

ECO-HC-3036: STATISTICAL METHODS FOR ECONOMICS

Unit: 1 Introduction and Overview

Topic: Population and Sample

B.A./B.Sc (H) 3rd Sem.

By

Mofidul Hassan

Assistant Professor

Department of Economics, Rangia College

Population and Sample

- **Population** in statistics means totality of the items under study. A population is always all the individuals/items who possess certain characteristics (or a set of characteristics), according to the purpose of the study.
- **Sample** refers to a group or section of the population. A sample consists of only a few (a fraction of the total population) individual units. A sample is smaller than the population and is capable of providing reasonably accurate information about the population at a much lower cost and shorter time.

Example:

Suppose, we want to study about the average height of the students of Economics honours of Rangia College. Then all the students of the Economics honours are the population of the present study. Now if we select 20% of the students among all the students, then this 20% of students are called the sample.

Population **parameter** and sample **statistic**

- The population characteristics (or the constant) which we are estimating is called a **parameter**. In other words, the numerical measure of a population is called a **population parameter**. A parameter is usually denoted with Greek letters such as mean μ and standard deviation σ .
- Any quantity obtained from a sample for the purpose of estimating a population parameter is called a **sample statistic** or simply the **statistic**. In simple words, the numerical measure of a sample is called a **sample statistic**. Sample statistics are usually denoted by Roman letters such as mean \bar{x} , standard deviation s etc.

Measures of location

1. Mean

2. Median

3. Quartiles

4. Percentiles, and

5. Trimmed Means

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Mean

Mean or Arithmetic Mean is defined as the sum of the values of all observations divided by the number of observations and is usually denoted by \bar{x} . In general, if there are n observations as $X_1, X_2, X_3, \dots, X_n$, then the Arithmetic Mean is given by

$$\bar{x} = \frac{X_1 + X_2 + X_3 + \dots + X_n}{n}$$

$$\bar{x} = \frac{\Sigma X}{n}$$

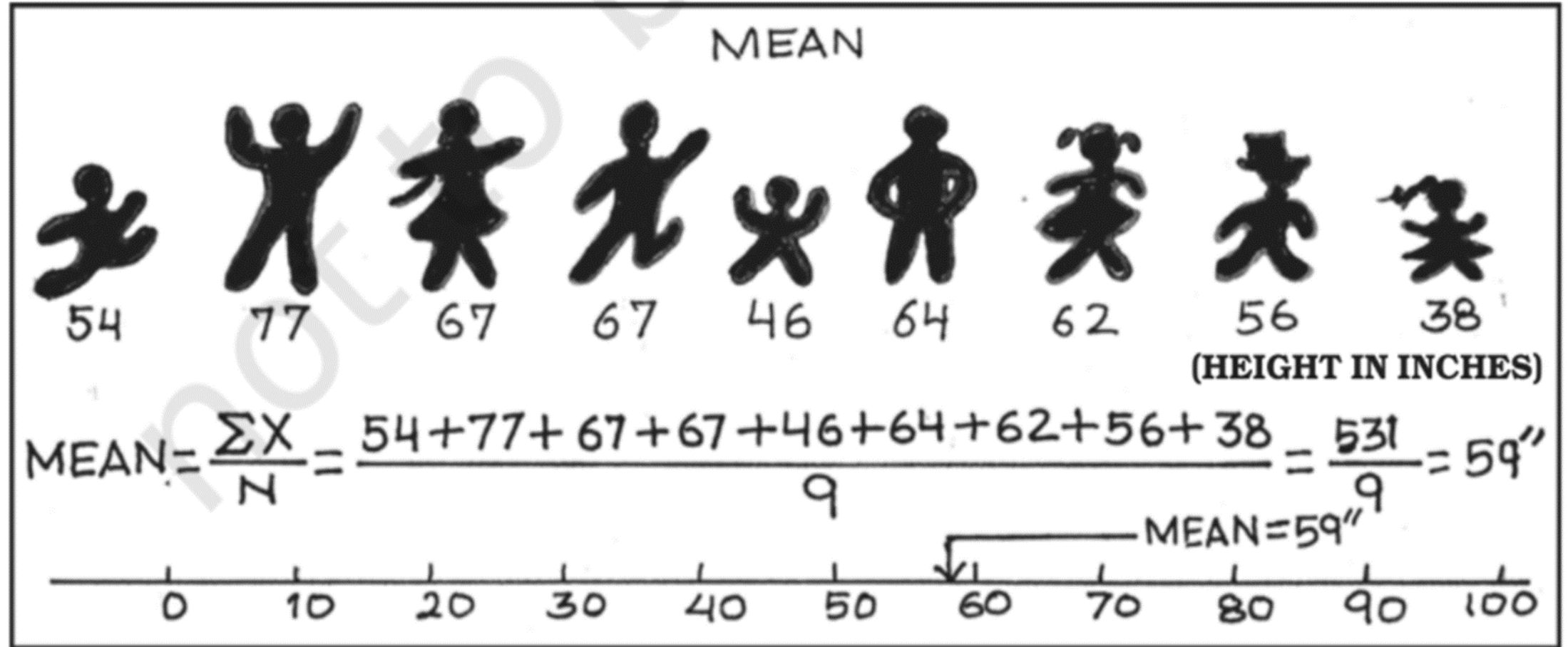
where, ΣX = sum of all observations

n = total number of observations.

Exercise 1: Calculate the average height (in inch) of the 9 students from the following data:

54, 77, 67, 67, 46, 64, 62, 56, 38

Solution:



Problem 1

Q. Calculate Arithmetic Mean from the data showing marks of a student in a class test:

Economics=30

Statistics= 54

Mathematics=59

English= 63

Geography= 55

MIL= 99

Disadvantage of Mean:

Its is affected by the presence of extreme values (too large or very small observation)

Median

- ✓ **Median** is that positional value of the variable which divides the distribution into two equal parts. The Median is the “middle” element when the data set is arranged in order of the magnitude.
- ✓ The median is computed by sorting the data from smallest to largest and finding out the middle value.
- Example 1: Find out the median from the following observation:

7, 8, 5, 2, 9, 11, 13, 3, 4

Solution: Arranging the data, in ascending order we have:

2, 3, 4, 5, 7, 8, 9, 11, 13

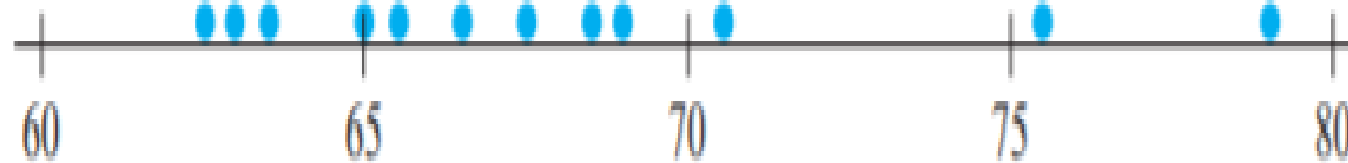
Here, the “mid-value” is 7, so the median is 7. Half of the scores are larger than 7 and half of the scores are smaller.

- If there are even numbers in the data, there will be two observations which fall in the middle. The median in this case is computed as the average of the two middle values.

Q1. The following data provides marks of 10 students. Calculate the median marks.
25, 72, 28, 65, 29, 60, 30, 54, 32, 53

Q. Calculate Arithmetic Mean from the data showing marks of a student in a class test:

Economics=60, Statistics= 65 , Mathematics=70, English= 75, MIL= 80



Next Class

- ✓ Other Measures of Location: Quartiles, Percentiles, and Trimmed Means