Assignment 3 (CBSE CLASS 9 Statistics)

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***Abstract*—This document contains the solution to Example 7 of Chapter 14 (Statistics) in the CBSE Class 9.**

PROBLEM

The marks obtained by 30 students of Class X of a certain school in a Mathematics paper consisting of 100 marks are presented in Table below. Find the mean of the marks obtained by the students.

10	20	36	92	95	40	50	56	60	70
92	88	80	70	72	70	36	40	36	40
92	40	50	50	56	60	70	60	60	80

TABLE I
LIST OF ALL MARKS

SOLUTION

marks(x_i)	Number of students(f_i)	$s_i = f_i \times x_i$
10	1	10
20	1	20
36	3	108
40	4	160
50	3	150
56	2	112
60	4	240
70	4	280
72	1	72
80	1	80
88	2	176
92	3	276
95	1	95
Total	$\sum_{i=1}^{13} f_i = 30$	$\sum_{i=1}^{13} f_i x_i = 1779$

TABLE II

The formulae for calculating the mean is

$$\mathbf{m} = \left(\mathbf{F}^\top \mathbf{S}\right)\left(\mathbf{K}^\top \mathbf{F}\right)^{-1} \tag{1}$$

where, $\mathbf{F}$ is a column matrix of f_i , $\mathbf{S}$ is a column matrix of $f_i \times x_i$, $\mathbf{K}$ is a row matrix of 1's with 13 columns and $\mathbf{m}$ is mean

$$\mathbf{F} = \begin{pmatrix} f_1 \\ f_2 \\ . \\ . \\ f_{12} \\ f_{13} \end{pmatrix} \tag{2}$$

$$\mathbf{S} = \begin{pmatrix} f_1 x_1 \\ f_2 x_2 \\ . \\ . \\ f_{12} x_{12} \\ f_{13} x_{13} \end{pmatrix} \tag{3}$$

$$\mathbf{K} = \begin{pmatrix} 1 \\ 1 \\ . \\ . \\ 1 \\ 1 \end{pmatrix} \tag{4}$$

on keeping the values from TABLE II in eq(2) and eq(3) and substituting these in eq(1) we will get

$$\mathbf{m} = 59.3 \tag{5}$$

$\therefore$ the mean of marks of students is 59.3