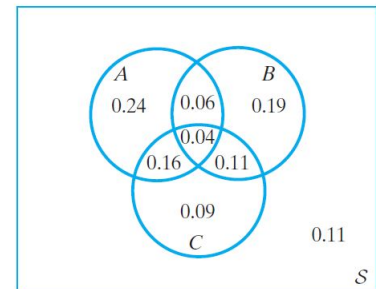


Question Bank for Probability and Statistics

AI-DS 3rd Sem
CSV TU Bhilai
Unit I

November 30, 2022

1. What do you mean by Probability. Define Sample Space and Events with Example. Write two properties of probability of events from a sample space.
2. Check whether the following can serve as probability distribution:
 - $f(x) = \frac{x-2}{2}$ for $x = 1, 2, 3, 4$
 - $g(x) = \frac{x^2}{25}$ for $x = 0, 1, 2, 3, 4$
 - $h(x) = \frac{x}{10}$ for $x = 0, 1, 2, 3, 4$
 - $i(x) = \frac{x-3}{5}$ for $x = 0, 1, 2, 3, 4$
3. What are mutually exclusive events and mutually exhaustive events. Explain with examples.
4. What is Conditional Probability. Ten cards numbered 1 to 10 are placed in a box, mixed up thoroughly and then one card is drawn randomly. If it is known that the number on the drawn card is more than 3, what is the probability that it is an even number?



5. With reference to the figure given, answer the following:
 - $P(A|B)$
 - $P(A \cap B|C)$
 - $P(A|B \cup C)$
 - $P(A|B \cap C)$
 - $P(B|A^c)$
6. What do you mean by Independent Events. A die is thrown. If E is the event 'the number appearing is a multiple of 3' and F be the event 'the number appearing is even' then find whether E and F are independent ?
7. Given that $P(A) = 0.60$, $P(B) = 0.40$, and $P(AB) = 0.24$, verify that
 - $P(A|B) = P(A)$

- $P(A|B^c) = P(A)$
- $P(B|A) = P(B)$
- $P(B|A^c) = P(B)$

8. What is Bayes Theorem. Given three identical boxes I, II and III, each containing two coins. In box I, both coins are gold coins, in box II, both are silver coins and in the box III, there is one gold and one silver coin. A person chooses a box at random and takes out a coin. If the coin is of gold, what is the probability that the other coin in the box is also of gold?
9. Define Random Variable, its domain and codomain with an example. Write its two types. Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Find the probability distribution of the number of Kings.
10. An urn contains 5 red and 2 black balls. Two balls are randomly drawn. Let X represent the number of black balls. What are the possible values of X? Is X a random variable ? If yes, find the probability distribution.
11. What is Mean of a random variable. What does it signify. Let a pair of dice be thrown and the random variable X be the sum of the numbers that appear on the two dice. Find the mean of X.
12. What is Variance and standard deviation? What does they signify. Let a pair of dice be thrown and the random variable X be the sum of the numbers that appear on the two dice. Find the variance and standard deviation of X.
13. Find the mean of the continuous random variable $f(x) = x, 0 \leq x \leq 2$.
14. Determine the variance of the probability distribution of the number that appear when a fair die is rolled.