

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY KOTTAYAM

Subject: Statistical Foundations For Data Science

Assignment-1

Course Code:DSC511

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- (1) Let A and B be events. Find the expression for the event “exactly one of the events A and B occurs”. Draw a Venn diagram for this event.
- (2) How many distinct permutations are there of four red balls, two white balls, and three black balls?
- (3) In how many ways can 10 students occupy 10 desks? 12 desks?
- (4) A lot of 100 items contains k defective items. m items are chosen at random and tested. What is the probability that r items are found defective?
- (5) A coin is tossed three times. Let us assign equal probability to each of the elementary events in S. What is the probability that at least one head shows up in three throws?
- (6) A die is tossed twice and the number of dots facing up is counted and noted in the order of occurrence. Let A be the event “total number of dots is even,” and let B be the event “both tosses had an even number of dots”. Find $P(A|B)$ and $P(B|A)$.
- (7) Two fair dice are rolled. What is the conditional probability that at least one lands on 6 given that the dice land on different numbers?
- (8) A box contains 1000 light bulbs. The probability that there is at least 1 defective bulb in the box is 0.1 and the probability that there are at least 2 defective bulbs is 0.05. Find the probability in each of the following cases
 - (a) The box contains no defective bulbs
 - (b) The box contains exactly 1 defective bulb
 - (c) The box contains at most 1 defective bulb
- (9) If $P(A|B) = 0.3$, $P(B) = 0.8$, and $P(A) = 0.3$, are the events B and the complement of A independent?