

NDA 1 2025

LIVE

MATHS

PROBABILITY

CLASS 4

NAVJYOTI SIR

SSBCrack
CLASSES

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EXAMS

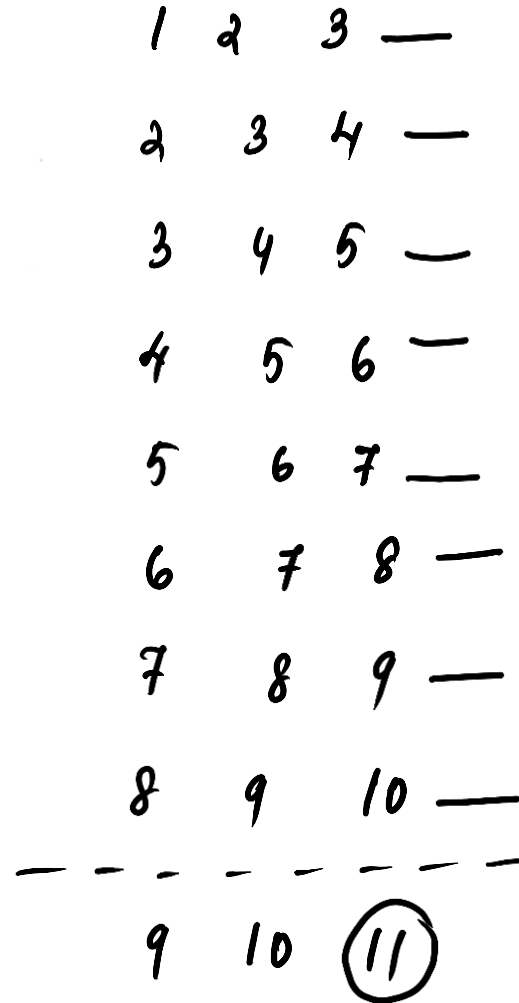
Three distinct natural numbers are chosen at random from 1 to 10. What is the probability that they are consecutive?

(a) $1/12$

(b) $3/40$

(c) $1/15$

(d) $7/120$



$$\begin{aligned}
 & \frac{8}{{}^{10}C_3} \\
 &= \frac{8}{\frac{10 \times 9 \times 8}{3 \times 2}} \\
 &= \frac{\cancel{8} \times \cancel{3} \times \cancel{2}}{\cancel{10} \times \cancel{9} \times \cancel{8}} \\
 &= \frac{1}{15}
 \end{aligned}$$

Three distinct natural numbers are chosen at random from 1 to 10. What is the probability that they are consecutive?

(a) $1/12$

(b) $3/40$

(c) $1/15$

(d) $7/120$

Ans: (c)

A, B, C are three mutually exclusive and exhaustive events associated with a random experiment. If $3P(B) = 4P(A)$ and $3P(C) = 2P(B)$, then what is $P(A)$ equal to?

(a) $7/29$

(b) $8/29$

(c) $9/29$

(d) $10/29$

x

$$3P(B) = 4x \Rightarrow P(B) = \frac{4}{3}x$$

$$3P(C) = 2P(B) \Rightarrow 3P(C) = 2\left(\frac{4}{3}x\right) \Rightarrow P(C) = \frac{8}{9}x$$

exhaustive events

$$P(A) + P(B) + P(C) = 1$$

$$x + \frac{4}{3}x + \frac{8}{9}x = 1$$

$$9x + 12x + 8x = 9$$

$$29x = 9$$

$$x = \frac{9}{29}$$

A, B, C are three mutually exclusive and exhaustive events associated with a random experiment. If $3P(B) = 4P(A)$ and $3P(C) = 2P(B)$, then what is $P(A)$ equal to?

(a) $7/29$

(b) $8/29$

(c) $9/29$

(d) $10/29$

Ans: (c)

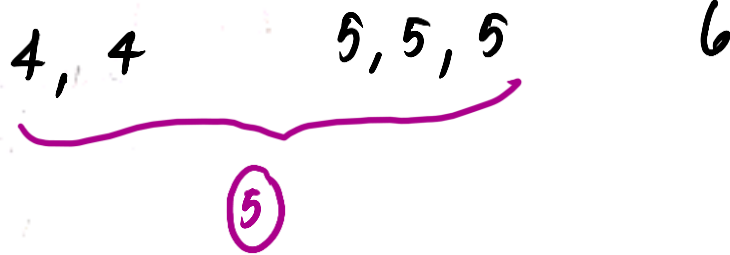
A die has two faces with number 4, three faces with number 5 and one face with number 6. If the die is rolled once, then what is the probability of getting 4 or 5?

(a) $1/3$

(b) $2/3$

(c) $5/6$

(d) $1/2$



A die has two faces with number 4, three faces with number 5 and one face with number 6. If the die is rolled once, then what is the probability of getting 4 or 5?

(a) $1/3$

(b) $2/3$

(c) $5/6$

(d) $1/2$

Ans: (c)

A box contains 2 black, 4 yellow and 6 white balls. Three balls are drawn in succession with replacement. What is the probability that all three are of the same colour?

(a) $1/6$

$$2 + 4 + 6 = \underline{12}$$

(b) $1/36$

(c) $1/12$

$$\frac{2}{12} \times \frac{2}{12} \times \frac{2}{12} + \frac{4}{12} \times \frac{4}{12} \times \frac{4}{12} + \frac{6}{12} \times \frac{6}{12} \times \frac{6}{12}$$

(d) $5/12$

$$\frac{1^3}{6^3} + \frac{1^3}{3^3} + \frac{1^3}{2^3}$$

$$= \frac{1 + 2^3 + 3^3}{6^3} = \frac{1 + 8 + 27}{216} = \frac{36}{216} = \frac{1}{6}$$

A box contains 2 black, 4 yellow and 6 white balls. Three balls are drawn in succession with replacement. What is the probability that all three are of the same colour?

- (a) $1/6$
- (b) $1/36$
- (c) $1/12$
- (d) $5/12$

Ans: (a)

A can hit a target 5 times in 6 shots, B can hit 4 times in 5 shots and C can hit 3 times in 4 shots. What is the probability that A and C may hit but B may lose?

(a) $1/8$

(b) $1/6$

(c) $1/4$

(d) $1/3$

$$\frac{5}{6} \times \frac{3}{4} \times \left(1 - \frac{4}{5}\right)$$

$$= \frac{\cancel{5} \times \cancel{3} \times 1}{\cancel{6} \times 4 \times \cancel{5}} = \frac{1}{8}$$

A can hit a target 5 times in 6 shots, B can hit 4 times in 5 shots and C can hit 3 times in 4 shots. What is the probability that A and C may hit but B may lose?

- (a) $1/8$
- (b) $1/6$
- (c) $1/4$
- (d) $1/3$

Ans: (a)

The letters of the word ZOOLOGY are arranged in all possible ways. What is the probability that the consonants and vowels occur alternatively?

- (a) 6/35
- (b) 3/35
- (c) 2/35
- (d) 1/35

Z O O L O G Y

Z - L - G - Y

$$\frac{\left(\frac{4! \times 3!}{3!} \right)}{\left(\frac{7!}{3!} \right)} = \frac{4! \times 3!}{7!} = \frac{\cancel{3} \times 2}{7 \times \cancel{6} \times 5} = \frac{1}{35}$$

The letters of the word ZOOLOGY are arranged in all possible ways. What is the probability that the consonants and vowels occur alternatively?

(a) $6/35$

(b) $3/35$

(c) $2/35$

(d) $1/35$

Ans: (d)

A natural number x is chosen at random from the first 100 natural numbers. What is the probability that $x^2 + x > 50$?

- (a) 93/100
- (b) 47/50
- (c) 24/25
- (d) 23/25

$$x(x+1) > 50$$

$$1 - 1 \times 2 = 2$$

$$2 - 2 \times 3 = 6$$

$$3 - 3 \times 4 = 12$$

$$4 - 4 \times 5 = 20$$

$$5 - 5 \times 6 = 30$$

$$6 - 6 \times 7 = 42$$

$$7 \times 8 = 56 \text{ — greater than } 50$$

Reqd. probability,

$$1 - P(x(x+1) < 50)$$

product less than 50.

$$= 1 - \frac{6}{100}$$

$$= \frac{94}{100}$$

$$= \frac{47}{50}$$

A natural number x is chosen at random from the first 100 natural numbers. What is the probability that $x^2 + x > 50$?

(a) $93/100$

(b) $47/50$

(c) $24/25$

(d) $23/25$

Ans: (b)

A fair coin is tossed till two heads occur in succession. What is the probability that the number of tosses required is less than 6?

(a) 5/64

$$2 \rightarrow \underline{HH} \rightarrow \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

(b) 15/32

(c) 31/64

$$3 \rightarrow \underline{T} \underline{HH} \rightarrow \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$$

(d) 19/32

$$4 \rightarrow \underline{HT} \underline{HH} \left(\frac{1}{16}\right)$$

$$\underline{TT} \underline{HH} \left(\frac{1}{16}\right) \rightarrow \frac{1}{16} + \frac{1}{16} = \frac{1}{8}$$

$$5 \rightarrow \underline{HTT} \underline{HH}$$

$$\underline{THT} \underline{HH}$$

$$\underline{HTT} \underline{HH} = \frac{3}{32}$$

HH ~~TT~~ HH
 successive already occurred,

$$\frac{1}{4} + \frac{1}{8} + \frac{1}{8} + \frac{3}{32}$$

$$\frac{1}{4} + \frac{1}{4} + \frac{3}{32} = \frac{8+8+3}{32} = \frac{19}{32}$$

A fair coin is tossed till two heads occur in succession. What is the probability that the number of tosses required is less than 6?

- (a) $5/64$
- (b) $15/32$
- (c) $31/64$
- (d) $19/32$

Ans: (d)

Urn A contains 2 white and 2 black balls while urn B contains 3 white and 2 black balls. One ball is transferred from urn A to urn B and then a ball is drawn out of urn B. What is the probability that the ball is white?

A
2 W
2 B

B
3 W
2 B

(a) 11/20

(b) 7/12

(c) 3/5

(d) 1

To choose
black or
white

$$\frac{1}{2} \times \frac{4}{6} + \frac{1}{2} \times \frac{3}{6}$$

$$= \frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

Urn A contains 2 white and 2 black balls while urn B contains 3 white and 2 black balls. One ball is transferred from urn A to urn B and then a ball is drawn out of urn B . What is the probability that the ball is white?

(a) $11/20$

(b) $7/12$

(c) $3/5$

(d) 1

Ans: (b)

For two events A and B ,
 $P(A) = P(A|B) = 0.25$ and $P(B|A) = 0.5$.
 Which of the following are correct?

I. A and B are independent.

II. $P(A^c \cup B^c) = 0.875$

III. $P(A^c \cap B^c) = 0.375$

Select the answer using the code given below.

(a) I and II only

(b) II and III only

(c) I and III only

(d) I, II and III

$$I) P(A) = P(A|B)$$

$$P(A) = \frac{P(A \cap B)}{P(B)}$$

$$\Rightarrow P(A \cap B) = P(A) \cdot P(B)$$

$\Rightarrow A$ & B are independent events.

$$II) P(A' \cup B') = P(A \cap B)'$$
 (De-Moivre's laws)

$$= 1 - P(A \cap B)$$

$$= 1 - 0.125$$

$$= 0.875$$

$$P(A/B) = 0.25 = P(A)$$

$$P(B/A) = 0.5$$

$$\frac{0.125}{P(B)} = 0.25$$

$$\left\{ \begin{array}{l} P(A \cap B) \\ P(A) \end{array} \right. = 0.5$$

$$P(B) = \frac{0.125}{0.25} = 0.5$$

$$P(A \cap B) = 0.5 \times 0.25 = 0.125$$

$$P(A' \cap B') = P(A \cup B)' = 1 - P(A \cup B)$$

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

$$= 0.25 + 0.5 - 0.125$$

$$= 0.75 - 0.125 = 0.625$$

$$1 - 0.525$$

$$= 0.375$$

For two events A and B ,
 $P(A) = P(A|B) = 0.25$ and $P(B|A) = 0.5$.
Which of the following are correct?

I. A and B are independent.

II. $P(A^c \cup B^c) = 0.875$

III. $P(A^c \cap B^c) = 0.375$

Select the answer using the code given below.

(a) I and II only

(b) II and III only

(c) I and III only

(d) I, II and III

Ans: (d)

Two perfect dice are thrown. What is the probability that the sum of the numbers on the faces is neither 9 nor 10?

(a) $1/36$

9
3, 6

(b) $5/36$

6, 3

(c) $7/36$

5, 4

(d) $29/36$

4, 5

10

5, 5

4, 6

6, 4

$$1 - \frac{7}{36} = \frac{29}{36}$$

. Two perfect dice are thrown. What is the probability that the sum of the numbers on the faces is neither 9 nor 10?

(a) $1/36$

(b) $5/36$

(c) $7/36$

(d) $29/36$

Ans: (d)

The occurrence of a disease in an industry is such that the workers have 20% chance of suffering from it. What is the probability that out of 6 workers chosen at random, 4 or more will suffer from the disease?

↪ Binomial distribution

(a) 53/3125

$$p = \text{getting disease} = 20\% = \frac{1}{5}$$

(b) 63/3125

$$q = 1 - \frac{1}{5} = \frac{4}{5}$$

(c) 73/3125

$$\underline{n=6} \quad P(X=4) + P(X=5) + P(X=6) = P(X \geq 4)$$

(d) 83/3125

$${}^6C_4 \left(\frac{1}{5}\right)^2 \left(\frac{4}{5}\right)^4 + {}^6C_5 \left(\frac{1}{5}\right)^1 \left(\frac{4}{5}\right)^5 + {}^6C_6 \left(\frac{1}{5}\right)^0 \left(\frac{4}{5}\right)^6$$

The occurrence of a disease in an industry is such that the workers have 20% chance of suffering from it. What is the probability that out of 6 workers chosen at random, 4 or more will suffer from the disease?

(a) $\frac{53}{3125}$

(b) $\frac{63}{3125}$

(c) $\frac{73}{3125}$

(d) $\frac{83}{3125}$

Ans: (a)

Three perfect dice are rolled. Under the condition that no two show the same face, what is the probability that one of the faces shown is an ace (one)?

(a) $5/9$

6 5 4

Total no. of outcomes = 120

(b) $2/3$

(c) $1/3$

(d) $1/2$

1 5 4

favourable outcomes = $3 \times (5 \times 4)$
= 60

$$\text{Probability} = \frac{60}{120} = \underline{\underline{\frac{1}{2}}}$$

Three perfect dice are rolled. Under the condition that no two show the same face, what is the probability that one of the faces shown is an ace (one)?

(a) $5/9$

(b) $2/3$

(c) $1/3$

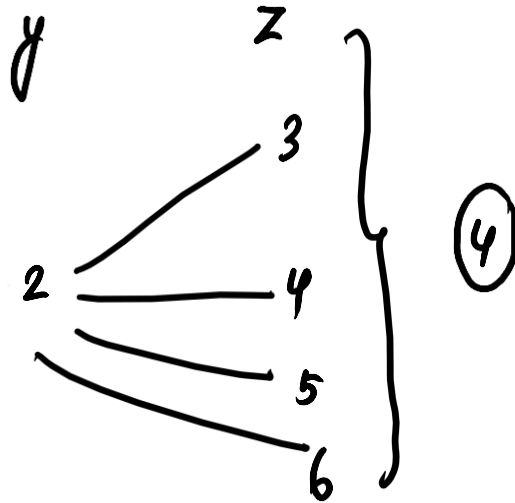
(d) $1/2$

Ans: (d)

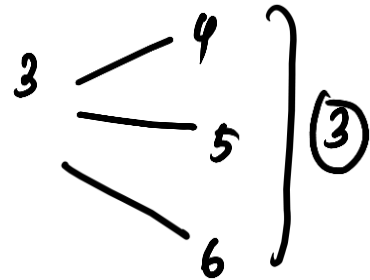
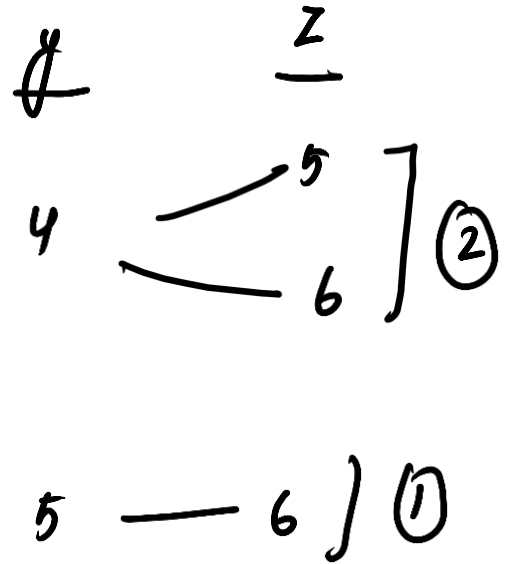
Three perfect dice D_1 , D_2 and D_3 are rolled. Let x , y and z represent the numbers on D_1 , D_2 and D_3 respectively. What is the number of possible outcomes such that $x < y < z$?

- (a) 20
- (b) 18
- (c) 14
- (d) 10

$x = 1$



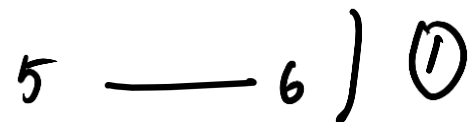
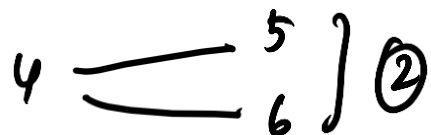
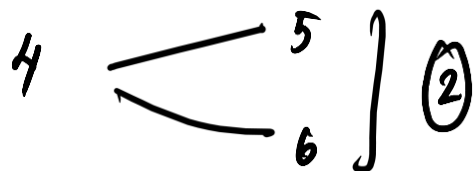
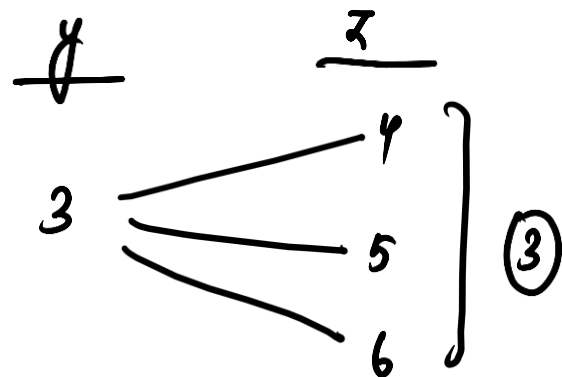
$x = 1$



$x = 1$ (10 outcomes)

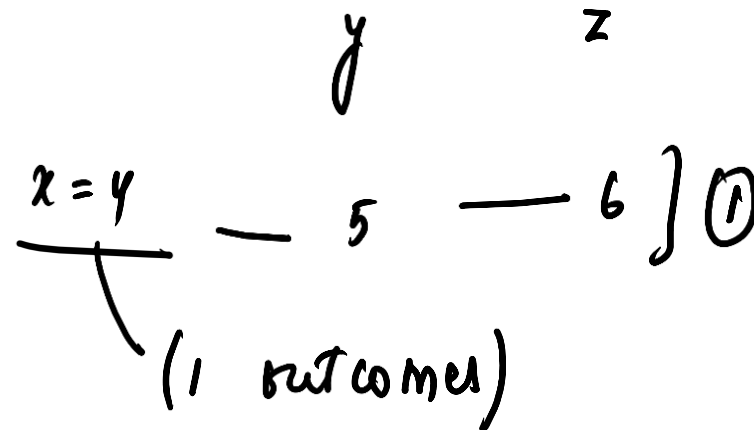
$$\frac{x=2}{\quad}$$

(6 outcomes)



$$\frac{x=3}{\quad}$$

(3 outcomes)



$$\text{Fav. outcomes} = 4 + 3 + 2 + 1$$

$$\begin{array}{r} 3 + 2 + 1 \\ 2 + 1 \\ + 1 \\ \hline 20 \end{array}$$

Three perfect dice D_1 , D_2 and D_3 are rolled. Let x , y and z represent the numbers on D_1 , D_2 and D_3 respectively. What is the number of possible outcomes such that $x < y < z$?

- (a) 20
- (b) 18
- (c) 14
- (d) 10

Ans: (a)

Q) In an examination, the probability of a candidate solving a question is $\frac{1}{2}$. Out of given 5 questions in the examination, what is the probability that the candidate was able to solve at least 2 questions?

(a) $\frac{1}{64}$

(b) $\frac{3}{16}$

(c) $\frac{1}{2}$

(d) $\frac{13}{16}$

$$\begin{aligned}
 p &= \frac{1}{2} ; q = \frac{1}{2} & P(X \geq 2) &= {}^5C_2 \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right)^2 + {}^5C_3 \left(\frac{1}{2}\right)^2 \left(\frac{1}{2}\right)^3 \\
 & & &+ {}^5C_4 \left(\frac{1}{2}\right)^1 \left(\frac{1}{2}\right)^4 + {}^5C_5 \left(\frac{1}{2}\right)^0 \left(\frac{1}{2}\right)^5 \\
 & & &= \left(\frac{1}{2}\right)^5 \left[{}^5C_2 + {}^5C_3 + {}^5C_4 + {}^5C_5 \right]
 \end{aligned}$$

$$= \left(\frac{1}{2}\right)^5 \left[{}^5C_2 + {}^5C_3 + {}^5C_4 + {}^5C_5 \right]$$

$$= \frac{1}{32} \left[10 + 10 + 5 + 1 \right]$$

$$= \frac{26}{32} = \frac{13}{16}$$

$${}^nC_r = {}^nC_{n-r}$$

$${}^nC_{n-1} = {}^nC_1 = n$$

$${}^nC_0 = {}^nC_n = 1$$

Q) In an examination, the probability of a candidate solving a question is $\frac{1}{2}$. Out of given 5 questions in the examination, what is the probability that the candidate was able to solve at least 2 questions?

(a) $\frac{1}{64}$

(b) $\frac{3}{16}$

(c) $\frac{1}{2}$

(d) $\frac{13}{16}$

Ans: (b)

Q) Three digits are chosen at random from 1, 2, 3, 4, 5, 6, 7, 8 and 9 without repeating any digit. What is the probability that the product is odd ?

(a) $\frac{2}{3}$

(b) $\frac{7}{48}$

(c) $\frac{5}{42}$

(d) $\frac{5}{108}$

Q) Three digits are chosen at random from 1, 2, 3, 4, 5, 6, 7, 8 and 9 without repeating any digit. What is the probability that the product is odd ?

(a) $\frac{2}{3}$

(b) $\frac{7}{48}$

(c) $\frac{5}{42}$

(d) $\frac{5}{108}$

Ans: (c)

Q) If $x \in [0, 5]$, then what is the probability that $x^2 - 3x + 2 \geq 0$?

(a) $\frac{4}{5}$

(b) $\frac{1}{5}$

(c) $\frac{2}{5}$

(d) $\frac{3}{5}$

Q) If $x \in [0, 5]$, then what is the probability that $x^2 - 3x + 2 \geq 0$?

(a) $\frac{4}{5}$

(b) $\frac{1}{5}$

(c) $\frac{2}{5}$

(d) $\frac{3}{5}$

Ans: (a)

Q) If $P(A \cup B) = \frac{5}{6}$, $P(A \cap B) = \frac{1}{3}$ and $P(\bar{A}) = \frac{1}{2}$, then which of the

following is/are correct?

1. A and B are independent events.
2. A and B are mutually exclusive events.

Select the correct answer using the code given below.

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Q) If $P(A \cup B) = \frac{5}{6}$, $P(A \cap B) = \frac{1}{3}$ and $P(\bar{A}) = \frac{1}{2}$, then which of the following is/are correct?

1. A and B are independent events.
2. A and B are mutually exclusive events.

Select the correct answer using the code given below.

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (a)

Q) A problem is given to three students A , B and C , whose probabilities of solving the problem independently are $\frac{1}{2}$, $\frac{3}{4}$ and p , respectively. If the probability that the problem can be solved is $\frac{29}{32}$, then what is the value of p ?

(a) $\frac{2}{5}$

(b) $\frac{2}{3}$

(c) $\frac{1}{3}$

(d) $\frac{1}{4}$

Q) A problem is given to three students A , B and C , whose probabilities of solving the problem independently are $\frac{1}{2}$, $\frac{3}{4}$ and p , respectively. If the probability that the problem can be solved is $\frac{29}{32}$, then what is the value of p ?

(a) $\frac{2}{5}$

(b) $\frac{2}{3}$

(c) $\frac{1}{3}$

(d) $\frac{1}{4}$

Ans: (d)

Q) For two events, A and B, it is given that $P(A) = \frac{3}{5}$, $P(B) = \frac{3}{10}$, and $P(A | B) = \frac{2}{3}$. If \bar{A} and \bar{B} are the complementary events of A and B, then $P(\bar{A} | \bar{B})$ equal to?

(a) $\frac{3}{7}$

(b) $\frac{3}{4}$

(c) $\frac{1}{3}$

(d) $\frac{4}{7}$

Q) For two events, A and B, it is given that $P(A) = \frac{3}{5}$, $P(B) = \frac{3}{10}$, and $P(A | B) = \frac{2}{3}$. If \bar{A} and \bar{B} are the complementary events of A and B, then $P(\bar{A} | \bar{B})$ equal to?

(a) $\frac{3}{7}$

(b) $\frac{3}{4}$

(c) $\frac{1}{3}$

(d) $\frac{4}{7}$

Ans: (a)

Q) A bag contains 20 books out of which 5 are defective. If 3 of the books are selected at random and removed from the bag in succession without replacement, then what is the probability that all three books are defective?

- (a) 0.009 (b) 0.016
(c) 0.026 (d) 0.047

Q) A bag contains 20 books out of which 5 are defective. If 3 of the books are selected at random and removed from the bag in succession without replacement, then what is the probability that all three books are defective?

- (a) 0.009 (b) 0.016
(c) 0.026 (d) 0.047

Ans: (a)

Q) There are 3 coins in a box. One is a two-headed coin; another is a fair coin; and third is biased coin that comes up heads 75% of time. When one of the three coins is selected at random and flipped, it shows heads. What is the probability that it was the two-headed coin?

(a) $\frac{2}{9}$

(b) $\frac{1}{3}$

(c) $\frac{4}{9}$

(d) $\frac{5}{9}$

Q) There are 3 coins in a box. One is a two-headed coin; another is a fair coin; and third is biased coin that comes up heads 75% of time. When one of the three coins is selected at random and flipped, it shows heads. What is the probability that it was the two-headed coin?

(a) $\frac{2}{9}$

(b) $\frac{1}{3}$

(c) $\frac{4}{9}$

(d) $\frac{5}{9}$

Ans: (c)

Q) In a college, 25% of the boys and 10% of the girls offer Mathematics. The girls constitute 60% of the total number of students. If a student is selected at random and is found to be studying Mathematics. The probability that the student is a girl, is

(a) $\frac{1}{6}$
(c) $\frac{5}{8}$

(b) $\frac{3}{8}$
(d) $\frac{5}{6}$

Q) In a college, 25% of the boys and 10% of the girls offer Mathematics. The girls constitute 60% of the total number of students. If a student is selected at random and is found to be studying Mathematics. The probability that the student is a girl, is

(a) $\frac{1}{6}$
(c) $\frac{5}{8}$

(b) $\frac{3}{8}$
(d) $\frac{5}{6}$

Ans: (b)

Q) If A and B are any two events, then $P(\bar{A} \cap B)$ is equal to

- (a) $P(\bar{A})P(\bar{B})$ (b) $1 - P(A) - P(B)$
(c) $P(A) + P(B) - P(A \cap B)$ (d) $P(B) - P(A \cap B)$

Q) If A and B are any two events, then $P(\bar{A} \cap B)$ is equal to

- (a) $P(\bar{A})P(\bar{B})$ (b) $1 - P(A) - P(B)$
(c) $P(A) + P(B) - P(A \cap B)$ (d) $P(B) - P(A \cap B)$

Ans: (d)

Q) For two dependent events A and B, it is given that $P(A) = 0.2$ and $P(B) = 0.5$. If $A \subseteq B$, then the values of conditional probabilities $P(A|B)$ and $P(B|A)$ are respectively

(a) $\frac{2}{5}, \frac{3}{5}$

(b) $\frac{2}{5}, 1$

(c) $1, \frac{2}{5}$

(d) Information is insufficient

Q) For two dependent events A and B, it is given that $P(A) = 0.2$ and $P(B) = 0.5$. If $A \subseteq B$, then the values of conditional probabilities $P(A|B)$ and $P(B|A)$ are respectively

(a) $\frac{2}{5}, \frac{3}{5}$

(b) $\frac{2}{5}, 1$

(c) $1, \frac{2}{5}$

(d) Information is insufficient

Ans: (b)

Q) In a class of 125 students 70 passed in Mathematics, 55 passed in Statistics and 30 passed in both. What is the probability that a student selected at random from the class has passed in only one subject?

- (a) $\frac{13}{25}$ (b) $\frac{3}{25}$ (c) $\frac{17}{25}$ (d) $\frac{8}{25}$

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Ans: (a)

Q) What is the probability that the roots of the equation $x^2 + x + n = 0$ are real, where $n \in N$ and $n < 4$?

- (a) 0 (b) $\frac{1}{4}$
(c) $\frac{1}{3}$ (d) $\frac{1}{2}$

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Ans: (a)

Q) Let A , B and C be three mutually exclusive and exhaustive events associated with a random experiment. If $P(B) = 1.5 P(A)$ and $P(C) = 0.5 P(B)$, then $P(A)$ is equal to

(a) $\frac{3}{4}$

(b) $\frac{4}{13}$

(c) $\frac{2}{3}$

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Ans: (b)

Q) An experiment consists of flipping a coin and then flipping it a second time if head occurs. If a tail occurs on the first flip, then a six-faced die is tossed once. Assuming that the outcomes are equally likely, what is the probability of getting one head and one tail?

(a) $1/4$

(b) $1/36$

(c) $1/6$

(d) $1/8$

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Ans: (d)

Q) Consider the following statements :

1. If A and B are exhaustive events, then their union is the sample space.
2. If A and B are exhaustive events, then their intersection must be an empty event.

Which of the above statements is/are correct ?

- | | |
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| (a) 1 only | (b) 2 only |
| (c) Both 1 and 2 | (d) Neither 1 nor 2 |

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Ans: (b)

Q) If three natural numbers from 1 to 100 are selected randomly, then probability that all are divisible by both 2 and 3, is

(a) $\frac{4}{105}$

(b) $\frac{4}{33}$

(c) $\frac{4}{35}$

(d) $\frac{4}{1155}$

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Ans: (d)

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