

Class: XII
Subject: Maths
Topic: Probability
No. of Questions: 27

Q1. If $P(A) = 0.65$, $P(B) = 0.15$, then $P(\bar{A}) + P(\bar{B}) =$

- A. 1.5
- B. 1.2
- C. 0.8
- D. None of these

Q2. A carton contains 20 bulbs, out of which 5 are defective. If a sample of 3 bulbs is selected at random, find the probability that 2 of them are defective bulbs.

- A. 1/16
- B. 3/64
- C. 9/64
- D. None of these

Q3. Out of 800 families with 4 children each, how many families would you expect to have 2 boys and 2 girls each?

- A. 500
- B. 400
- C. 300
- D. 200

Q4. A random variable X has the probability distribution as shown below:

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

- A. 0.87
- B. 0.77
- C. 0.35
- D. 0.50

Q5. If X has binomial distribution with mean np and variance npq, then $\frac{P(X = k)}{P(X = k - 1)}$ is equal to

- A. $\frac{n - k}{k - 1} \cdot \frac{p}{q}$
- B. $\frac{n - k + 1}{k} \cdot \frac{p}{q}$
- C. $\frac{n + 1}{k} \cdot \frac{q}{p}$
- D. $\frac{n - 1}{k + 1} \cdot \frac{q}{p}$

Q6. In a binomial distribution, mean is 3 and standard deviation is $\frac{3}{2}$. The probability distribution is

- A. ${}^6C_r \left(\frac{1}{2}\right)^6; r = 0, \dots, 6$
- B. ${}^6C_{r+1} \left(\frac{1}{2}\right)^6; r = 0, \dots, 6$
- C. ${}^5C_r \left(\frac{1}{2}\right)^5; r = 0, \dots, 5$
- D. ${}^5C_{r+1} \left(\frac{1}{2}\right)^5; r = 0, \dots, 5$

Q7. If the mean and variance of a binomial variable X are 2 and 1 respectively, then what is the probability that X is greater than 1?

- A. $2/3$
- B. $4/5$
- C. $7/8$
- D. $11/16$

Q8. If mean and variance of a random variable X having a binomial distribution are 4 and 2 respectively, then $P(X = 1)$ is equal to

- A. $\frac{1}{32}$
- B. $\frac{1}{16}$
- C. $\frac{1}{8}$
- D. $\frac{1}{4}$

Q9. The mean and variance of a binomial distribution are 6 and 4 respectively. The parameter n is

- A. 18
- B. 12
- C. 10
- D. 9

Q10. The mean and the variance of a binomial distribution are 4 and 2 respectively. What is the probability of two successes?

- A. $37/256$
- B. $219/256$
- C. $128/256$
- D. $28/256$

Q11. The mean height of soldiers is 68.52 inches with variance of 10.8 inches. How many soldiers in a regiment of 1000 would you expect to be over 6 feet?

- A. 100
- B. 200
- C. 125
- D. 150

Q12. Under a normal curve, mean $\pm 3\sigma$ covers an area equal to

- A. 99.73%
- B. 95.45%
- C. 75.15%
- D. None of these

Q13. Which of the following is correct for normal curve?

- A. Mean = Median
- B. Mean = Mode
- C. Mean = Median = Mode
- D. None of these

Q14. Which distribution is also known as Bell shaped distribution?

- A. Binomial
- B. Poisson
- C. Normal
- D. Frequency Distribution

Q15. If A and B are two events such that $P(A) > 0$ and $P(B) < 1$, then $P(A|\bar{B})$ is equal to

- A. $1 - P(\bar{A}|B)$
- B. $1 - P(A|B)$
- C. $\frac{P(\bar{A})}{P(B)}$
- D. $1 - P(\bar{A}|\bar{B})$

Q16. The probability that an event A occurs in a single trial of an experiment is 0.4. Three independent trials of the experiment are performed. The probability that A occurs at least once is

- A. 0.936
- B. 0.784
- C. 0.904
- D. 0.788

Q18. The probability of India winning a test match against West Indies is $1/2$. Assuming independence from match to match, the probability that in a 5 match series India's second win occurs at the third test is

- A. $1/8$
- B. $1/4$
- C. $1/2$
- D. $2/3$

Q19. The number of times a fair coin must be tossed so that the probability of getting at least one head is at least 0.95 is

- A. 5
- B. 6
- C. 7
- D. 12

Q20. A box contains N coins, m of which are fair and the rest of them 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. The probability that the coin drawn is fair is

- A. $\frac{8m}{8N + m}$
- B. $\frac{m}{8N + m}$
- C. $\frac{9m}{8N + m}$
- D. $\frac{9N}{8N + m}$

Q21. P speaks truth in 75% of the cases, while B in 90% of the cases. In what per cent of cases are they likely to contradict each other in stating the same fact? Do you think that statement of B is true? [All India 2013]

Q22. The probabilities of two students A and B coming to the school in time are $\frac{3}{7}$ and $\frac{5}{7}$, respectively. Assuming that the events, 'A coming in time' and 'B coming in time' are independent, find the probability of only one of them coming to the school in time.

Write at least one advantage of coming to school in time. [Value Based Question; Delhi 2013]

Q23. 12 cards numbered 1 to 12 are placed in a box, mixed up thoroughly and then a card is drawn at random from the box. If it is known that the number on the drawn card is more than 3, then find the probability that it is an even number. [All India 2008]

Q24. Three cards are drawn successively with replacement from a well-shuffled deck of 52 cards. If getting a card of spade is a success, then find the probability distribution of number of success. [Delhi 2009C]

Q25. There are three coins. One is a two-headed coin (having head on both faces), other is a biased coin that comes up heads 75% of the times and third is an unbiased coin. 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. [Foreign 2011; Delhi 2009]

Q26. In a class, 5% of boys and 10% of girls have an IQ of more than 150. In the class, 60% are boys and rest are girls. If a student is selected at random and found to have an IQ of more than 150, then find the probability that the student is boy. [All India 2010C]

Q27. A doctor is to visit a patient. From the past experience, it is known that the probabilities of doctor coming by train, bus, scooter and taxi are $\frac{1}{10}$, $\frac{1}{5}$, and $\frac{2}{5}$, respectively. The probabilities that he will be late are $\frac{1}{4}$, $\frac{1}{3}$ and $\frac{1}{12}$, if he comes by train, bus and scooter respectively but by taxi, he will not be late. When he arrives he is late; what is the probability that he came by bus? [Delhi 2008C]

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