

Measures of Central Tendency

Statistics Sub

- Lies, Damn Lies & Statistics!
- However, Statistics are useful in practice, if used properly!
- For example, how do we standardise on the height of a "Standard" door?
- How do we evaluate the market performance of a new product? etc.

- 3 -

- In statistics there are various methods to establish the "Average" value.

Arithmetic Mean

- Colloquially, it is commonly referred to as "Average" or "Mean" value.

$$\text{Mean Value} = \frac{\sum x}{N}$$

We have

$$N = 12$$

$$\sum x = 59 + 65 + 61 + 55 + \dots + 69 + 78 = 809$$

$$\therefore \text{Mean} = 809/12 = \underline{\underline{67.42}}$$

- 2 -

Let us start from the very beginning!

Ex: 1

What is the "typical" age of a person in the following USA class? The age of persons are as below:

59, 65, 61, 55, 70, 72, 75, 68, 70, 67, 69, 78

- We normally refer to such a value as "Average" value
- In statistics terminology it is called "Measure(s) of Central Tendency"

- 4 -

\therefore "Average" or "Typical" age of a person in the class is 67.42 years

- Sounds okay, looking at the data values

Ex: 2

Let us now consider a primary school class with an adult teacher!

6, 7, 8, 6, 6, 5, 5, 7, 55

$$\therefore \text{Mean} = \frac{6+7+8+6+6+5+5+7+55}{9}$$

$$= \frac{105}{9} = \underline{\underline{11.7}} \text{ years!}$$

which is NOT a "Typical Age" of the class!

- Arithmetic Mean is not useful when there are a large "outlying" values.
- This is very common in practice and hence this value is not normally used as a "Representative" value of a group.

Median Value

Middle value of the group, after the values are arranged in an "Ascending" order.

Ex-3

Find the Median value of the age in Ex.2

Let us arrange the values in Ascending order

5	5	6	6	6	7	7	8	55
1	2	3	4	5	6	7	8	9

↑
Middle value.

Median value = 6 years

This value makes more sense!

- Hence, Median Value is invariably used to represent a group of values.

Mode

- Mode is often used as "representative" value, especially in the case for "discrete values with limited out-comes"

- For ex, values obtained from rolling of a cubic dice. The out-comes are 1, 2, 3, 4, 5 & 6.

Mode is defined as the "most frequently" occurring value.

Ex.4 Find the Mode of Ex.2

We can write the values as below:

5,5	- 2	
6,6,6	- 3	∴
7,7	- 2	Mode = <u>6</u>
8	- 1	
45	- 1	

H.W.

- Find the Median & Mode of Ex.1
- Find the Mean of 10, 20, -30.
- A person travels from A to B at 30km/h and travels back at 60km/h. What is the Average speed?