two die A and B both having six faces. Die A has three faces marked with 1, two faces marked with 2, and one face marked with 3. Die B has one face marked with 1, two faces marked with 2, and three faces marked with 3. Both dices are thrown randomly once. If E be the event of getting sum of the numbers appearing on top faces equal to x and let P(E) be the probability of event E, then P(E) is minimum when x equals to

A. 3

B. 4

C. 5

D. 6

Answer: B

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6. There are two die A and B both having six faces. Die A has three faces marked with 1, two faces marked with 2, and one face marked with 1, two faces marked with 2, and one face marked with 3. Die B has one face marked with 1, two faces marked with 2, and three faces marked with 3. Both dices are thrown randomly once. If E be the event of getting sum of the numbers appearing on top faces equal to x and let P(E) be the probability of event E, then

When x = 4, then P(E) is equal to

A. $5/9$

B. $6/7$

C. $7/18$

D. $8/19$

Answer: C

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7. A cube having all of its sides painted is cut by two horizontal, two vertical, and other two planes so as to form 27 cubes all having the same dimensions. Of these cubes, a cube is selected at random.

The probability that the cube selected has none of its sides painted is

A. $1/9$

B. $1/27$

C. $1/18$

D. $5/54$

Answer: B

Watch Video Solution

8. A cube having all of its sides painted is cut by two horizontal, two vertical, and other two planes so as to form 27 cubes all having the same dimensions. Of these cubes, a cube is selected at random.

The probability that the cube selected has two sides painted is

A. $1/9$

B. $4/9$

C. $8/27$

D. none of these

Answer: B

Watch Video Solution

9. A cube having all of its sides painted is cut by two horizontal, two vertical, and other two planes so as to form 27 cubes all having the same dimensions. Of these cubes, a cube is selected at random.

The total number of cubes having at least one of its sides painted is

A. 18

B. 20

C. 22

D. 26

Answer: D

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10. There are some experiment in which the outcomes cannot be identified discretely. For example, an ellipse of eccentricity $2\sqrt{2}/3$ is inscribed in a circle and a point within the circle is chosen at random. Now, we want to find the probability that this point lies outside the ellipse. Then, the point must lie in the shaded region shown in Figure. Let the radius of the circle be a and length of minor axis of the ellipse be 2b.

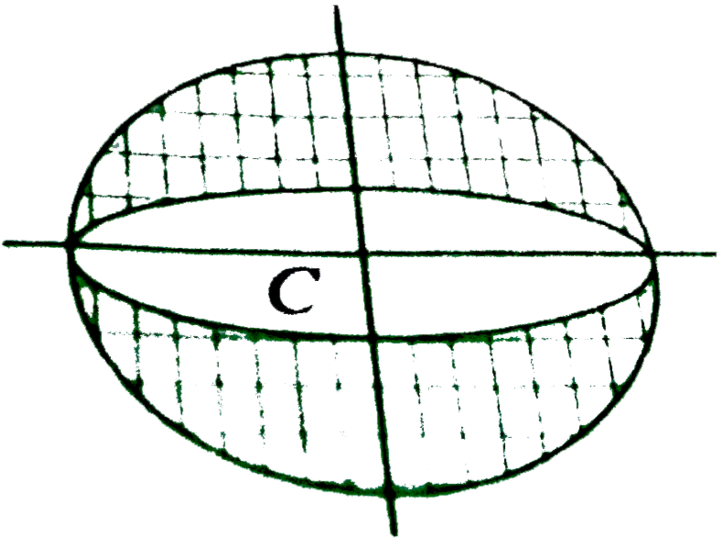
Given that

$$1-\frac{b^2}{a^2}=\frac{8}{9} \text{ or } \frac{b^2}{a^2}=\frac{1}{9}$$

Then, the area of circle serves as sample space and area of the shaded region represents the area for favorable cases. Then, required probability is

$$p = \frac{\text{Area of shaded region}}{\text{Area of circle}}$$
$$= \frac{\pi a^2 - \pi ab}{\pi a^2} = 1 - \frac{b}{a} = 1 - \frac{1}{3} = \frac{2}{3}$$

Now, answer the following questions.



A point is selected at random inside a circle. The probability that the point is closer to the center of the circle than to its circumference is

A. $1/4$

B. $1/2$

C. $1/3$

D. $1/\sqrt{2}$

Answer: A

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11. There are some experiment in which the outcomes cannot be identified discretely. For example, an ellipse of eccentricity $2\sqrt{2}/3$ is inscribed in a circle and a point within the circle is chosen at random. Now, we want to find the probability that this point lies outside the ellipse. Then, the point must lie in the shaded region shown in Figure. Let the radius of the circle be a and length of minor axis of the ellipse be 2b.

Given that

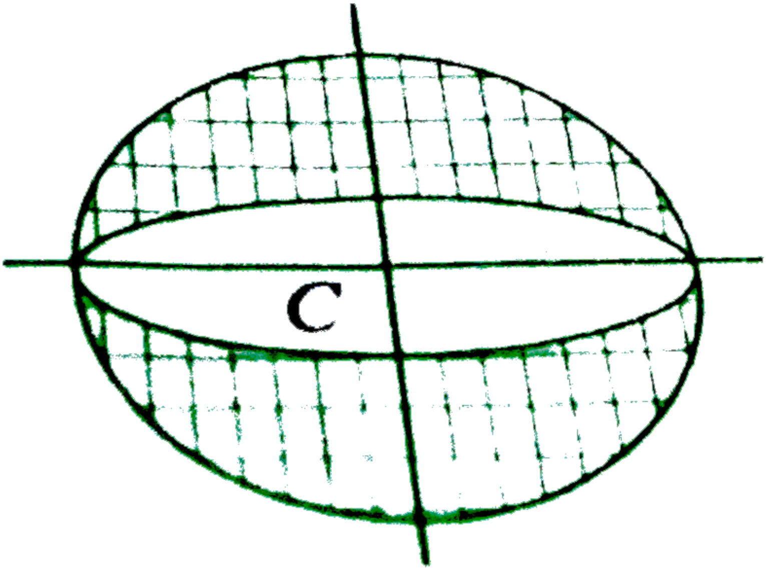
$$1-\frac{b^2}{a^2}=\frac{8}{9} \text{ or } \frac{b^2}{a^2}=\frac{1}{9}$$

Then, the area of circle serves as sample space and area of the shaded region represents the area for favorable cases. Then, required probability is

$$p=\frac{\text{Area of shaded region}}{\text{Area of circle}}$$

$$=\frac{\pi a^2-\pi ab}{\pi a^2}=1-\frac{b}{a}=1-\frac{1}{3}=\frac{2}{3}$$

Now, answer the following questions.



Two persons A and B agree to meet at a place between 5 and 6 pm. The first one to arrive waits for 20 min and then leave. If the time of their arrival be independant and at random, then the probability that A and B meet is

A. $1/3$

B. $1/3$

C. $2/3$

D. $5/9$

Answer: D

View Text Solution

12. If the squares of a 8×8 chess board are painted either red and black at random .The probability that not all squares is any alternating in colour is

A. $\left(1 - 1/2^7\right)^8$

B. $1/2^{56}$

C. $1 - 1/2^7$

D. none of these

Answer: A

Watch Video Solution

13. If the squares of a 8×8 chess board are painted either red and black at random .The probability that not all squares is any alternating in colour is

A. $\frac{.^{64}C_{32}}{2^{64}}$

B. $\frac{64!}{32!.2^{64}}$

C. $\frac{2^{32}-1}{2^{64}}$

D. none of these

Answer: A

Watch Video Solution

14. If the squares of a 8×8 chess board are painted either red and black at random .The probability that not all squares is any alternating in colour is

A. $1/2^{64}$

B. $1/2^{63}$

C. $1/2$

D. none of these

Answer: B

Watch Video Solution

Exercise Matrix

1. n whole numbers are randomly chosen and multiplied. Now, match the following lists.

List I		List II
a. The probability that the last digit is 1, 3, 7, or 9 is	p.	$\frac{8^n - 4^n}{10^n}$
b. The probability that the last digit is 2, 4, 6, 8 is	q.	$\frac{5^n - 4^n}{10^n}$
c. The probability that the last digit is 5 is	r.	$\frac{4^n}{10^n}$
d. The probability that the last digit is zero is	s.	$\frac{10^n - 8^n - 5^n + 4^n}{10^n}$

A. $\begin{matrix} a & b & c & d \\ q & s & s & r \end{matrix}$

B. $\begin{matrix} a & b & c & d \\ r & q & q & p \end{matrix}$

C.
a	b	c	d
q	p	p	s

D.
a	b	c	d
q	s	p	r

Answer: A::B::C::D

View Text Solution

2. Three distinct numbers a, b and c are chosen at random from the numbers 1, 2, ..., 100. The probability that

List I	List II
a. a, b, c are in AP is	p. $\frac{53}{161700}$
b. a, b, c are in GP is	q. $\frac{1}{66}$
c. $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in GP is	r. $\frac{1}{22}$
d. a + b + c is divisible by 2 is	s. $\frac{1}{2}$

A.
a	b	c	d
q	s	s	r

B.
a	b	c	d
r	q	q	p

C.
a	b	c	d
q	p	p	s

D.
a	b	c	d
q	s	p	r

Answer: C

View Text Solution

Exercise Numerical

1. If the probability of a six digit number N whose six digit sare 1,2,3,4,5,6 written as random order is divisible by 6 is $p,$ then the value of $1/p$ is________.

Watch Video Solution

2. If the probability that the product of the outcomes of three rolls of a fair dice is a prime number is $p,$ then the value of $1/(4p)$ is____.

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3. There are two red, two blue, two white, and certain number (greater than 0) of green socks n a drawer. If two socks are taken at random from the drawer4 without replacement, the probability that they are of the same color is 1/5, then the number of green socks are ______.

Watch Video Solution

4. A dice is weighted such that the probability of rolling the face numbered n is proportional to n^2 (n = 1, 2, 3, 4, 5, 6). The dice is rolled twice, yielding the number a and b. The probability that $a > b$ is p then the value of $[2/p]$ (where [.] represents greatest integer function) is ______.

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5. In a knockout tournament 2^n equally skilled players, $S_1, S_2, \ldots. S_{2n}$, are participatingl. In each round, players are divided in pair at random and winner from each pair moves in the next round. If S_2 reaches the semi-final, then the probability that S_1 wins the tournament is 1/84. The value of n equals ______.

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6. Five different games are to be distributed among 4 children randomly. The probability that each child get at least one game is $1/4$ b. $15/64$ c. $5/9$ d. $7/12$

Watch Video Solution

7. A bag contains 10 different balls. Five balls are drawn simultaneously and then replaced and then seven balls are drawn. The probability that exactly three balls are common to the tow draw on is $p,$ then the value of $12p$ is _____.

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Jee Main Previous Year

1. Four numbers are chosen at random (without replacement) from the set {1, 2, 3, ..., 20}. Statement-1: The probability that the chosen numbers when arranged in some order will form an AP Is $\frac{1}{85}$. Statement-2: If the four chosen numbers from an AP, then the set of all possible values of common difference is {1, 2, 3, 4, 5}. (1) Statement-1 is true, Statement-2 is true; Statement-2 is not the correct explanation for Statement-1 (2) Statement-1 is true, Statement-2 is false (3) Statement-1 is false, Statement-2 is true (4) Statement-1 is true, Statement-2 is true; Statement-2 is the correct explanation for Statement-1

A. Statement 1 is false, statement 2 is true.

B. Statement 1 is true, statement 2 is true, statement 2 is a correct explanation for statement 1.

C. Statement 1 is true, statement 2 is true, statement 2 is not a correct explanation for statement 2.

D. Statement 1 is true, statement 2 is false.

Answer: D

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2. An urn contains nine balls of which three are red, four are blue and two are green. Three balls are drawn at random without replacement from the urn. The probability that the three balls have different colour is

A. $\frac{2}{23}$

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

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

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

Answer: C

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3. If two different numbers are taken from the set $\{0, 1, 2, 3, , 10\};$ then the probability that their sum as well absolute difference are both multiple of $4,$ is: $\frac{14}{45}$ (2) $\frac{7}{55}$ (3) $\frac{6}{55}$ (4) $\frac{12}{55}$

A. $\frac{7}{55}$

B. $\frac{6}{55}$

C. $\frac{12}{55}$

D. $\frac{14}{45}$

Answer: B

Watch Video Solution

4. For three events A, B and C, P (Exactly one of A or B occurs) $= P$ (Exactly one of B or C occurs) $= P$ (Exactly one of C or A occurs) $= \frac{1}{4}$ and P (All the three events occur simultaneously) $= \frac{1}{16}$. Then the probability that at least one of the events occurs, is :

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

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

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

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

Answer: C

Watch Video Solution

Jee Advanced Previous Year

1. Let ω be a complex cube root unity with $\omega \neq 1$. A fair die is thrown three times. If $r_1, r_2 and r_3$ are the numbers obtained on the die, then the probability that $\omega^{r1} + \omega^{r2} + \omega^{r3} = 0$ is $1/18$ b. $1/9$ c. $2/9$ d. $1/36$

A. $1/18$

B. $1/9$

C. $2/9$

D. $1/36$

Answer: C

Watch Video Solution

2. Three boys and two girls stand in a queue. The probability, that the number of boys ahead is at least one more than the number of girls ahead of her, is `

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

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

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

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

Answer: A

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3. Three randomly chosen nonnegative integers $x, yandz$ are found to satisfy the equation $x + y + z = 10$. Then the probability that z is even, is: $\frac{5}{12}$ (b) $\frac{1}{2}$ (c) $\frac{6}{11}$ (d) $\frac{36}{55}$

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

B. $\frac{36}{55}$

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

D. $\frac{5}{11}$

Answer: C

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4. Box 1 contains three cards bearing numbers 1, 2, 3; box 2 contains five cards bearing numbers 1, 2, 3,4, 5; and box 3 contains seven cards bearing numbers 1, 2, 3, 4, 5, 6, 7. A card is drawn from each of the boxes. Let x_i be the number on the card drawn from the ith box, i = 1, 2, 3. The probability that $x_1 + x_2 + x_3$ is odd is The probability that x_1, x_2, x_3 are in an aritmetic progression is

A. $\frac{29}{105}$

B. $\frac{53}{105}$

C. $\frac{57}{105}$

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

Answer: B

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5. Box 1 contains three cards bearing numbers 1, 2, 3; box 2 contains five cards bearing numbers 1, 2, 3,4, 5; and box 3 contains seven cards bearing numbers 1, 2, 3, 4, 5, 6, 7. A card is drawn from each of the boxes. Let x_i be the number on the card drawn from the ith box, i = 1, 2, 3. The probability that $x_1 + x_2 + x_3$ is odd is The probability that x_1, x_2, x_3 are in an aritmetic progression is

A. $\frac{9}{105}$

B. $\frac{10}{105}$

C. $\frac{11}{105}$

D. $\frac{7}{105}$

Answer: C

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6. PARAGRAPH A There are five students S_1, S_2, S_3, S_4 and S_5 in a music class and for them there are five seats R_1, R_2, R_3, R_4 and R_5 arranged in a row, where initially the seat R_i is allotted to the student $S_i, i = 1, 2, 3, 4, 5$. But, on the examination day, the five students are randomly allotted five seats. (For Ques. No. 17 and 18) The probability that, on the examination day, the student S_1 gets the previously allotted seat R_1 , and NONE of the remaining students gets the seat previously allotted to him/her is $\frac{3}{40}$ (b) $\frac{1}{8}$ (c) $\frac{7}{40}$ (d) $\frac{1}{5}$

A. $\frac{3}{40}$

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

C. $\frac{7}{40}$

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

Answer: A

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7. PARAGRAPH A There are five students $S_1,\ S_2,\ S_3,\ S_4$ and S_5 in a music class and for them there are five seats $R_1,\ R_2,\ R_3,\ R_4$ and R_5 arranged in a row, where initially the seat R_i is allotted to the student $S_i,\ i = 1,\ 2,\ 3,\ 4,\ 5$. But, on the examination day, the five students are randomly allotted five seats. For $i = 1,\ 2,\ 3,\ 4,$ let T_i denote the event that the students S_i and S_{i+1} do NOT sit adjacent to each other on the day of the examination. Then, the probability of the event $T_1 \cap T_2 \cap T_3 \cap T_4$ is $\frac{1}{15}$ (b) $\frac{1}{10}$ (c) $\frac{7}{60}$ (d) $\frac{1}{5}$

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

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

C. $\frac{7}{60}$

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

Answer: C

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