

PROBABILITY (2023)

Class 12 - Mathematics

Section A

- If $P(\text{not } A) = 0.7$, $P(B) = 0.7$ and $P(B/A) = 0.5$, then find $P(A/B)$ and $P(A \cup B)$.
- A die is thrown three times. Find $P(\frac{A}{B})$ and $P(\frac{B}{A})$, if $A = 4$ appears on the third toss, $B = 6$ and 5 appear respectively on first two tosses.
- The bag A contains 8 white and 7 black balls while the bag B contains 5 white and 4 black balls. One ball is randomly picked up from the bag A and mixed up with the balls in bag B. Then a ball is randomly drawn out from it. Find the probability that ball drawn is white.
- If A and B are two events such that $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$ and $P(A \cup B) = \frac{5}{12}$, find $P(\frac{A}{B})$ and $P(\frac{B}{A})$.

Section B

- A letter has come either to NADIA or DIANA. On the envelope just two consecutive letters IA are visible. What is the probability that the letter has come to DIANA?
 - $\frac{1}{8}$
 - $\frac{1}{4}$
 - $\frac{3}{4}$
 - $\frac{1}{2}$
- A and B are two students. Their chances of solving a problem correctly are $\frac{1}{3}$ and $\frac{1}{4}$, respectively. If the probability of their making a common error is $\frac{1}{20}$ and they obtain the same answer, then the probability of their answer to be correct is
 - $\frac{1}{12}$
 - $\frac{1}{40}$
 - $\frac{10}{13}$
 - $\frac{13}{120}$
- 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
 - $\frac{1}{4}$
 - $\frac{4}{15}$
 - $\frac{1}{9}$
 - $\frac{1}{3}$
- If A and B are two events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(\frac{A}{B}) = \frac{1}{4}$ then $P(A' \cap B')$ equals
 - $\frac{1}{12}$
 - $\frac{3}{16}$
 - $\frac{1}{4}$
 - $\frac{3}{4}$
- Two integers are selected at random from the set $\{1, 2, \dots, 11\}$. Given that the sum of selected numbers is even, the conditional probability that both the numbers are even is
 - $\frac{2}{5}$
 - $\frac{7}{10}$
 - $\frac{1}{2}$
 - $\frac{3}{5}$

Section C

10. In a group of 400 people, 160 are smokers and non-vegetarian, 100 are smokers and vegetarian and the remaining are non-smokers and vegetarian. The probabilities of getting a special chest disease are 35%, 20% and 10%, respectively. A person is chosen from the group at random and is found to be suffering from the disease. What is the probability that the selected person is a smoker and non-vegetarian?
11. For A, B and C the chances of being selected as the manager of a firm are in the ratio 4 : 1 : 2 respectively. The respective probabilities for them to introduce a radical change in marketing strategy are 0.3, 0.8 and 0.5. If the change does take place, find the probability that it is due to the appointment of B or C.
12. A letter is known to have come either from LONDON or CLIFTON. On the envelope just two consecutive letters ON are visible. What is the probability that the letter has come from
- LONDON
 - CLIFTON?
13. A and B appear for an interview for two vacancies in the same post. The probability of A's selection is $\frac{1}{6}$ and that of B's selection is $\frac{1}{4}$. Find the probability that at least one of them is selected.

Section D

14. The probabilities that a student pass in Mathematics, Physics and Chemistry are m , p and c respectively. Of these subjects, the student has a 75% chance of passing in at least one, a 50% chance of passing in at least two and a 40% chance of passing in exactly two. Find the value of $p + m + c$.
15. A problem in mathematics is given to three students whose chances of solving it correctly are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. What is the probability that only one of them solves it correctly?

Section E

16. A laboratory blood test is 99% effective in detecting a certain disease when it is in fact, present. However, the test also yields a false positive result for 0.5% of the healthy person tested (i. e if a healthy person is test then with probability 0.005 the test will imply he has the disease) If 0.1 percent of the population actually has the disease, what is the probability that a person has the disease given that his test result is positive.
17. A card from a pack of 52 playing cards is lost. From the remaining cards of the pack three cards are drawn at random (without replacement) and are found to be all spades. Find the probability of the lost card being a spade.
18. There are three urns containing 2 white and 3 black balls, 3 white and 2 black balls, and 4 white and 1 black balls, respectively. There is an equal probability of each urn being chosen. A ball is drawn at random from the chosen urn and it is found to be white. Find the probability that the ball drawn was from the second urn.
19. There are three coins. One is a two headed coin (having head on both faces), another is a biased coin that comes up heads 75% of the times and third is also a biased coin that comes up tails 40% of the times. One of the three coins is chosen at random and tossed and it shows head. What is the probability that it was the two headed coin?