MATHS

BOOKS - MCGROW HILL EDUCATION MATHS (HINGLISH)

PROBABILITY

Solved Examples Single Correct

1. If 15 boys of different ages are distributed into 3 groups of 4,5, and 6 boys randomly then the probability that three youngest boys are in different groups is

A. $\frac{24}{91}$

B. $\frac{71}{91}$

C. $\frac{67}{91}$

D. $\frac{20}{91}$

Answer: A

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2. A bag contains 6 white and 6 black socks. A man randomly takes out two socks from the bag. The probability that socks are the same colour is:

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

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

C. $\frac{7}{11}$

D. $\frac{4}{11}$

Answer: B

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3. Two numbers are randomly selected from the first 100 natural numbers. The probability that the product of the numbers is divisible by 7 is

A. 0

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

C. $\frac{4859}{4950}$

D. $\frac{91}{4950}$

Answer: C

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4. Let A = {1, 2, 3, 4} and B = {a, b}. A function f : A $\rightarrow$ B is selected randomly. Probability that function is an onto function is

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

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

C. $\frac{7}{8}$

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

Answer: C

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5. Sets A, B, C, $A \cap B$, $A \cap C$, $B \cap C$ and $A \cap B \cap C$ have 35, 40, 45, 13, 12, 14 and 5 elements respectively. An element is selected at random from the set $A \cup B \cup C$. The probability that the selected element belongs to only set A is:

A. $\frac{13}{86}$

B. $\frac{35}{86}$

C. $\frac{5}{86}$

D. $\frac{15}{86}$

Answer: D

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6. If P(A) = 0.4, and P(A $\cap$ B) = 0.15, then P $(A \mid A' \cup B')$ is equal to

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

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

C. $\frac{5}{17}$

D. $\frac{9}{17}$

Answer: C

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

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

B. $\frac{1}{32}$

C. $\frac{5}{512}$

D. $\frac{7}{512}$

Answer: C

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8. 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. $\left[\frac{1}{3}, \frac{2}{9}\right]$

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

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

Answer: C

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9. A number x is chosen at random from the set {1, 2, 3,...., 100}. Define event: A = the chosen number x satisfies $\frac{x-20}{x-40} \geq 2$. Then P(A) is

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

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

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

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

Answer: B

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10. A number x is chosen at random from the set S = (1, 2, 3,....,100).Then the probability that the expression $\sqrt{\frac{x-15}{(x-10)(x-20)}}$ is a positive real number is

A. $11/25$

B. $7/25$

C. $21/25$

D. $17/25$

Answer: C

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Solved Examples Level 1 Single Correct

1. Suppose A and B are two events such that $0 < P(B) < 1$. If $P(A \mid B') = \dfrac{P(A)}{1 - P(B)}$ then which one of the following is not true?

A. $P(A \cap B) = 0$

B. $P(A \cap B) = P(A \cup B)$

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

D. $P(A \mid B) = 0$

Answer: B

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2. A man is known to speak truth 3 out of 4 times. He takes out a card at random from a well shuffled pack of 52 playing cards, and reports it is a king. The probability that its actually a king is

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

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

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

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

Answer: D

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3. Suppose A has 7 fair coins and B has 6 fair coins. If A and B toss these coins simultaneously, then the probability that A and B get equal number of heads is

A. $.^{13}C_6\left(\frac{1}{2}\right)^{13}$

B. $.^{13}C_5\left(\frac{1}{2}\right)^{13}$

C. $.^{13}C_{12}\left(\frac{1}{2}\right)^{13}$

D. $\left(\frac{1}{2}\right)^{13}$

Answer: A

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4. A box X contains 1 white ball, 3 red balls and 2 black balls. Another box Y contains 2 white balls, 3 red balls and 4 black balls. If one ball is drawn from each of the two boxes, then the probability the balls are of different colours is

A. $\frac{19}{54}$

B. $\frac{35}{54}$

C. $\frac{17}{54}$

D. $\frac{37}{54}$

Answer: B

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5. A sample consists of six points S={(I,j)|i=1,2,j=1,2,3}. Suppose P((I,j)) = $\frac{k}{i+j}$. Let A = {(I,j)|i+j=4} and B={(I,j)|j=2} , then P(B|A) is equal to

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

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

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

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

Answer: A

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6. Let A be a set consisting of n elements. The probability of selecting two subsets P and Q of set A such that $Q = \overline{P}$, is

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

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

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

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

Answer: B

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7. Four natural numbers are selected at random and are multiplied. The probability that the product is divisible by 5 or 10 is

A. $\frac{49}{625}$

B. $\frac{369}{625}$

C. $\frac{64}{625}$

D. $\frac{256}{625}$

Answer: B

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8. Six boys and six girls sit in a row randomly. Find the probability that (i) the six girls sit together, (ii) the boys and girls sit alternately.

A. $\frac{1}{231}$

B. $\frac{5}{462}$

C. $\frac{1}{462}$

D. $\frac{7}{101}$

Answer: C

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9. An unbiased die is thrown twice. Let the event A be "odd number on the first throw" and B the event "odd number on the second throw". Check the independence of the events A and B.

A. are mutually exclusive

B. are independent and mutually exclusive

C. are independent

D. none of these

Answer: C

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10. Two events $AandB$ have probabilities 0.25 and 0050, respectively. The probability that both $AandB$ occur simultaneously is 0.14. then the probability that neither A nor$B$ occurs is a. 0.39 b. 0.25 c. 0.11 d. none of these

A. 0.39

B. 0.25

C. 0.11

D. none of these

Answer: A

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11. An anti-aircraft gun can take a maximum of four shots at an enemy plane moving away from it. The probability of hitting the plane at the first, second, third and fourth shots are 0.4, 0.3, 0.2 and 0.1, respectively, What is the probability that the plane is hit when all the four shots are fired? (A) 0.4379 (B) 0.6872 (C) 0.6976 (D) 0.3507

A. 0.6976

B. 0.866

C. 0.922

D. 0.934

Answer: A

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12. are two candidates seeking admission in I.I.T. The probability that P is selected is 0.5 and the probability that both are selected is at most 0.3. Prove that the probability of being selected is at most 0.8

A. 0.6

B. 0.7

C. 0.8

D. 0.9

Answer: C

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

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

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

C. $\frac{1}{28}$

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

Answer: B

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

A. $\frac{1}{65}$

B. $\frac{3}{65}$

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

D. $\frac{4}{65}$

Answer: D

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

A. p=q=1

B. p=q=1/2

C. p=1,q=0

D. p=1,q=1/2

Answer: C

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16. A bag contains a white and b black balls. Two players, $AandB$ alternately draw a ball from the bag, replacing the ball each time after the draw till one of them draws a white ball and wins the game. A begins

the game. If the probability of A winning the game is three times that of B, then find the ratio $a:b$

A. $1:1$

B. $1:2$

C. $2:1$

D. none of these

Answer: C

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17. 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.

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

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

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

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

Answer: B

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18. A fair coin is tossed 100 times. The probability of getting tails an odd number of times is $1/2$ b. $1/8$ c. $3/8$ d. none of these

A. $1/2$

B. $1/8$

C. $3/8$

D. none of these

Answer: A

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19. The probability that at least one of $AandB$ occurs is 0.6. If $AandB$ occur simultaneously with probability 0.3, then find the value of $P(A') + P(B')$.

A. 0.9

B. 1.15

C. 1.1

D. 1.2

Answer: C

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20. An unbiased die with faced marked 1, 2, 3, 4, 5, and 6 is rolled four times. Out of four face value obtained, the probability that the minimum face value is not less than 2 and the maximum face value is not greater than five is then $16/81$ b. $1/81$ c. $80/81$ d. $65/81$

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

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

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

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

Answer: A

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21. Let A and B be two events such that $P(A) = 0.3$ and $P(A \cup B) = 0.8$. If A and B are independent events, then $P(B) =$

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

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

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

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

Answer: C

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

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

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

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

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

Answer: A

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23. E and F are two independent events. The probability that both e and F happen is 1/12 and the probability that neither E nor F happens is 1/2. Then

A. P(E) = 1/3, P(F) = 1/2

B. P(E) = 1/2, P(F) = 2/3

C. P(E) = 2/3, P(F) = 3/4

D. P(E) = 1/4, P(F) = 1/3

Answer: D

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24. A man is known to speak the truth 3 out of 4 times. He throws a dice and reports that it is a six. Find the probability that it is actually a six.

A. $3/8$

B. $1/5$

C. $3/4$

D. none of these

Answer: A

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25. If A is an independent event it self then $P(A) =$

A. 0 or 1

B. $1/2$

C. 0

D. 0,1/2 or 1

Answer: A

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26. If three distinct number are chosen randomly from the first 100 natural numbers, then the probability that all three of them are divisible by both 2 and 3 is $4/25$ b. $4/35$ c. $4/33$ d. $4/1155$

A. $\frac{4}{57}$

B. $\frac{7}{99}$

C. $\frac{4}{1155}$

D. $\frac{1}{1100}$

Answer: C

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27. One ticket is selected at random from 100 tickets numbered 00,01,02,...,98,99. If $x_1, and x_2$ denotes the sum and product of the digits on the tickets, then $P(x_1 = 9/x_2 = 0)$ is equal to $2/19$ b. $19/100$ c. $1/50$ d. none of these

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

B. $\frac{2}{19}$

C. $\frac{2}{21}$

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

Answer: B

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28. If three six-faced fair dice are thrown together, the probability that the sum of the numbers appearing on the dice is 16 is

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

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

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

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

Answer: A

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29. Four persons are selected at random out of 3 men, 2 women and 4 children. The probability that there are exactly 2 children in the selection

is a. 11/21 b. 9/21 c. 10/21 d. none of these

A. $\frac{9}{21}$

B. $\frac{10}{23}$

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

D. $\frac{10}{21}$

Answer: D

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30. A die is thrown. Let A be the event that the number obtained is greater than 3. Let B be the event that the number obtained is less than 5. Then $P(A \cup B)$ is (1) $\frac{3}{5}$ (2) 0 (3) 1 (4) $\frac{2}{5}$

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

B. 0

C. 1

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

Answer: C

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

C. P(A)+P(B)

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

Answer: A

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32. If A and B are two events such that P(A) $>$ 0 and P(B) $<$ 1, then P($A \mid \overline{B}$) is equal to

A. $1 - P(\overline{A} \mid B)$

B. $1 - P(A \mid B)$

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

D. $1 - P(\overline{A} \mid \overline{B})$

Answer: D

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33. For a biased die, the probabilities for the different faces to turn up are given by the table

Face	1	2	3	4	5	6
Probability	0.1	0.32	0.21	0.15	0.05	0.17

The die is thrown and you are told that either the face 1 or the face 2 has turned up, then the probability that it is face 1, is

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

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

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

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

Answer: D

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34. A six-faced dice is so biased that it is twice as likely to show an even number as an odd number when thrown. It is thrown twice, the probability that the sum of two numbers thrown is even is $1/12$ b. $1/6$ c. $1/3$ d. $5/9$

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

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

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

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

Answer: D

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35. In shuffling a pack of 52 playing cards, four are accidently dropped; find the chance that the missing cards should be one from each suit.

A. $\frac{1}{20825}$

B. $\frac{2197}{20825}$

C. $\frac{1}{256}$

D. $\frac{301}{20825}$

Answer: B

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36. The probability that a man who is 85 years old will die before attaining the age of 90 is 1/3. Four persons A_1, A_2, A_3 and A_4 are 85 years old. The

probability that A_1 will die before attaining the age of 90 and will be the first to die is

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

B. $\frac{13}{81}$

C. $\frac{65}{324}$

D. $\frac{13}{108}$

Answer: C

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37. Three persons A, B and C speak at a function along with 5 other persons. If the persons speak at random, find the probability that A speaks before B and B speaks before C

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

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

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

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

Answer: D

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38. The probability that a man will live 10 more years is $1/4$ and the probability that his wife will live 10 more years is $1/3$. Then the probability that neither will be alive in 10 years, is

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

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

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

D. $\frac{11}{12}$

Answer: B

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

A. $\frac{3}{29}$

B. $\frac{3}{55}$

C. $\frac{5}{29}$

D. $\frac{47}{87}$

Answer: D

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40. If m is a natural 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. $\frac{2}{3}$

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

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

Answer: C

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41. If two events A and B such that $P(A') = 0.3$, $P(B) = 0.5$ and $P(A \cap B) = 0.3$, then $P(B/A \cup B')$ is

A. 0.6

B. 0.32

C. 0.31

D. 0.28

Answer: A

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42. 7 white balls and 3 black balls are kept randomly in order. Find the probability that no two adjacent balls are black.

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

B. $\frac{7}{15}$

C. $\frac{2}{15}$

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

Answer: B

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

A. $\frac{13}{32}$

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

C. $\frac{1}{32}$

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

Answer: A

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44. There are four machines and it is known that eactly two of them are faulty. They are tested, one by one, in a random order till both the faulty machines are identified. The probability that only two tests are needed is (A) $\frac{1}{6}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{1}{4}$

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

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

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

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

Answer: A

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

A. $P(E|F')+P(E'|F')=1$

B. $P(E|F)+P(E|F')=1$

C. $P(E'|F)+P(E|F')=1$

D. none of these

Answer: A

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

A. 0.936

B. 0.784

C. 0.904

D. 0.788

Answer: B

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47. Fifteen coupens are numbered $1, 2, 3, \ldots 15$ respectively. Seven coupons are selected at random one at a time with replacement The Probability that the largest number appearing on a selected coupon is 9 is :

A. $\left(\frac{9}{15}\right)^6$

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

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

D. none of these

Answer: D

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48. If A and B toss 3 coins each, The probability that both get equal number of heads is

A. $3/8$

B. $1/9$

C. $5/16$

D. none of these

Answer: C

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49. The probability that a student is not a swimmer is $\frac{1}{5}$. What is the probability that out of 5 students, 4 are swimmers?

A. $\left(\frac{4}{5}\right)^3$

B. $\left(\frac{4}{5}\right)^4$

C. $.^5C_4\left(\frac{4}{5}\right)^4$

D. $\left(\frac{3}{4}\right)^3$

Answer: B

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

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

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

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

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

Answer: D

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51. Number of times a fair coin must be tossed so that the probabaility of getting at least one head is at least 0.95 is

A. 5

B. 6

C. 7

D. 12

Answer: A

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52. 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?

A. $\frac{8m}{8N+m}$

B. $\frac{m}{8N+m}$

C. $\frac{9m}{8N+m}$

D. $\frac{9N}{8N+m}$

Answer: C

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53. The probability of India winning a test match against West Indies is 1/2. Assuming independence from match to match, find the probability that in a match series Indias second win occurs at the third test.

A. $1/8$

B. $1/4$

C. $1/2$

D. $2/3$

Answer: B

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54. If $0 < P(A) < 1, 0 < P(B) < 1$ and $P(A \cup B) = P(A) + P(B) - P(A)P(B)$, then

A. P(A|B)=0

B. P(B|A)=0

C. $P(A' \cap B') = P(A')P(B')$

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

Answer: C

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55. If $A_1, A_2, \ldots, A_n$ are n independent events, such that $P(A_i) = \frac{1}{i+1}, i = 1, 2, \ldots, n$, then the probability that none of $A_1, A_2, \ldots, A_n$ occur, is

A. $\frac{n}{n+1}$

B. $\frac{1}{n+1}$

C. $\frac{1}{n!}$

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

Answer: B

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56. A four digit number (numbered from 0000 to 9999) is said to be lucky if sum of its first two digits is equal to the sum of its last two digits. If a four digit number is picked up at random then the probability that it is lucky number is :-

A. 0.065

B. 0.064

C. 0.066

D. 0.067

Answer: D

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57. 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:

A. $\frac{11}{30}$

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

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

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

Answer: B

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58. One ticket is selected at random from 50 tickets numbered 00, 01, 02, ... , 49. Then the probability that the sum of the digits on the selected ticket is 8, given that the product of these digits is zero, equals (1) 1/14 (2) 1/7 (3) 5/14 (4) 1/50

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

B. $\frac{1}{50}$

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

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

Answer: C

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

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

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

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

Answer: D

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

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

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

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

Answer: C

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61. A signal which can be green or red with probability $\frac{4}{5}$ and $\frac{1}{5}$ respectively, is received by station A and then and 3 transmitted to station B. The probability of each station receiving the signal correctly is $\frac{3}{4}$ If the signal received at station B is green, then the probability that the original signal was green is (a) $\frac{3}{5}$ (b) $\frac{6}{7}$ (d) $\frac{20}{23}$ (d) $\frac{9}{20}$

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

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

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

D. $\frac{9}{20}$

Answer: C

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62. Three numbers are chosen at random from the numbers 1, 2. ... 20. The probability that the arithmetic mean of these numbers is 4 is

A. $7/2280$

B. $3/4$

C. $2/7281$

D. 0

Answer: A

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63. An unbiased cubical die is thrown 5 times. The probability that the maximum number appearing on the die is 4 is

A. $7/6^5$

B. $1023/6^5$

C. $3781/6^5$

D. $1781/6^5$

Answer: B

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64. Let A and B be two events such that P(A) = 3/7, P(B) = 4/7 and P(A ∪ B) = 5/7, Then $\frac{P(A \mid B)}{P(A' \mid B)}$ equals

A. $1/3$

B. $2/3$

C. $1/2$

D. $3/8$

Answer: C

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65. If A,B and C are three independent events such that

P(A)=P(B)=P(C)=p,

then P (atleast two of A,B and C occur)=$3p^2 - 2p^3$

A. $2p^2 - 3p^3$

B. $3p^2 - 2p^3$

C. $p^2 - p^3$

D. $2p^2 - p^3$

Answer: B

Watch Video Solution

66. A and B are two students. Their probabilities of solving a problem correctly are 1/4 and 1/5 respectively. If the probability of their making a common error is 1/40, and they obtain the same answer, then the probability of their answer is correct is

A. $1/12$

B. $1/20$

C. $10/13$

D. $13/200$

Answer: C

Watch Video Solution

67. Suppose A and B are two events such that P(A) $\neq$ 0, P(B) $\neq$ 0, then

A. P(A|B)=P(A)/P(B)

B. P(A|B)=$P(A \cap B)/P(B)$

C. P(A|B). P(B/A)=1

D. P(A/B)=P(A)P(B)

Answer: B

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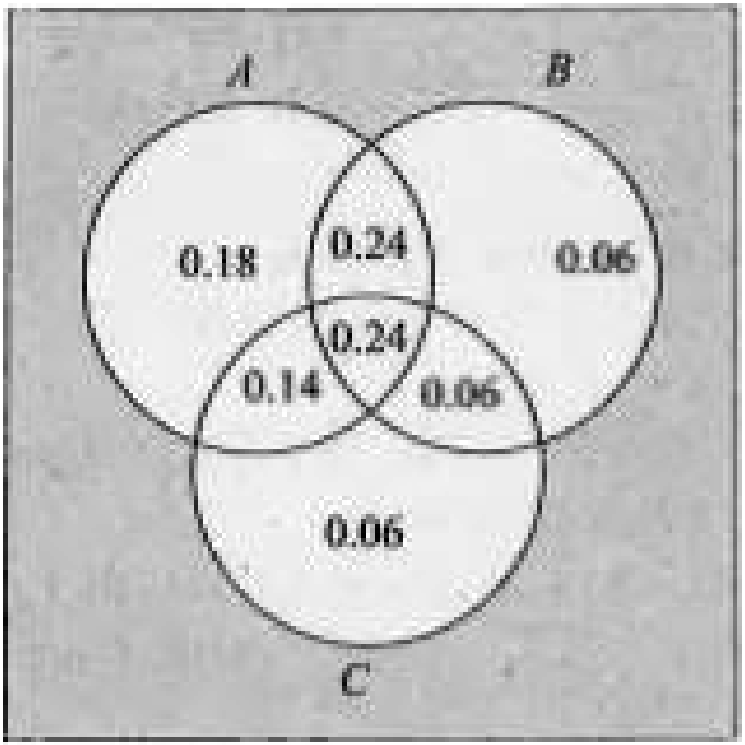
68. Fig. 24.8 shows three events A, B and C. Probabilities of different events are shown in the figure. For instance,

$P(A \cap B' \cap C')$=0.18 , $P(A' \cap B \cap C')$= 0.06 etc.



Which of the following is not true ?

A. A and B are independent

B. B and C are independent

C. A and C are independent

D. A and B $\cap$ C are independent

Answer: C

Watch Video Solution

69. A fair die is tossed repeated until a six is obtained. Let X denote the number of tosses required.

The probability that $X \geq 3$ is

A. $\frac{125}{216}$

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

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

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

Answer: D

Watch Video Solution

70. if $P(A) = 0.4$, $P(B') = 0.6$ and $P(A \cap B) = 0.15$ then the value of $P(A \mid A' \cup B')$ is K. The value of 17 K is equal to.

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

B. $\frac{5}{17}$

C. $\frac{10}{17}$

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

Answer: B

Watch Video Solution

71. Consider 5 independent Bernoulli.s trials each with probability of success p. If the probability of at least one failure is greater than or equal to $\frac{31}{32}$, then p lies in the interval : (1) $\left(\frac{1}{2}, \frac{3}{4}\right]$ (2) $\left(\frac{3}{4}, \frac{11}{12}\right]$ (3) $\left[0, \frac{1}{2}\right]$ (4) $\left(\frac{11}{12}, 1\right]$

A. [11/12,1]

B. [1/2,3/4]

C. [3/4,11/12]

D. [0,1/2]

Answer: D

Watch Video Solution

72. If C and D are two events such that $C \subset D$and P(D) is not equal to 0,` then the correct statement among the following is

A. $P(C/D) = \frac{P(C)}{P(D)}$

B. P(C/D)=P(C)

C. $P(C/D) \geq P(C)$

D. $P(C/D) < P(C)$

Answer: A

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73. 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 (1) $\frac{3}{8}$ (2) $\frac{1}{5}$ (3) $\frac{1}{4}$ (4) $\frac{2}{5}$

A. $1/5$

B. $1/4$

C. $2/5$

D. $3/8$

Answer: A

Watch Video Solution

74. Ten unbiased coins are thrown simultaneously. The probability of getting at least seven heads is

A. $\frac{3}{64}$

B. $\frac{5}{64}$

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

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

Answer: D

Watch Video Solution

75. 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 at least one of the selected persons will be a woman is

A. $5/13$

B. $10/13$

C. $14/39$

D. $25/39$

Answer: D

Watch Video Solution

76. Four persons A, B, C, D are to speak at a function along with 6 others. If they all speak in random order, the probability that A speaks before B, B before C, C before D is

A. $1/4$

B. $1/6$

C. $1/24$

D. $1/16$

Answer: C

View Text Solution

77. Let A, B, C be pariwise independent events with $P(C) > 0$ and $P(A \cap B \cap C) = 0$. Then $P\left(\frac{A^c \cap B^c}{C}\right)$.

A. P(A)-P(B')

B. P(A')+P(B')

C. P(A')-P(B')

D. P(A')-P(B)

Answer: D

Watch Video Solution

78. Four fair dice D_1, D_2, D_2 and D_4 each having six faces numbered 1, 2, 3, 4, 5 and 6 are rolled simultaneously. The probability that shows a number appearing on one of D_1, D_2 and D_2 is:

A. $\frac{91}{216}$

B. $\frac{108}{216}$

C. $\frac{125}{216}$

D. $\frac{127}{216}$

Answer: A

Watch Video Solution

79. Let A and B be two events such that P(A|B)=1/2 , P(B|A)=1/3, $P(A \cap B)$ =1/6 , then

A. $P(A \cup B) = 1/2$

B. A and B are independent

C. $P(A' \cup B)$=1/3

D. none of these

Answer: B

Watch Video Solution

80. A ship is fitted with three engines E_1, E_2, and E_3,. The engines function independently of each other with respective probabilities $\frac{1}{2}, \frac{1}{4}$

and $\frac{1}{4}$,and For the ship to be operational at least two of its engines must function. Let X denote the event that the ship is operational and let X_1, X_2, and X_3 denote respectively the events that the engines E_1, E_2 and E_3,are functioning. Which of the following is (are) true?

A. $P(X'_1 / X) = 3/8$

B. $P(X / X_2) = 7/8$

C. P (Exactly two engines are functioning)=7/8

D. $P(X / X_1) = 7/16$

Answer: D

Watch Video Solution

Solved Examples Level 2 Straight Objective Correct

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

A. 0.84

B. 0.16

C. 0.62

D. 0.38

Answer: A

View Text Solution

2. A person write 4 letters and addresses 4 envelopes. If the letters are placed in the envelopes at random, then the probability that all letters are not placed in the right envelopes, is a. 1/4 b. 11/24 c. 15/24 d. 23/24

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

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

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

D. $\frac{23}{24}$

Answer: D

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3. A letter is known to come either from TATANAGAR or CALCUTTA. On the envelope, Just to consecutive letters TA are visible. What is the probability that the letter came from (i) TATANAGAR (ii) CALCUTTA

A. $\frac{4}{11}$

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

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

D. $\frac{7}{19}$

Answer: A

Watch Video Solution

4. A fair coin is tossed n times. if the probability that head occurs 6 times is equal to the probability that head occurs 8 times, then find the value of n.

A. 24

B. 48

C. 14

D. 16

Answer: C

Watch Video Solution

5. If the standard deviation of the binomial distribution $(q+p)^{16}$ is 2, then mean of the distribution is

A. 6

B. 8

C. 10

D. 12

Answer: B

Watch Video Solution

6. If A and B are two events such that $P(A \cup B) = 3/4, P(A \cap B) = 1/4, P(A') = 2/3$, then $P(A' \cup B)$ is

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

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

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

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

Answer: A

View Text Solution

7. A die is tossed 5 times. Getting and odd number is cosidered a success. Then, the variance of distribution of success, is

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

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

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

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

Answer: D

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8. The mean and variance of a random variable X having a binomial distribution are $4 \text{ and } 2$ respectively. The $P(X=1)$ is

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

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

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

D. $\frac{1}{32}$

Answer: D

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9. 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.

A. $1/3 \leq p \leq 1/2$

B. $1/4 \leq p \leq 1/3$

C. $-1 \leq p \leq 1/5$

D. $-2 \leq p \leq 1/3$

Answer: A

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10. A letter is taken out at random from 'ASSISTANT and another is taken out from 'STATISTICS. The probability that they are the same letters, is

A. $1/45$

B. $13/90$

C. $19/90$

D. $5/18$

Answer: C

Watch Video Solution

11. For the three events

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

and

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

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

A. $\frac{3p + 2p^2}{2}$

B. $\frac{p + 3p^2}{4}$

C. $\frac{p + 3p^2}{2}$

D. $\frac{3p + 2p^2}{4}$

Answer: A

Watch Video Solution

12. Let A, B, C be three mutually independent events. Consider the two statements $S_1 and S_2 \cdot S_1 : A and B \cup C$ are independent $S_2 : A and B \cap C$ are independent Then, a. both $S_1 and S_2$ are true b. only S_1 is true c. only S_2 is true d. neither $S_1 n$ or S_2 is true

A. Both S_1 and S_2 are true

B. Only S_1 is true

C. Only S_2 is true

D. Neither S_1 nor S_2 is true.

Answer: A

Watch Video Solution

13. Three identical dice are rolled. The probability that same number appears on them, is

A. $1/6$

B. $1/36$

C. $1/18$

D. $3/28$

Answer: B

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14. A bag contains some white and some black balls, all combinations of balls being equally likely. The total number of balls in the bag is 10. If

there ball are drawn at random without replacement and all of them are found to be black, the probability that eh bag contains 1 white and 9 black balls is $14/55$ b. $12/55$ c. $2/11$ d. $8/55$

A. $14/55$

B. $12/55$

C. $2/11$

D. $8/55$

Answer: A

Watch Video Solution

Solved Examples Numerical Answer

1. Three numbers are drawn at random successively without replacement from a set S = {1, 2,..... 10}. Let p be the probability that the minimum of the chosen is 4 or their maximum is 8, then 4p = _____

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2. A bag P contains 5 distinct white and 3 distinct black balls. Four balls are drawn from P and put in an empty bag Q. A ball is drawn from Q and is found to be black. Let p denote the probability that all the three black balls are transferred to bag Q, then 7p = _____

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3. Suppose A, B and C are three mutually exclusive and exhaustive events such that 3P(A) = 2P(B) and P(B) = 2P(C), then $\frac{1}{P(A \cup B)}$=_____

Watch Video Solution

4. The probability distribution of a random variable X is given by

x	3	5	7	9
$P(X=x)$	k	$2k$	$3k$	$4k$

Then $\frac{1}{2\sigma} =$

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5. Suppose E_1 and E_2 are two events of a sample space such that $P(E_1) = \frac{1}{2}, P(E_2 \mid E_1) = \frac{1}{2}, P(E_1 \mid E_2) = \frac{1}{4}$ then $P(E'_2)$= _____

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6. If A and B are two events such that P((A $\cup$ B)')=$\frac{1}{6}$, $P(A \cap B) = \frac{1}{4}$ and P(A')=$\frac{1}{4}$, then P(A) and P(B) are

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7. For a random variable X if P(X=k) = $4\left(\frac{k+1}{5^k}\right)a$, for k=0,1,2,...then a= _____

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8. A student has to appear in two examinations A and B. The probabilities that the student clears A and B are $\frac{2}{3}$ and $\frac{3}{4}$ respectively. Let p be the probability that he passes both of them, given that he passes at least one of them, then 5.5p = _____

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9. Suppose P(A)=0.6, $P(A \cup B) = P(A \cap B)$, then 6.1P (A $\cap$ B) + 4.2 P(B) is equal to ___

View Text Solution

10. If A, B are two events such that $P(A') = 0.3, P(B) = 0.4$ and $P(A \cap B') = 0.5$, then $P(A \cup B')$ is equal to

Watch Video Solution

11. Suppose A and B are two events and P(B) = p, P(A) = p^2 where 0 $<$ p $<$ 1. If the odds against A are the cubes of the odds against B, then 6p-1.2 is equal to _____

Watch Video Solution

12. A man takes a step forward with probability 0.7 and backward with probability 0.3. If the man takes 12 steps, and let the probability that he is just one step away from his initial position be p, then 13.23 - 15p is equal to ____

Watch Video Solution

13. Three persons enter a lift and can leave the lift at any of the 8 floors. Let p be the probability that they leave the lift at different floors, then $\frac{16}{7}p$ is equal to _____

Watch Video Solution

14. In a group of 3 persons, if p is the probability that at least two of them have the same birthdays, then $(365)^p$ - 1,085 is equal to _____

Watch Video Solution

15. Each coefficient in the equation $ax^2 + bx + c = 0$ is obtained by rolling a die. Find the probability that the equation has equal roots.

Watch Video Solution

16. Out of 3n consecutive natural numbers m, m+ 1, m + 2, .., m + 3n – 1, three are selected at random without replacement. Let p be the probability that sum of the three numbers is divisible by 3. If $p = \frac{31}{91}$, then n is equal to ____

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17. A student can pass test 1 with a probability of $\frac{3}{4}$. For the next three tests, the probability of passing in test $k(k \geq 2)$ depends on his passing test (k-1).

If he passes test (k 1), then probability of passing test k is $\frac{3}{4}$ otherwise $\frac{1}{4}$.

Let p be the probability that he passes at least three tests out of first four, then $\frac{16}{27}p$ is equal to ____

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18. A bag contains three tickets numbered 1, 2 and 3. A ticket is drawn at random its number is noted and is put back in the bag. This is done 4 times. Let p denote the probability that sum of the numbers on tickets is odd, then $\frac{2}{p}$ is equal to _____

Watch Video Solution

19. The minimum number of times a fair coin needs to be tossed, so that the probability of getting at least two heads is at least $0.96,$ is _____.

Watch Video Solution

20. Three six-faced dice are thrown together. The probability that the sum of the numbers appearing on the dice is $k(9 \leq k \leq 14)$, is

Watch Video Solution

21. There are n different objects 1, 2, 3, ..., n distributed at random in n places marked 1, 2, 3,..., n. If p be the probability that atleast three of the object occupy places corresponding to their number, then the value of 6p is

Watch Video Solution

Exercises Single Correct Answer

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

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

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

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

Answer: A

Watch Video Solution

2. Two events A and B are such that P(B) = 0.55 and P(A $\cap$ B') = 0.15, then probability that at least one of A, B occurs is

A. 0.70

B. 0.20

C. 0.35

D. 0.30

Answer: A

Watch Video Solution

3. Two numbers are randomly selected from the first 100 natural numbers.

The probability the product is divisible by 17 is

A. $\frac{931}{990}$

B. $\frac{97}{990}$

C. $\frac{101}{990}$

D. $\frac{879}{990}$

Answer: B

Watch Video Solution

4. Out of 30 consecutive integers 2 are choosen at random. Find the probability so that their sum is odd.

A. $\frac{14}{29}$

B. $\frac{15}{29}$

C. $\frac{1}{29}$

D. $\frac{3}{29}$

Answer: B

Watch Video Solution

5. Suppose A and B are two events such that P(A) = 0.5 and P(B) = 0.8, then which one of the following is not true?

A. $P(A \cap B) \leq 0.5$

B. $P(A \cap B) \geq 0.3$

C. $P(A' \cap B) \leq 0.5$

D. $P(A \cap B') \leq 0.1$

Answer: D

Watch Video Solution

6. Let A, B and C be three events and suppose that simultaneous occurrence of A and B implies the occurrence of C, then

A. $P(C) \geq P(A) + P(B)$

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

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

D. none of these

Answer: B

View Text Solution

7. Let A and B be two events such that P(A|B) $=\frac{1}{2}$, P(B|A)$=\frac{1}{3}$ and $P(A \cap B) = \frac{1}{6}$, then which one of the following is not true?

A. $P(A \cup B) = \frac{2}{3}$

B. A and B are independent

C. A and B are not independent

D. $P(A' \cap B) = \frac{1}{6}$

Answer: C

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8. An urn contains four balls bearing numbers 1, 2, 3 and 123 respectively. A ball is drawn at random from the urn. Let E_i, i = 1, 2, 3 denote the event that digit i appears on the ball drawn. Which one of the following is not true?

A. E_1 and E_2 are independent

B. E_2 and E_3 are independent

C. E_3 and E_1 are independent

D. E_1, E_2, E_3 are independent

Answer: D

Watch Video Solution

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

B. $\frac{n+1}{2^n}$

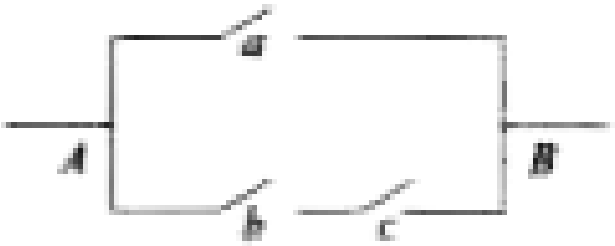
C. $\frac{n!}{2^n}$

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

Answer: A

Watch Video Solution

10. Consider the circuit



If the probability that a circuit is closed is p and the probability that current flows from A to B is 4/9, then value of p is

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

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

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

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

Answer: C

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Exercises Level 1 Single Correct Answer

1. A bag contains 100 tickets numbered 1 to 100. If one ticket is picked up at random, then the probability that the number is divisible by 3 or 5 is

A. 0.47

B. 0.53

C. 0.52

D. 0.61

Answer: A

Watch Video Solution

2. Suppose n students appear in an examination. Let X = the number of students who pass the examination. Suppose $P(X = k) = \lambda k^2$, then

value of λ is

A. $\frac{2}{n(n+1)}$

B. $\frac{6}{n(n+1)(2n+1)}$

C. $\frac{4}{n^2(n+1)^2}$

D. $\frac{2n+1}{n^2(n+1)^2}$

Answer: B

Watch Video Solution

3. Suppose two numbers a and b are chosen randomly from the set {1, 2, 3, 4, 5, 6}. The probability that function $f(x) = x^3 + ax^2 + bx$ is strictly increasing function on R is:

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

B. $\frac{2}{15}$

C. $\frac{13}{15}$

D. $\frac{14}{15}$

Answer: C

Watch Video Solution

4. Two dice are rolled together and the numbers x, y on them form complex number z = x + iy. The probability that $|z| \leq 3$ is

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

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

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

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

Answer: C

Watch Video Solution

5. Suppose A is an event which is independent of itself and B is any other event, then

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

B. $P(A \cap B) < P(B)$

C. $P(A \cap B) = 0$

D. $P(A' \cup B') = 1$

Answer: A

View Text Solution

6. Six boys and six girls sit in a row randomly. Find the probability that (i) the six girls sit together, (ii) the boys and girls sit alternately.

A. $\frac{1}{132}$

B. $\frac{7}{462}$

C. $\frac{5}{462}$

D. $\frac{1}{924}$

Answer: A

Watch Video Solution

7. 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.

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

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

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

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

Answer: B

Watch Video Solution

8. Out of 20 consecutive integers, two are chosen at random. The probability that their product is odd is

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

B. $\frac{9}{38}$

C. $\frac{2}{19}$

D. $\frac{7}{19}$

Answer: B

Watch Video Solution

9. An experiment has 10 equally likely outcomes. Let A and B be two non-empty events of the experiment. If a consists of 4 outcomes, the number of outcomes that B must have so that A and B are independent , is

A. 2,4 or 8

B. 3,6 or 9

C. 4 or 8

D. 5 or 10

Answer: D

Watch Video Solution

10. A box contains 24 identical balls of which 12 are white and 12 are black. The balls are drawn at random from the box one at a time with replacement. The probability that a white ball is drawn for the 4th time on the 7th draw is $5/64$ b. $27/32$ c. $5/32$ d. $1/2$

A. $\frac{5}{64}$

B. $\frac{27}{32}$

C. $\frac{5}{32}$

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

Answer: C

Watch Video Solution

11. India plays two matches each with West Indies and Australia. In any match the probabilities of India getting points $0, 1 \text{ and } 2$ are $0.45, 0.05 \text{ and } 0.50$ respectively. Assuming that the outcomes are independent, the probability of India getting at least 7 points is (a) 0.8750 (b) 0.0875 (c) 0.0625 (d) 0.0250

A. 0.875

B. 0.0875

C. 0.0625

D. 0.0250

Answer: B

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12. If E and F are two events associated with a random experiment for which P(E)=0.6, $P(E \cup F) = 0.85$ and $P(E \cap F)$=0.42 , then P(F) is

A. 0.6

B. 0.67

C. 0.7

D. 0.73

Answer: B

Watch Video Solution

13. If E and F are events with P(E) $\leq$ P(F) and P(E $\cap$ F) $>$ 0, then

A. occurrence of E $\Rightarrow$ occurrence of F

B. occurrence of F $\Rightarrow$ occurrence of E

C. non-occurrence of E $\Rightarrow$ non-occurrence of F

D. none of the above implication hold

Answer: D

Watch Video Solution

14. If the integers m and n are chosen at random between 1 and 100, then the probability that a number of the form $7^m + 7^n$ is divisible by 5, equals :

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

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

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

D. $\frac{1}{49}$

Answer: A

Watch Video Solution

15. The probabilities that a student passes in Mathematics, Physics and Chemistry are m, p and c respectively. Of these subjects the student has 75% chance of passing in at least one subject, 50% chance of passing in at least two and 40% chance of passing in exactly two. which is true?

A. $p+m+c=\frac{19}{20}$

B. $p+m+c=\frac{27}{20}$

C. $\pm c=\frac{1}{3}$

D. $\pm c=\frac{1}{7}$

Answer: B

Watch Video Solution

16. One ticket is selected at random from 100 tickets numbered 00, 01, 02,.., 99. Suppose A and B are the sum and product of the digit found on the ticket. Then $P(A=7/B=0)$ is given by

A. $\frac{2}{13}$

B. $\frac{2}{19}$

C. $\frac{1}{50}$

D. $\frac{3}{19}$

Answer: B

Watch Video Solution

17. 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.

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

B. $\frac{1}{n!}$

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

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

Answer: C

Watch Video Solution

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

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

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

D. $\frac{13}{50}$

Answer: B

Watch Video Solution

19. A bag contains $(2n+1)$ coins. It is known that n of these coins have a head on both sides whereas the rest of the coins are fair. A coin is picked up at random from the bag and is tossed. If the probability that the toss results in a head is $\frac{31}{42}$, determine the value of n.

A. 10

B. 11

C. 12

D. 13

Answer: A

Watch Video Solution

20. If X and Y are independent binomial vatiates $B\left(5, \frac{1}{2}\right)$ and $B\left(7, \frac{1}{2}\right)$ and the value of $P(X+Y=3)$ is

A. $\frac{55}{1024}$

B. $\frac{55}{4098}$

C. $\frac{55}{2048}$

D. $\frac{55}{128}$

Answer: A

Watch Video Solution

21. Suppose n ($\geq$ 3) persons are arranged in a row. The probability that two particular persons are not together is

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

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

C. $1-\frac{1}{n}$

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

Answer: A

Watch Video Solution

22. A number x is chosen at random from the set {1, 2, 3, ..., 100). Let p = probability that x is divisible by 19 and q = probability that x is divisible by 31, then p + q is equal to

A. 0.05

B. 0.06

C. 0.07

D. 0.08

Answer: D

Watch Video Solution

23. If the letters of the word PROBABILITY are written down at random in a row, the probability that two B-s are retogether is

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

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

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

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

Answer: A

Watch Video Solution

24. If four positive integers are taken at random and multiplied together, then the probability that the last digit is 1, 3, 7 or 9 is

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

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

C. $\frac{1}{625}$

D. $\frac{16}{625}$

Answer: D

View Text Solution

25. Two contestants play a game as follows: each is asked to select a digit from 1 to 9. If the two digits match they both win a prize. The probability that they will win a prize in a single trial is

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

B. $\frac{7}{81}$

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

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

Answer: C

Watch Video Solution

26. If A and B are two events, then which of the following does not represent the probability that exactly one of A, B occurs is

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

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

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

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

Answer: A

Watch Video Solution

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

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

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

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

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

Answer: D

Watch Video Solution

28. A sum of money is rounded off to the nearest rupee, find the probability that the round off error is at least ten paise.

A. $\frac{10}{101}$

B. $\frac{11}{101}$

C. $\frac{12}{101}$

D. $\frac{21}{100}$

Answer: D

Watch Video Solution

29. An electric bulb will last for 150 days or with a probability 0.7 and it will last formost 160 days with probability 0.8.probability that the bulb will last between 150 and 160 days is

A. 0.5

B. 0.3

C. 0.56

D. 0.28

Answer: A

Watch Video Solution

30. In a bag there are three tickets numbered 1,2,3. A ticket is drawn at random and put back, and this is done four times. The probability that the sum of the numbers is even, is

A. $\frac{40}{81}$

B. $\frac{41}{81}$

C. $\frac{14}{27}$

D. $\frac{13}{81}$

Answer: B

Watch Video Solution

31. Two natural numbers x and y are chosen at random from the set $\{1, 2, 3, 4, \ldots 3n\}$. find the probability that $x^2 - y^2$ is divisible by 3.

A. $\frac{(3N-1)}{3N}$

B. $\frac{(N-1)}{N}$

C. $\frac{(5N-3)}{(9N-3)}$

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

Answer: C

Watch Video Solution

32. Three persons A, B and C are to speak at a function along with 7 other persons. The probability that A, B, and C speak together

A. $\frac{3}{70}$

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

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

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

Answer: B

View Text Solution

33. A positive integer is chosen at random. The probability that the sum of the digits of its square is 33 is

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

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

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

D. 0

Answer: D

View Text Solution

34. Consider a lottery that sells n^2 tickets and awards n prizes. If one buys n tickets the probability of A his winning is i.e., getting at least one prize is

A. $\frac{(n^2-n)!}{(n^2)!}$

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

C. $\frac{(n-1)!^2}{(n^2)!}$

D. none of these

Answer: D

Watch Video Solution

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

Answer: C

Watch Video Solution

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

A. $\frac{5}{72}$

B. $\frac{5}{54}$

C. $\frac{13}{216}$

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

Answer: B

Watch Video Solution

37. If $\frac{1+4p}{4}, \frac{1-p}{3}$ and $\frac{1-2p}{2}$ are the probabilities of three mutually exclusive events then values of p may be

A. $\frac{1}{3} \leq p \leq \frac{1}{2}$

B. $\frac{1}{2} \leq p \leq \frac{2}{3}$

C. $\frac{1}{6} \leq p \leq \frac{1}{2}$

D. $0 \leq p \leq \frac{1}{2}$

Answer: D

Watch Video Solution

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

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

B. $\frac{9}{25}$

C. $\frac{9}{17}$

D. 0

Answer: B

Watch Video Solution

39. A is a set containing n elements. Two subsets P and Q of A are chosen at random. (P and Q may have elements in common). The probability that $P \cap Q = \phi$ is

A. $\left(\frac{3}{4}\right)^n$

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

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

D. none of these

Answer: A

View Text Solution

40. Suppose A is a set containing n elements. Two subsets P and Q of A are chosen at random. If the probability that P is a subset of Q is 243/1024, then n is equal to

A. 3

B. 4

C. 5

D. 6

Answer: C

Watch Video Solution

41. Three of six vertices of a regular hexagon are chosen at random. The probability that the triangle with three vertices is equilateral is $1/2$ b. $1/5$ c. $1/10$ d. $1/20$

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

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

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

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

Answer: C

Watch Video Solution

42. Each of the n urns contains 4 white and 6 black balls. The $(n+1)$ th urn contains 5 white and 5 black balls. One of the $n+1$ urns is chosen at random and two balls are drawn from it without replacement. Both the balls turn out to be black. If the probability that the $(n+1)$ th urn was chosen to draw the balls is 1/16, then find the value of n .

A. 10

B. 11

C. 12

D. 13

Answer: A

Watch Video Solution

43. Two integers x and y are chosen with replacement out of the set {0, 1, 2, . . . 10}. The probability that |x - y| doesn't exceed 5 is

A. $\frac{8}{11}$

B. $\frac{7}{11}$

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

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

Answer: A

Watch Video Solution

44. In a test, an examinee either guesses or copies or knows the answer to a multiple choice question with four choices. The probability that he makes a guess is 1/3 and the probability that he copies the answer is p. The probability that his answer is correct, given that he copied it, is 1/8. If the probability that he knew the answer to question, given that he correctly answered is 8/11, then value of p is

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

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

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

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

Answer: B

Watch Video Solution

45. An unbiased coin is tossed n times. Let X denote the number of times head occurs. If $P(X=4), P(X=5)$ and $P(X=6)$ are in A.P, then the

value of n can be

A. 7

B. 10

C. 12

D. 24

Answer: A

Watch Video Solution

46. A fair coin is tossed at a fixed number of times.If the probability of getting exactly 3 headsequals the probability of getting exactly 5 heads, then the probability of getting exactlyone head is

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

B. $\frac{1}{32}$

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

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

Answer: B

Watch Video Solution

47. Let E° denotes the complement of an event E. If E, F, G are pairwise independent events with $P(G) > 0$ and $P(E \cap F \cap G) = 0$. Then, $P(E^{\circ} \cap F^{\circ} \mid G)$ equals :

A. P(E')+P(F')

B. P(E')-P(F')

C. P(E')-P(F)

D. P(E)-P(F')

Answer: C

Watch Video Solution

48. If P (E) = 0.40, P (F) = 0.35, P (E $\cup$ F) = 0.55, then P(F/E) is

A. 0.5

B. 0.25

C. 0.6

D. 0.7

Answer: A

Watch Video Solution

49. The mean and variance of a binomial distribution are 4 and 4/3 respectively, find $P(X \geq 1)$.

A. $\left(\frac{3}{4}\right)^{16}$

B. $4\left(\frac{3}{4}\right)^{15}$

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

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

Answer: B

Watch Video Solution

50. There are 20 cards. Ten of these cards have the letter I printed on them and the other 10 have the letter I printed on them. If three cards picked up at random and kept in the same order, the probability of making word IIT is $1/9, 1/3$ b. $1/16, 1/4$ c. $1/4, 1/2$ d. none of these

A. $\frac{9}{80}$

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

C. $\frac{4}{27}$

D. $\frac{15}{38}$

Answer: D

Watch Video Solution

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

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

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

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

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

Answer: B

Watch Video Solution

52. A fair coin is tossed repeatedly. If head and tail appear alternatively on first 7 tosses, then the probability that head appears on the eighth toss is

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

B. $\frac{1}{128}$

C. $\frac{1}{256}$

D. $\frac{7}{256}$

Answer: A

Watch Video Solution

53. If P(A) $>$ 0, then the event A is independent of itself if and only if P(A) is

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

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

C. 1

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

Answer: C

Watch Video Solution

54. If A and B are two events, then $P(A \cup B) = P(A \cap B)$ if and only if

A. P(A)+P(B)=1

B. P(A)=P(B)

C. P(A)+P(B) $>$ 1

D. P(A)+P(B) $<$ 1

Answer: B

View Text Solution

55. A dice is thrown. The probability that the first time 1 occurs at the even throw is

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

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

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

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

Answer: B

Watch Video Solution

56. If A and B are two events such that $P(A) \neq 0$ and $P(B) \neq 1$ then $P\left(\frac{\overline{A}}{B}\right)$

A. $[1 - P(A \cup B)] / P(B')$

B. P(A')/P(B')

C. 1-P(A|B)

D. 1-P(A'|B)

Answer: A

Watch Video Solution

57. Two unbiased die are rolled together . Let A={(a,b): a+b=11} and B= { (a,b): a $\neq$ 5}, then P(A|B) equals

A. $1/30$

B. $1/15$

C. $2/15$

D. $5/6$

Answer: A

Watch Video Solution

58. A bag contains w white and b black balls. A ball is drawn at random and put back in the bag with k additional balls of the same colour. A ball is again drawn at random from the bag. The probability that it is black is

A. (b+k)/(w+b+k)

B. b/(w+b+k)

C. b/(w+b)

D. b/(w+b+2k)

Answer: C

Watch Video Solution

59. The probability distribution of a random variable X is given as follows:

x	1	2	3	2k	3k	5k
$P(x = x)$	1/2	1/5	3/25	1/10	1/25	1/25

If E(X)=2.3 , then value of k is

A. $1/2$

B. $5/4$

C. 3

D. 2

Answer: D

Watch Video Solution

60. Let A and B be two events such that P(A|B) = P(A'|B') = p and P(B) = 0.05. The value of p so that P(B|A) =0.9 is

A. $21/430$

B. $173/430$

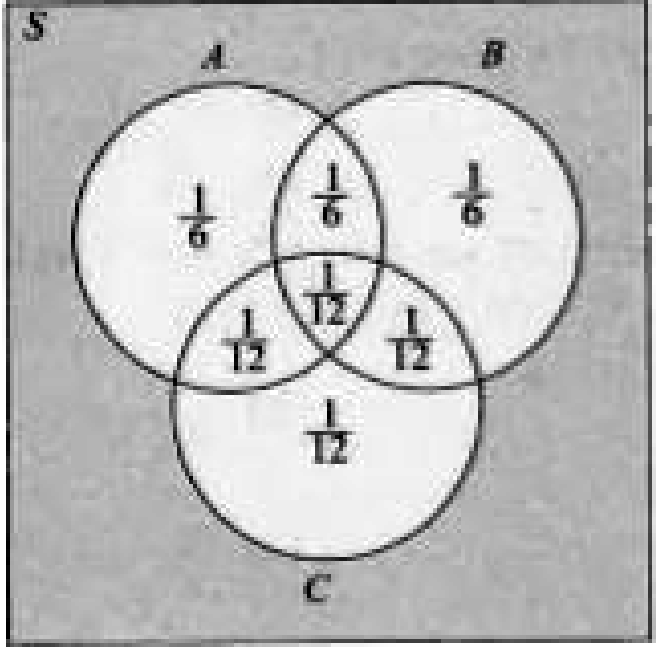
C. $171/430$

D. $95/430$

Answer: C

Watch Video Solution

61. In the Fig. 24.10 the number represents the probability of the event. Which one of following is not true ?



A. A and B are independent

B. A and C are independent

C. B and C are independent

D. A and B $\cap$ C are dependent.

Answer: D

View Text Solution

62. If three numbers are selected from the set of the first 20 natural numbers, the probability that they are in GP, is

A. $1/20$

B. $1/30$

C. $1/45$

D. none of these

Answer: D

Watch Video Solution

63. From a bag containing 30 tickets numbered 1, 2, 3, ... 30, three tickets are selected at random without replacement. Suppose these tickets are arranged as $x_1 < x_2 < x_3$. The probability that x_2 = 15 and $x_3 > 20$, is

A. $1/29$

B. $1/7$

C. $1/19$

D. $1/11$

Answer: A

Watch Video Solution

64. Suppose an unbiased die has n sides numbered i = 1, 2, ... n. The die is tossed n times (assume independence) and a "match" is defined to be the occurrence of side i on the its roll. The probability of at least one match is

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

B. $\frac{1}{n^n}$

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

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

Answer: C

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65. Three numbers are chosen at random (without replace ment) from the numbers 1, 2,... 20. The probability that the numbers are not consecutive are

A. $\frac{3}{190}$

B. $\frac{7}{190}$

C. $\frac{171}{190}$

D. $\frac{187}{190}$

Answer: D

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Exercises Level 2 Single Correct Answer

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

probability that the event A happens atleast once, is

A. 0.936

B. 0.932

C. 0.948

D. 0.946

Answer: A

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

A. 0.6

B. 0.5

C. 0.4

D. 0.2

Answer: D

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3. Suppose X ~ B(n,p) and P(X=3)=P(X=5). If p $>$ 1/2, then

A. $n \leq 7$

B. $n > 8$

C. $n \geq 9$

D. none of these

Answer: A

Watch Video Solution

4. Two dice are thrown three times.The probability of throwing doublets not more than twice is

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

B. $\frac{5}{72}$

C. $\frac{215}{216}$

D. none of these

Answer: C

Watch Video Solution

5. A bag contains 5 brown and 4 white socks. A man pulls out two socks. The probability that these are of the same colour is $\frac{5}{108}$ b. $\frac{18}{108}$ c. $\frac{31}{108}$ d. $\frac{48}{108}$

A. $\frac{5}{108}$

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

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

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

Answer: D

Watch Video Solution

6. In one throw of three dice together, find the probability of getting:

(i) same number on three dice

(ii) a sum less than 6

(iii) a sum at least 6

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

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

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

D. $\frac{5}{19}$

Answer: A

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7. The probability that a student is not a swimmer is 1/5. Then find the probability that out of 5 students exactly 4 are swimmer.

A. $\left(\frac{4}{5}\right)^4$

B. $\left(.^5C_4\right)\left(\frac{4}{5}\right)^4$

C. $\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$

D. none of these

Answer: A

Watch Video Solution

8. Four persons are selected at random out of 3 men, 2 women and 4 children. The probability that there are exactly 2 children in the selection is a. 11/21 b. 9/21 c. 10/21 d. none of these

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

B. $\frac{10}{23}$

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

D. $\frac{10}{21}$

Answer: D

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9. Fifteen persons, among whom are A and B, sit down at random on a round table. The probability that there are 4 persons between A and B, is

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

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

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

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

Answer: C

Watch Video Solution

10. There are 3 works. One is of 3 volumes and one is of 4 volumes and one is of exactly one volume. If the books are placed in a random order on a shelf, the probability that all the volumes of the same work are together is

A. $\frac{1}{70}$

B. $\frac{3}{140}$

C. $\frac{1}{65}$

D. $\frac{3}{130}$

Answer: B

View Text Solution

11. If the mean of a binomial distribution with 9 trials 6, then its variance is

A. 2

B. 3

C. 4

D. $\sqrt{2}$

Answer: A

Watch Video Solution

12. For a binomial vareiate X if n=5 and P(X=1)=8P(X=3), then p=

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

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

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

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

Answer: B

Watch Video Solution

Exercises Numerical Answer

1. Let A and B be two events of random experiment such that $P(A') = 0.3$, $P(B) = 0.4$ and $P(A \cap B') = 0.5$, then $P(A \cup B) + P(B|A \cup B') =$ ____

Watch Video Solution

2. A speaks 3 out of 5 times. He throws an unbiased die and reports it is a six. Let p be the probability that it is actually a six, then $6.5p =$ _____

View Text Solution

3. An urn contains 5 blue and an unknown number x of red balls.Two balls are drawn at random. If the probability of both of them being blue is 5/14 find x.

Watch Video Solution

4. If $P(A \cap B) = \frac{7}{10}$ and $P(B) = \frac{17}{20}$,then P(A/B) equals to

Watch Video Solution

5. If $P(A \cap B) = \frac{1}{2}$ and $P(A' \cap B') = \frac{1}{3}, P(A) = 2p$ and P(B)=p , then the value of 9p is ____

Watch Video Solution

6. Suppose A and B are two events such that P(A|B)=0.6, P(B|A)=0.3 , P(A)=0.1 then $P(A' \cap B')$ is equal to _____

Watch Video Solution

7. A problem is given to three students whose chances of solving it are ¼, ⅕ and $.^{1}/_{6}$ respectively. Find the probability that the problem is solved.

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8. Suppose A and B are two events such that $P(A) = \frac{1}{4}, P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{5}$, then 4P(A'|B') is equal to ____

Watch Video Solution

9. Let A and B be two events, the probability that at least one of them occurs is $\frac{4}{5}$ and the probability that A and B occur simultaneously is $\frac{1}{4}$, then P(A') + P(B') is equal to ____

Watch Video Solution

10. The probability that A speaks truth is $\frac{5}{6}$, while this probability for B is $\frac{4}{5}$.The probability that they contradict each other when asked to speak on a fact is ___

Watch Video Solution

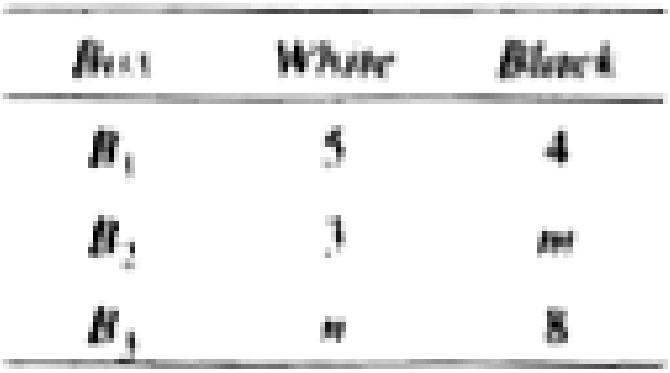
11. There are 2m persons sitting in a row. Two of them are selected at random. If the probability the selected are not together is 15/17, then m is equal to _____

View Text Solution

12. Let $S = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} : a, b, c, d \in \{0, 1\} \right\}$ A matrix A is picked up at random from the set S and is found to be invertible. The probability that det(A) $>$ 0 , is ____

Watch Video Solution

13. Three boxes B_1, B_2 and B_3, have the following composition of white and black balls. All balls are assumed to be distinct.



where m,n $\in$ N . The total number of balls in the box is 28. One of the box is selected at random and a ball is drawn from it. if the probability that the ball is white is $\frac{49}{135}$, then |m-n| is equal to ___

Watch Video Solution

14. Let A,B and C be three events such that

P(A)=0.50, P(B)=0.40, $P(A \cap B)$= 0.20

$P(C \mid A \cap B') = 0.30$, $P(C \mid A' \cap B)$=0.25 and $(A \cap B)$=0.20 then

$P(C \mid A \cup B)$ =_____

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15. E and F be two independent events such that P(E) $<$ P(F). The probability that both E and F happen is 1/15 and the probability that neither E nor F happen is 8/15. Then P(E) = ____

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16. Let A and B be two events such that P(A) = 1/3, P(B) = 1/4 and P(A $\cap$ B) = 1/5, then 45P(A' |B') - 35.32 is equal to _____

Watch Video Solution

17. Three numbers are chosen from the set {1, 2, 3, ..., 40} at random without replacement. If p is the probability that three numbers chosen are not consecutive, then 145p - 140.25 is equal to _____

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18. A random variable X has the following probability distribution:

x	2	3	4
$P(X=x)$	0.3	0.4	0.3

then Var(X)=____

Watch Video Solution

19. If $P(B)=\frac{3}{4}, P\left(A \cap B \cap \overline{C}\right)=\frac{1}{3}$ and $P\left(\overline{A} \cap B\overline{C}\right)=\frac{1}{3}$ then $P(B \cap C)=$

Watch Video Solution

20. A pair of fair dice is rolled together till a sum of 7 or 11 is obtained. Let p denote the probability that 7 comes before 11, then the of p is equal to _____

View Text Solution

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

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22. If $\frac{1+4p}{4}, \frac{1-p}{3}$ and $\frac{1-2p}{2}$ are the probabilities of three mutually exclusive events then values of p may be

Watch Video Solution

23. The digits 1, 2, 3, 4, 5, 6, 7, 8, and 9 are written in random order to form a nine digit number.Let p be the probability that this number is divisible by 36, find 9p.

Watch Video Solution

24. Two squares are chosen at random on a chessboard. If p denotes the probability that they have exactly one vertex in common, then 36p is ____

View Text Solution

25. In a multiple choice question, there are five alternative answers of which one or more than one are correct. A candidate will get marks on the question, if he ticks all the correct answers. If he decides to tick answer all random, then the least number of choices should he be allowed, so that the probability of his getting marks on the question exceeds $\frac{1}{8}$ is

Watch Video Solution

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

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27. In a sequence of independent trials, the probability of success is 1/4, If P denotes the probability that the second success occurs on the fourth trial or later trial, then 16P =

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28. A fair coin is tossed 100 times. The probability of getting tails 1, 3, .., 49 times is $1/2$ b. $1/4$ c. $1/8$ d. $1/16$

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Previous Years Aieee Jee Main Papers

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

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

B. $\left[\frac{1}{3}, \frac{13}{3}\right]$

C. [0,1]

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

Answer: D

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2. Five horses are in race. Mr. X selected two of horses at random and bets on them. The probability that Mr. X selected the winning horse is

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

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

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

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

Answer: C

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3. The mean and variance of a random variable X having a binomial distribution are 4 and 2 respectively. The $P(X = 1)$ is

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

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

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

D. $\frac{1}{32}$

Answer: D

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

A. 0.35

B. 0.77

C. 0.87

D. 0.50

Answer: B

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5. The probability that A speaks truth is $\frac{4}{5}$, while this probability for B is $\frac{3}{4}$. The probability that they contradict each other when asked to speak on a fact is

A. $\frac{7}{20}$

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

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

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

Answer: A

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6. The mean and the variance of a binomial distribution are 4 and 2 respectively. Then, the probability of 2 successes is

A. $\frac{128}{256}$

B. $\frac{219}{256}$

C. $\frac{37}{256}$

D. $\frac{28}{256}$

Answer: B

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7. If A and B are two events such that $P[(A \cup B)'] = \frac{1}{6}, P(A \cap B) = \frac{1}{4}$ and $P(A') = \frac{1}{4}$, then events A and B are

A. independent but not equally likely

B. mutually exclusive and independent

C. equally likely and mutually exclusive

D. equally likely but not independent

Answer: A

Watch Video Solution

8. 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. $\frac{8}{9}$

B. $\frac{7}{9}$

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

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

Answer: D

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9. A pair of fair dice is thrown independently three times. The probability of getting a score of exactly 9 twice is (1) 1/729 (2) 8/9 (3) 8/729 (4) 8/243

A. $\frac{1}{729}$

B. $\frac{8}{9}$

C. $\frac{8}{729}$

D. $\frac{8}{243}$

Answer: D

Watch Video Solution

10. 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. 0.06

B. 0.14

C. 0.2

D. 0.7

Answer: A::C

Watch Video Solution

11. A die is thrown. Let A be the event that the number obtained is greater than 3. Let B be the event that the number obtained is less than 5. Then $P(A \cup B)$ is (1) $\frac{3}{5}$ (2) 0 (3) 1 (4) $\frac{2}{5}$

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

B. 0

C. 1

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

Answer: C

Watch Video Solution

12. One ticket is selected at random from 50 tickets numbered 00, 01, 02, ... , 49. Then the probability that the sum of the digits on the selected ticket is 8, given that the product of these digits is zero, equals (1) 1/14 (2) 1/7 (3) 5/14 (4) 1/50

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

B. $\frac{1}{50}$

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

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

Answer: C

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13. In a binomial distribution $B\left(n, p=\frac{1}{4}\right)$, if the probability of at least one success is greater than or equal to $\frac{9}{10}$, then n is greater than (1) $\frac{1}{(\log)_{10}^{4}-(\log)_{10}^{3}}$ (2) $\frac{1}{(\log)_{10}^{4}+(\log)_{10}^{3}}$ (3) $\frac{9}{(\log)_{10}^{4}-(\log)_{10}^{3}}$ (4) $\frac{4}{(\log)_{10}^{4}-(\log)_{10}^{3}}$

A. $\frac{9}{\log 4-\log 3}$

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

C. $\frac{1}{\log 4-\log 3}$

D. $\frac{1}{\log 4-\log 3}$

Answer: C

Watch Video Solution

14. 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 colours is

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

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

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

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

Answer: D

Watch Video Solution

15. 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

Watch Video Solution

16. Consider 5 independent Bernoulli.s trials each with probability of success p. If the probability of at least one failure is greater than or equal to $\frac{31}{32}$, then p lies in the interval : (1) $\left(\frac{1}{2}, \frac{3}{4}\right]$ (2) $\left(\frac{3}{4}, \frac{11}{12}\right]$ (3) $\left[0, \frac{1}{2}\right]$ (4) $\left(\frac{11}{12}, 1\right]$

A. [11/12,1]

B. [1/2,3/4]

C. [3/4,11/12]

D. [0,1/2]

Answer: D

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17. If C and D are two events such that $C \subset D$and P(D) is not equal to 0,` then the correct statement among the following is

A. $P(C \mid D) = \frac{P(C)}{P(D)}$

B. P(C|D)=P(C)

C. P(C|D) $\geq$ P(C)

D. P(C|D) $<$ P(C)

Answer: A

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18. Let A, B, C be pariwise independent events with $P(C) > 0$ and $P(A \cap B \cap C) = 0$. Then $P\left(\frac{A^c \cap B^c}{C}\right)$.

A. P(A)-P(B')

B. P(A')+P(B')

C. P(A')-P(B')

D. P(A')-P(B)

Answer: A

Watch Video Solution

19. 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 (1) $\frac{3}{8}$ (2) $\frac{1}{5}$ (3) $\frac{1}{4}$ (4) $\frac{2}{5}$

A. $1/5$

B. $1/4$

C. $2/5$

D. $3/8$

Answer: A

Watch Video Solution

20. A multiple choice examination has 5 questions. Each question has three alternative answers of which exactly one is correct. The probability that a student will get 4 or more correct answers just by guessing is (1) $\frac{13}{3^5}$ (2) $\frac{11}{3^5}$ (3) $\frac{10}{3^5}$ (4) $\frac{17}{3^5}$

A. $\frac{10}{3^5}$

B. $\frac{17}{3^5}$

C. $\frac{13}{3^5}$

D. $\frac{11}{3^5}$

Answer: D

Watch Video Solution

21. Given two independent events, if the probability that exactly one of them occurs is $\frac{26}{49}$ and the probability that none of them occurs is $\frac{15}{49}$,

then the probability of more probable of the two events is :

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

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

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

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

Answer: A

Watch Video Solution

22. 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. $\left[\frac{1}{3}, \frac{2}{9}\right]$

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

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

Answer: C

Watch Video Solution

23. v31

A. 3

B. 5

C. 2

D. 4

Answer: A

Watch Video Solution

24. A, B, C try to hit a target simultaneously but independently. Their respective probabilities of hitting the target are $\frac{3}{4}, \frac{1}{2}, \frac{5}{8}$. The probability that target is hit by A or B but not by C is

A. $\frac{21}{64}$

B. $\frac{7}{8}$

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

D. $\frac{9}{64}$

Answer: A

Watch Video Solution

25. 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 the complement of the event A. Then the events A and B are

A. equally likely but not independent

B. independent but not equally likely

C. independent and equally likely

D. mutually exclusive and independent

Answer: B

Watch Video Solution

26. If A and B are two events such that $P(A \cup B) = P(A \cap B)$, then the incorrect statement amongst the followving statements is :

A. A and B are equally likely

B. $P(A \cap B') = 0$

C. $P(A' \cap B) = 0$

D. P(A)+P(B)=1

Answer: D

Watch Video Solution

27. If X has a binomial distribution, B(n, p) with parameters n and p such that P(X = 2) = P(X = 3), then E(X), the mean of variable X, is

A. 2-p

B. 3-p

C. $p/2$

D. $p/3$

Answer: B

Watch Video Solution

28. A number x is chosen at random from the set $\{1, 2, 3, 4, \ldots\ldots\ldots, 100\}$. Defind the event : A = the chosen number x satisfies $\frac{(x-10)(x-50)}{(x-30)} \geq 0$, then P(A) is

A. 0.71

B. 0.70

C. 0.51

D. 0.20

Answer: A

Watch Video Solution

29. Let $AansB$ be any two events with positive probabilities Statement I $P\left(\frac{E}{A}\right) \geq P\left(\frac{A}{E}\right)P(E)$Statement I $P\left(\frac{E}{A}\right) \geq P(A \cap E)$

A. Both statements are true

B. Both statements are false

C. Statement-1 is true, Statement-2 is false

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

Answer: A

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30. A set 'S' contains 7 elements. A non-empty subset A of S and an element 'x' of S are chosen at random. Then the probability that $x \in A$ is

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

B. $\frac{64}{127}$

C. $\frac{63}{128}$

D. $\frac{31}{128}$

Answer: B

Watch Video Solution

31. Let x be set containing 10 elements and $p(x)$ be its power set. If A and B are picked up at random from p(x),with replacement, then probability that A and B have equal number of elements, is

A. $\frac{.^{20}C_{10}}{2^{10}}$

B. $\frac{2^{10}-1}{2^{20}}$

C. $\frac{2^{10}-1}{2^{10}}$

D. $\frac{.^{20}C_{10}}{2^{20}}$

Answer: A

Watch Video Solution

32. If the lengths of the sides of a triangle are decided by the three thrown of a single fair die,then the probability that the triangle is of maximum area given that it is an isosceles triangle, is

A. $1/26$

B. $1/27$

C. $1/21$

D. $1/15$

Answer: B

Watch Video Solution

33. If the mean and the variance of a binomial variable X are 2 and 1 respectively, then the probability that X takes a value greater than one is equal to:

A. $1/16$

B. $9/16$

C. $3/4$

D. $15/16$

Answer: D

Watch Video Solution

34. Let two fair six-faced dice A and B be thrown simultaneously. If E_1 is the event that die A shows up four, E_2 is the event that die B shows up two and E_3 is the event that the sum of numbers on both dice is odd,

then which of the following statements is NOT true ? (1) E_1 and E_2 are independent. (2) E_2 and E_3 are independent. (3) E_1 and E_3 are independent. (4) E_1 , E_2 and E_3 are independent.

A. E_1 and E_2 are independent

B. E_2 and E_3 are independent

C. E_1 and E_3 are independent

D. E_1, E_2, E_3 are independent

Answer: D

Watch Video Solution

35. 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 $P(A \mid (A' \cup B'))$ where A' denotes the complement of $A$is equal to

A. $11/20$

B. $5/17$

C. $8/17$

D. $1/4$

Answer: B

Watch Video Solution

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

A. $496/729$

B. $192/729$

C. $240/729$

D. $256/729$

Answer: D

Watch Video Solution

37. A box contains 15 green and 10 yellow balls. If 10 balls are randomly drawn, one-by-one, with replacement, then the variance of the number of green balls drawn is

A. $6/25$

B. $12/5$

C. 6

D. 6

Answer: B

Watch Video Solution

38. 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. $7/55$

B. $6/55$

C. $12/55$

D. $14/55$

Answer: B

Watch Video Solution

39. 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) $= \frac{1}{6}$. Then the probability that at least one of the events occurs, is : $\frac{7}{64}$ (2) $\frac{3}{16}$ (3) $\frac{7}{32}$ (4) $\frac{7}{16}$

A. $3/16$

B. $7/32$

C. $7/16$

D. $7/46$

Answer: C

Watch Video Solution

40. From a group of 10 men and 5 women,four member committees are to be formedeach of which must contain at least onewoman. Then the probability for thesecommittees to have more women than men, is :

A. $21/220$

B. $3/11$

C. $1/11$

D. $2/23$

Answer: C

Watch Video Solution

41. E and F are two independent events. The probability that both e and F happen is 1/12 and the probability that neither E nor F happens is 1/2. Then

A. $4/3$

B. $1/3$

C. $1/3$

D. $5/12$

Answer: A

Watch Video Solution

42. Three persons P, Q and R independentlytry to hit a target. If the probabilities oftheir hitting the target are $\frac{3}{4}, \frac{1}{2}$ and $\frac{5}{8}$ respectively, then the probability that thetarget is hit by P or Q but not by R is:

A. $21/64$

B. $9/64$

C. $15/64$

D. $39/64$

Answer: A

Watch Video Solution

43. An unbiased coin is tossed eight times. The probability of obtaining at least one head and at least one tail is :

A. $\frac{255}{256}$

B. $127/128$

C. $63/64$

D. $1/2$

Answer: B

Watch Video Solution

44. A bag contains 4 red and 6 black balls. A ball is drawn at random from the bag, its colour is observed and this ball along with two additional balls of the same colour are returned to the bag. If now a ball is drawn at random from the bag, then the probability that this drawn ball is red, is

A. $2/5$

B. $1/5$

C. $3/4$

D. $3/10$

Answer: A

Watch Video Solution

45. A box 'A' contains 2 white, 3 red and 2 black balls. Another box 'B' contains 4 white, 2 red and 3 black balls. If two balls are drawn at random, without replacement, from a randomly selected box and one ball turns

out to be white while the other ball turns out to be red, then the probability that both balls are drawn from box 'B' is :

A. $7/16$

B. $7/8$

C. $9/16$

D. $9/32$

Answer: A

Watch Video Solution

46. A player X has a biased coin whose probability of showing heads is p and a player Y has a fair coin. They start playing a game with their own coins and play alternately. The player who throws a head first is a winner. If X starts the game, and the probability of winning the game by both the players is equal, then the value of 'p is :

A. $1/5$

B. $1/3$

C. $2/5$

D. $1/4$

Answer: B

Watch Video Solution

47. Let A,B and C be three events, which are pair-wise independent and $\overline{E}$ denotes the complement of an event E. If $P(A \cap B \cap C) = 0$ and $PC) > 0$, then $P\left[\left(\overline{A} \cap \overline{B}\right) \mid C\right]$ is equal to :

A. P(A')-P(B)

B. P(A)+P(B')

C. P(A')-P(B')

D. P(A')+P(B')

Answer: A

Watch Video Solution

48. Two different families A and B are blessed with equal number of children. There are 3 tickets to be distributed amongst the children of these families so that no child gets more than one ticket. If the probability that all the tickets go to children of the family B is $\frac{1}{12}$ then the number of children in each family is :

A. 3

B. 4

C. 5

D. 6

Answer: C

Watch Video Solution

49. Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Let X denote the random variable of number of aces obtained in the two drawn cards. Then P(X = 1) + P(X = 2) equals

A. $52/169$

B. $25/169$

C. $49/169$

D. $24/169$

Answer: B

Watch Video Solution

50. An urn contains 5 red and 2 green balls. A ball is drawn at random from the urn. If the drawn ball is green, then a red ball is added to the urn and if the drawn ball is red, then a green ball is added to the urn, the original ball is not returned to the urn. Now, a second ball is drawn at random from it. The probability that the second ball is red is

A. $26/49$

B. $32/49$

C. $32/49$

D. $21/49$

Answer: B

Watch Video Solution

51. An unbiased coin is tossed. If the outcome is a head then a pair of unbiased dice is rolled and the sum of the coin results in tail, then a card from a well-shuffled pack of nine cards numbered 1,2,3,.....9 is randomly picked and the number on the card is noted. The probability that the noted number is either 7 or 8 is

A. $13/36$

B. $19/36$

C. $19/72$

D. $15/72$

Answer: C

Watch Video Solution

52. If the probability of hitting a target by a shooter, in any shot is 1/3, then the minimum number of independent shots at the target required by him so that the probability of hitting the target at least once is greater than $\frac{5}{6}$ is

A. 6

B. 5

C. 4

D. 3

Answer: B

Watch Video Solution

53. Two integers are selected at random from the set {1, 2, ..., 11}. Given that the sum of selected numbers is even, the conditional probability that both the numbers are even is

A. $3/5$

B. $2/5$

C. $7/10$

D. $1/2$

Answer: B

Watch Video Solution

54. Let $S = \{1, 2, \ldots, 20\}$ A subset B of S is said to be nice, if the sum of the elements of B is 203. Then the probability that a randomly chosen subset of S is nice is: (a) $\frac{7}{2^{20}}$ (b) $\frac{5}{2^{20}}$ (c) $\frac{4}{2^{20}}$ (d) $\frac{6}{2^{20}}$

A. $\frac{6}{2^{20}}$

B. $\frac{5}{2^{20}}$

C. $\frac{4}{2^{20}}$

D. $\frac{7}{2^{20}}$

Answer: B

Watch Video Solution

55. There are 30 white balls and 10 red balls in bag. 16 balls are drawn with replacement from the bag. If X be the number of white balls drawn then the value of $\frac{mean(X)}{s\tan darddeviation(X)}$ is equal to (A) $4\sqrt{3}$ (B) $2\sqrt{3}$ (C) $3\sqrt{3}$ (D) $3\sqrt{2}$

A. 4

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

C. $4\sqrt{3}$

D. $3\sqrt{2}$

Answer: C

Watch Video Solution

56. In a random experiment, a fair die is rolled until two fours are obtained in succession.The probability that the experiment will end in the fifth throw of the die is equal to

A. $\frac{150}{6^5}$

B. $\frac{175}{6^5}$

C. $\frac{200}{6^5}$

D. $\frac{225}{6^5}$

Answer: B

Watch Video Solution

57. In a class of 60 students, 40 opted for NCC, 30 opted for NSS and 20 opted for both NCC and NSS. If one of these students is selected at random, then the probability that the student selected has opted neither for NCC nor for NSS is

A. $2/3$

B. $1/6$

C. $1/3$

D. $5/6$

Answer: B

Watch Video Solution

58. In a game, a man wins Rs 100 if he gets 5 or 6 on a throw of a fair die and loses Rs 50 for getting any other number on the die. If he decides to throw the die either till he gets a five or a six or to a maximum of three

throws, then his expected gain/loss (in rupees) is: (a) $\frac{400}{3}$ gain (b) $\frac{400}{9}$ loss (c) 0 (d) $\frac{400}{3}$ loss

A. $\frac{400}{3}$ gain

B. $\frac{400}{3}$ loss

C. 0

D. $\frac{400}{9}$ loss

Answer: C

Watch Video Solution

59. A and B try to hit a target. The probability that A hits the target is 7/10 and the probability that B hits the target is 4/10. If these two events are independent, the probability that B hits the target, given that the target is hit,is :

A. $17/41$

B. $20/41$

C. $19/41$

D. $18/41$

Answer: B

Watch Video Solution

60. Let A and B be two non-null events such that $A \subseteq B$. Then, which of the following statements is always correct?

A. P(A|B)=P(B)-P(A)

B. P(A|B) $\geq$ P(A)

C. P(A|B) $\leq$ P(A)

D. P(A|B)=1

Answer: B

Watch Video Solution

61. The minimum number of times one has ot toss a fair coin so that the probability of observing atleast one head is atlest 90% is

A. 5

B. 3

C. 4

D. 2

Answer: C

Watch Video Solution

62. Four persons can hit a target correctly with probabilities $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ and $\frac{1}{8}$ respectively. If all hit at the target would be hit, is

A. $25/192$

B. $7/32$

C. $1/192$

D. $25/32$

Answer: D

Watch Video Solution

63. 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]

A. 13.9

B. 12.8

C. 13

D. 13.5

Answer: A

Watch Video Solution

64. Assume that each born child is equally likely to be a boy or a girl. If two families have two children each, then the conditional probability that all children are girls given that at least two are girls , is

A. $1/11$

B. $1/10$

C. $1/12$

D. $1/17$

Answer: A

Watch Video Solution

65. Minimum number of times a fair coin must be tossed so that the probility of gettig atleast one head is more than $99\ \%$ is

A. 5

B. 6

C. 8

D. 7

Answer: D

Watch Video Solution

66. For an initia screening of an admission test, a candidate is given fifty problems to solve. If the probability that the candidate can solve and problem is $\frac{4}{5}$, then the probability that he is unable to solve less than two problems is:

A. $\frac{201}{5}\left(\frac{1}{5}\right)^{49}$

B. $\frac{316}{25}\left(\frac{4}{5}\right)^{48}$

C. $\frac{54}{5}\left(\frac{4}{5}\right)^{49}$

D. $\frac{164}{25}\left(\frac{1}{5}\right)^{48}$

Answer: C

Watch Video Solution

67. Three of the six vertices of a regular hexagon are chosen the random.

What is the probability that the triangle with these vertices is equilateral.

A. $1/10$

B. $1/5$

C. $3/10$

D. $3/20$

Answer: A

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Previous Years B Architecture Entrance Examination Papers

1. Two events A and B are such that P(B) = 0.55 and P(AB') = 0.15. The probability of occurrence of at least one of event is

A. 0.70

B. 0.20

C. 0.35

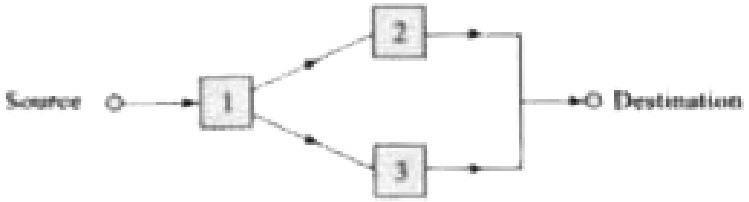
D. 0.30

Answer: A

View Text Solution

2. A certain water-supply system consists of a source, three pumping stations, and a destination. Each pump ing station has a probability p (0 $<$ p $<$ 1) of being operable at a specified time to and station functions

independently of one another. The stations are connected as shown in figure:



The probability that water is available to the destination at time to is

A. $2p^2$

B. $p^2(2-p)$

C. p^3

D. p^2

Answer: A

Watch Video Solution

3. An urn contains four balls bearing numbers 1, 2, 3 and 123 respectively. A ball is drawn at random from the urn. Let E_i, i = 1, 2, 3 donote the event that digit i appears on the ball drawn.

Statement -1: $P(E_1 \cap E_2) = P(E_1 \cap E_3) = P(E_2 \cap E_3) = \frac{1}{4}$

Statement-2: $P(E_1) = P(E_2) = P(E_3) = \frac{1}{2}$

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4. Three dice, red, blue and green in colour are rolled together. Let B be the event that sum of the numbers shown up is 7. Let A be the event that the red die shows 1. The conditional probability of the event A given B, P(A|B) is

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

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

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

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

Answer: B

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5. Sets A,B,C $A \cap B$, $A \cap C$, $B \cap C$ and $A \cap B \cap C$ have 35, 40, 45, 13, 12, 14 and 5 elements respectively. An element is selected at random from the set A $\cup$ B $\cup$ C. The probability that the selected element belongs to only set A is

A. $\frac{13}{86}$

B. $\frac{35}{86}$

C. $\frac{5}{86}$

D. $\frac{15}{86}$

Answer: D

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

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

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

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

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

Answer: B

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7. if $P(A) = 0.4, P(B') = 0.6$ and $P(A \cap B) = 0.15$ then the value of $P(A \mid A' \cup B')$ is K. The value of 17 K is equal to.

A. $1/17$

B. $4/17$

C. $5/17$

D. $10/17$

Answer: C

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

A. $1/10$

B. $1/32$

C. $5/512$

D. $7/512$

Answer: C

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9. Let $AandB$ be two event such that $P(A \cup B) \geq 3/4$ and $1/8 \leq P(A \cap B) \leq 3/8.$ Statement 1: $P(A) + P(B) \geq 7/8.$ Statement 2:$P(A) + P(B) \leq 11/8.$

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10. 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 p equals

A. $2/3$

B. $1/2$

C. $1/3$

D. $1/4$

Answer: C

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11. 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. $31/50$

B. $9/25$

C. $29/50$

D. $13/25$

Answer: A

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12. In a binomial distribution $B\left(n, p=\frac{1}{4}\right)$, if the probability of at least one success is greater than or equal to $\frac{9}{10}$, then n is greater than (1) $\frac{1}{(\log)_{10}^4-(\log)_{10}^3}$ (2) $\frac{1}{(\log)_{10}^4+(\log)_{10}^3}$ (3) $\frac{9}{(\log)_{10}^4-(\log)_{10}^3}$ (4) $\frac{4}{(\log)_{10}^4-(\log)_{10}^3}$

A. $\frac{9}{\log_{10}4-\log_{10}3}$

B. $\frac{1-\log_{10}9}{\log_{10}4-\log_{10}3}$

C. $\frac{1}{\log_{10}4-\log_{10}3}$

D. $\frac{1}{\log_{10}4+\log_{10}3}$

Answer: C

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13. A box contains 4 white and 5 black balls. A ball is drawn at random and its colour is noted. A ball is then put back in the box along with two additional balls of its opposite colour. If a ball is drawn again from the box, then the probability that the ball drawn now is black, is

A. $5/11$

B. $53/99$

C. $48/99$

D. $7/11$

Answer: B

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14. If A and B are two independent events such that P(A) = 3/10 and P(A ∪ B) = 4/5. then P(A ∩ B) is equal to:

A. $3/35$

B. $1/5$

C. $1/10$

D. $3/14$

Answer: D

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15. A bag contains three coins, one of which has head on both sides, another is a biased coin that shows up heads 90% of the time and the third one is an unbiased coin. A coin is taken out from the bag at random and tossed. If it is shows up a head, then the probability that it is the unbiased coin, is:

A. $3/8$

B. $5/12$

C. $5/25$

D. $1/3$

Answer: C

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16. Two numbers are selected at random (without replacement) from first 7 natural numbers. If X denotes the smaller of the two numbers obtained, find the probability distribution of X. Also, find mean of the distribution.

A. $5/3$

B. $14/3$

C. $13/3$

D. $7/3$

Answer: D

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17. A box contains 6 red balls and 2 black balls. Two balls are drawn at random, from it without replacement. If X denotes the number of red balls drawn then E(X) is equal to:

A. $3/2$

B. $1/2$

C. $5/2$

D. $27/28$

Answer: A

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18. A six-faced dice is so biased that it is twice as likely to show an even number as an odd number when thrown. It is thrown twice, the probability that the sum of two numbers thrown is even is $1/12$ b. $1/6$ c. $1/3$ d. $5/9$

A. $3/4$

B. $5/8$

C. $7/9$

D. $3/8$

Answer: B

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19. If for two events A and B, in a random experiment, P(A|B) = 4/5 and P(B|A) = 1/4, then P(A | A $\cup$ B) is equal to _____

A. $5/16$

B. $5/17$

C. $16/17$

D. $11/16$

Answer: C

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20. A bag contains 8 white and 6 black balls. A ball is drawn at random from the bag, its colour is observed and is kept aside (i.e. not returned in the bag). Three additional balls of the same colour as observed are put in the bag. If now two balls are drawn simultaneously at random from the bag, then the probability that these are of different colours, is ___

A. $2/5$

B. $4/15$

C. $7/25$

D. $18/35$

Answer: D

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21. India plays two matches each with West Indies and Australia. In any match the probabilities of India getting points $0, 1 \text{ and } 2$ are $0.45, 0.05 \text{ and } 0.50$ respectively. Assuming that the outcomes are independent, the probability of India getting at least 7 points is (a) 0.8750 (b) 0.0875 (c) 0.0625 (d) 0.0250

A. $1/20$

B. $1/40$

C. $3/40$

D. $1/40$

Answer: D

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