U3A Maths

25-Feb-2022 Term 1/Week 4

Grouped Frequency Table

Review $z = \frac{x-\mu}{\sigma}$

Z score "normalises" or "Standardises" the location of data value with respect to the mean value. This better insight and inference into the data value.

- Grouped Frequency Table provides a more efficient way to present large number of data values.

- Let us consider following Example

Ex.1

The of participants at a retirement seminar is as given below: x-Min

56, 58, 62, 62, 69, (48), 70, 71, 72, 55, 56, 58, 65, 64, 51, 60, 61, 49, 65, 70, 66, 58, 62, 67, 59, 62, 64, 63, 48, 52, 54, 74, 54, (75), 55

x-Max

We have 'n' = 35 persons. {Population}

- The data itself does not make much sense, but grouped data provides a much better picture.

(of course, we can calculate mean (μ) and Std. dev(σ) from the data values)

- How many groups?

The best estimate is obtained by using $\simeq \sqrt{n}$

$\therefore$ No. of groups $\simeq \sqrt{35} = 5.9$ (say 6)

- We now need to establish the "group size" or "Class width".

- "same class width" is invariably used, except for extremities

- We have

$x_{min} = 48$; $x_{max} = 75$

$\therefore$ Class width $\simeq \frac{75-48}{6}$

$= 4.5$ (say 5)

- We can now write "Grouped Frequency Table" as below:

Class/Group	Frequency (f)
48-52	5
53-57	6
58-62	10
63-67	7
68-72	5
73-77	2
	$n = \sum f = 35$

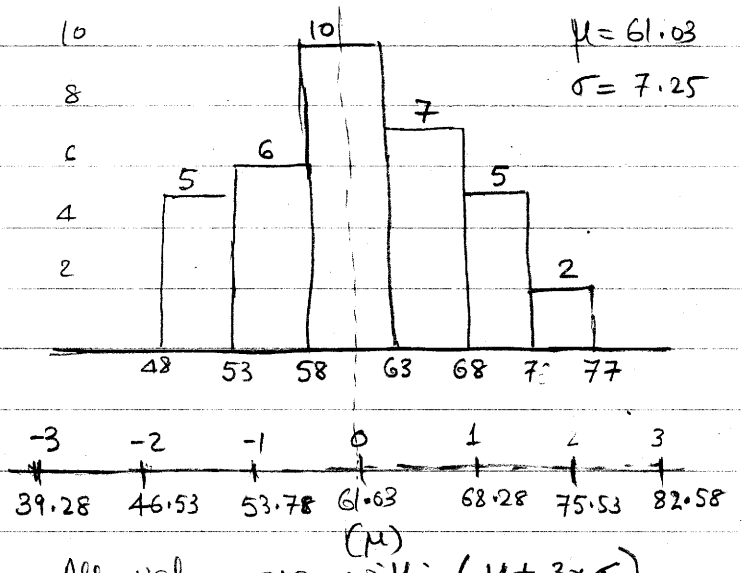
(*) Note: often 'open ended' classes are used for extremities, for ex, ≤ 48 and > 77, if there are a few odd values.

- It is possible to calculate mean & Std. dev from Grouped Freq Table., however, it is quite common to calculate mean (μ) and Std dev (σ) from raw data

- We have;

$\mu = 61.03$ & $\sigma = 7.25$

- Let us now plot the "Grouped Frequency Table" as a bar chart



- All value are within $(\mu \pm 3\times\sigma)$
- The above plot is called a "Histogram" or "Freq Distribution Plot"

Homework (Freq. Table)

The lengths of leaves (in cm) collected from an oak tree are as below:

9, 16, 13, 7, 8, 4, 18, 9, 12, 5, 9, 9, 16, 1
8, 17, 1, 10, 5, 9, 11, 15, 6, 14, 9, 1, 12, 5,
16, 4, 16, 8, 15, 14, 17, 18, 10, 17

(a) Prepare a Grouped Freq Table
(b) Draw Histogram
(c) Calculate mean (μ) and Std. dev (σ) for the given data values.

Homework (Z-score)

Prof. Smith has marked a test. The scores (out of 60) obtained by the students are:

20, 15, 26, 32, 18, 28, 35, 14, 26, 22, 17

Most students got less than 30 out of 60, hence they fail. Prof. Smith felt that the test was hard and decided fail only those who got a Z-Score less than 1.

How many students failed the test.!