# **CHAPTER ONE**

# **STATISTICS – PART TWO**

### Determination of the mean by the use of an assumed mean:

- This is another method of finding the mean.
- -- For example if we want to find the mean of 1,3,4,5 and 8, using an assumed mean, we go through these steps:
- 1.We write the numbers in a column form i.e.

- 8
- 2. We next choose one of these numbers as the assumed mean. This number must be the middle number or must be positioned around the middle. For the given example, we therefore choose 4 as the assumed mean.
- 3. We then calculate the deviation of each of these numbers, with reference to the assumed mean.
- 4. The deviation (d) of a given number is given by d = x assumed mean, where x = the number. The assumed mean is represented by the letter A. i.e.

	Number, X	deviation d = (x - A) d = (x - 4)
	1	-3
	4	0
5	8	1 4
		$\sum d = 1$

5. We then find the total deviation i.e.  $\Sigma d$ .

- 6. We then calculate the mean using the formula mean =  $A + \frac{\sum d}{N}$ , where A = assumed mean and N = the number of items or numbers under consideration, which is 5 in the given example.
- 7. For the given example, the mean  $= 4 + \frac{1}{5} = 4 + 0.2 = 4.2.$

NB: The deviation d = (x - A) = (x - 4) in the given example.

- If the number x = 1, then d = (1 4) = -3.
- Also if the number x = 5, then d = (5 4)= 1.
- Lastly if the number x = 8, then d = (8 4) = 4
- Q1. Find the mean of 5,7, 5, 4, 3, 8 by using an assume mean.

Number, X	deviation d = (x - 5)
5	0
7	2
5	0
4	- 1
3	- 2
8	3

Solution

$$\sum d = 2$$

Since there are six numbers => N = 6. The mean =  $\overline{x} = A + \sum_{N=0}^{\infty} d$ =>  $\overline{x} = 5 + \frac{2}{6} = 5 + \frac{1}{3} = 5 + 0.33$ => x = 5.33

# Determination of the mean by means of an assumed mean, when frequencies are involved:

Whenever frequencies are involved, the mean is determined using the formula  $x = A + \sum Fd$ 

$$\frac{\Sigma}{\Sigma F}$$

Q2.Find the mean of this given data, by using an assumed mean.

Х	1	2	5	8
F	6	2	4	3

Solution Let assumed mean = 5

	X	$\mathbf{d} = (\mathbf{x} - \mathbf{A})$	F	Fd	
	1 2 5 8	- 4 - 3 0 3	6 2 4 3	- 24 - 6 0 9	
The 1	mean = 2	$\overline{\mathbf{x}} = \mathbf{A} + \underline{\sum} \mathbf{F} \mathbf{d}$	$\sum f = 1$	5 ∑Fd =	-21

$$= 5 + \frac{(-21)}{15}$$
  
= 5 + (-1.4) = 5 - 1.4 = 3.6

NB: To get the value of the Fd, we multiply the d by F.

Q3

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Age / yrs	2	1	3	5
Freq	3	1	2	3

The given table shows the age distribution of a group of friends. By using an assumed mean, calculate the mean

#### Solution

Let assumed mean = 3.

Age x	d = (x - 3)	F	Fd
2 1 3 5	- 1 - 2 0 2	3 1 2 3	- 3 - 2 0 6
		$\Sigma F = 9$	$\sum Fd = 1$

Mean = A + 
$$\sum Fd$$
 = 3 +  $\frac{1}{9}$  = 3.1

### The mean deviation:

- Basically two types of mean deviations may be said to exist, and these are:
- i. The mean deviation of ungrouped data.
- ii. The mean deviation of grouped data.

## Mean deviation of ungrouped data:

This can be in two forms and these are

a. the mean deviation which is not associated with frequencies.

b. the mean deviation which is associated with frequencies.

## Mean deviation which is not associated with Frequencies:

In this case, the mean deviation =  $\sum_{N} \left| x - \overline{x} \right|$ 

Where  $\overline{x}$  = the mean, and N = the total number of items under consideration.

Q1. Find the mean deviation of the following set of numbers 11, 12, 13, 14, 15.

Solution

Determine the mean first

The mean 
$$= \overline{x} = \underline{11 + 12 + 13 + 14 + 15}{5}$$
  
=  $\underline{65}{5} = 13.$ 

We then construct the next table

Number or	x – x
Х	x – 13
11 12 13 14	- 2 - 1 0 1
13	$\frac{2}{\sum  \mathbf{x} - \overline{\mathbf{x}}  = 0}$

Since five numbers are given, then N = 5.

Mean deviation =  $\underline{\sum \left| x - \overline{x} \right|}_{N} = \underline{0}_{5} = 0.$ 

# b. Mean deviation which is associated with frequencies:

- In this case, the mean deviation =  $\sum_{i=1}^{n} \frac{|x - \overline{x}|}{\sum_{i=1}^{n}}$ 

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Number	10	11	12	13
Frequency	5	2	1	10

Determine the mean deviation of the given table.

Solution

First determine the mean

Number x	Frequency F	FX
10	5	50
11	2	22
12	1	12
13	10	130
	$\Sigma F = 18$	$\sum FX = 214$

 $Mean = \overline{x} = \sum FX = 214 = 11.9$  $\sum F$ 

We then draw the table next in which  $\overline{x} = 11.9$ .

Number X	$\left  x - \overline{x} \right $	Frequency F	$F \left  x - \overline{x} \right $
10 11 12 13	- 1.9 - 0.9 0.1 1.1	5 2 1 10	- 9.5 - 1.8 0.1 11
		$\Sigma F = 18, \Sigma$	$\left  F \left  x - \overline{x} \right  = -0.2$

Mean deviation

$$= \underline{\sum F \left| x - \overline{x} \right|}_{\sum F} = - \underline{0.2}_{18} = - 0.011.$$