ODM EDUCATIONAL GROUP
Changing your Tomorrow

Variance and Standard Deviation of random variable

SUBJECT : (MATHEMATICS)
CHAPTER NUMBER: 13
CHAPTER NAME : PROBABILITY

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Variance and Standard Deviation of random variables:-

Let X be a random variable whose possible values x_1 , x_2, x_3 …… x_n occurs with probabilities $P(x_1), P(x_2), P(x_3)\ldots\ldots, P(x_n)$ respectively.

Then the variance of X

i.e. Var (X) = $\sum_{i=1}^{n}(x_i)^2\, p(x_i) - \left(\sum_{i=1}^{n}(x_i)p(x_i)\right)^2$

i.e. Var (X) = $\sum(X)^2 - \left(\sum(X)\right)^2$

NOTE:

Standard Deviation = $\sqrt{Variance}$

Problem-1

A class has 15 students whose ages 14, 17, 15, 14, 21, 17, 19, 20, 16, 18, 20, 17, 16, 19, 20 years.

One student is selected in such a manner that each has the same chance of being chosen and

the age X of the selected student is recorded. what is the probability distribution of the random variable X?

Find mean, variance, and standard derivation of X.

Problem:- 2

In a meeting 70% of the members favour and 30% oppose a certain proposal. A member is select at random and we take x = 0 if he opposed and x=1 if he is in favour. Find Expectation of X and Variance.

Problem- 3

Three numbers are selected at random (without replacement) from first six positive integers.

If X denotes the smallest of the three numbers obtained, find the probability distribution of X. Also,

find the mean and variance of the distribution.

Problem – 4

There are 4 cards numbered 1 to 4, one number on one card. Two cards are drawn at random without replacement. Let X denote the sum of the numbers on the two drawn cards. Find the mean and variance of X.

HOME ASSIGNMENT

Q1. A coin is biased so that the head is three times as likely occur as tail. If the coin is tossed twice, Find the probability distribution of number of tails. Also fond the variance and standard deviation of distribution.

Q2. Two numbers are selected at random (without replacement) from the first six positive integers. let X denotes the larger of two numbers obtained. Find Expectation of mean of the distribution.

Q3. Suppose 10000 tickets are sold in a lottery each for rupees 1. First prize is of rupees 3000 and the second prize is of rupees 2000. There are third prizes of rupees 500 each. If you buy one ticket, then what is your expectation?

THANKING YOU

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