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Assignment {Histogram} - 1

Example :- {10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 82, 90, 92, 94, 99}

bins = 5

bin size = 20

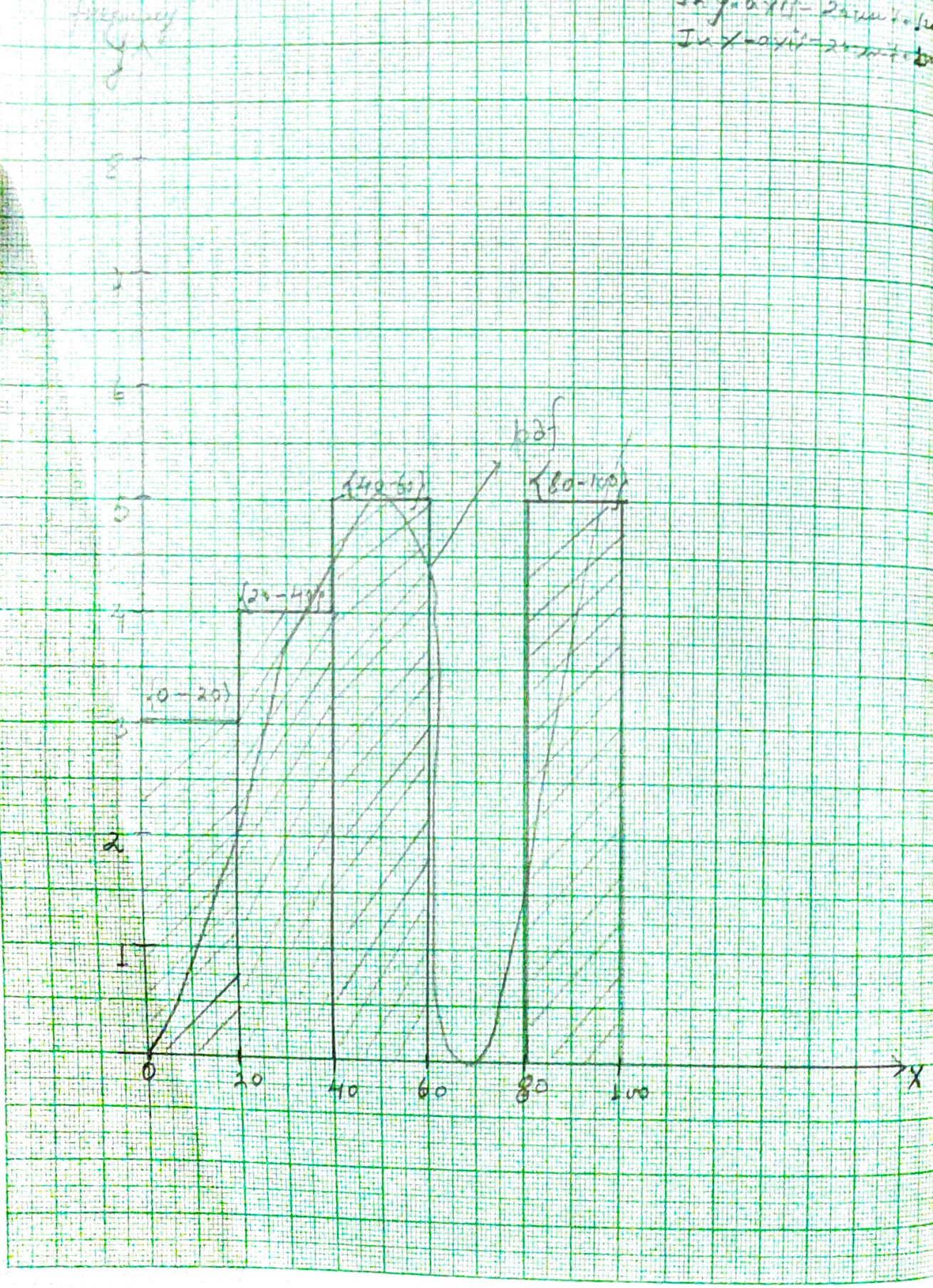
$\Rightarrow \frac{100}{20} = 5$ bins

Teacher's Signature : _____

Scale:

For x-axis:

For y-axis:



Assignment Work

Q) In a Quant test of CAT Exam, the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. construct a 80% CI about the mean?

Soln: $\sigma = 100$, $n = 25$

$\bar{x} = 520$

$$C.I = \bar{x} \pm Z_{\alpha/2} \boxed{\frac{\sigma}{\sqrt{n}}} \rightarrow S.E$$

Z-score table

α = significant value

$1 - C.I = 0.20$

$Z_{\frac{0.20}{2}} = Z_{0.10} = 1.29$

$1 - 0.10 = 0.90$

$$LF = \bar{x} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

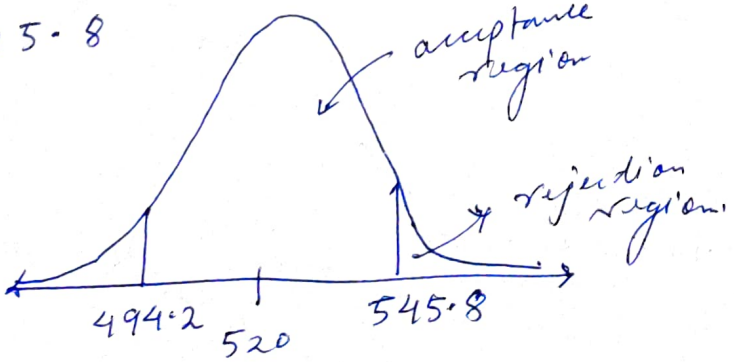
$$= 520 - 1.29 \frac{100}{\sqrt{25}} \quad 20$$

$$= 494.2$$

$$UF = \bar{x} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 + 1.29 \frac{100}{\sqrt{25}} \quad 20$$

$$= 545.8$$



Assignment 4

A car company believes that the % of residents in city ABC that owns a vehicles is 60% or less. A sales manager disagrees with this. He conducted a hypothesis testing surveying 250 residents and found that 170 responded yes to owning a vehicles.

a) State the Null and alternate hypothesis.

b) At 10% significance level, is there enough evidence to the support the idea that vehicles ownership in ABC is 60% or less?

Sol^{n}:- We are to set the null hypothesis as —

$$\left.\begin{array}{l} H_0 : p_0 \geq 60\% \\ \text{against} \\ H_1 : p_0 < 60\% \end{array}\right\}$$

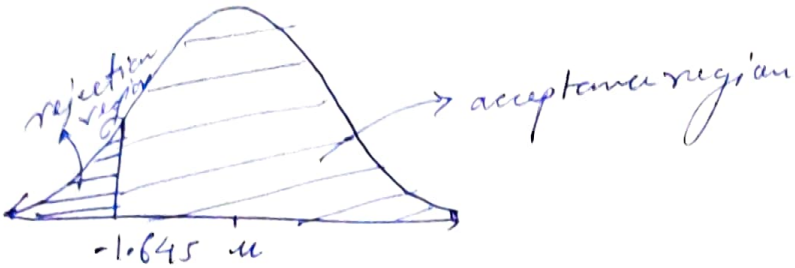
$n = 250, \quad x = 170.$

$$\hat{p} = \frac{x}{n} = \frac{170}{250} = 0.68$$

$$q_0 = 1 - p_0 = 1 - 0.60 = 0.40$$

$\alpha = 0.10, \quad C.I = 0.90$

Decision rule

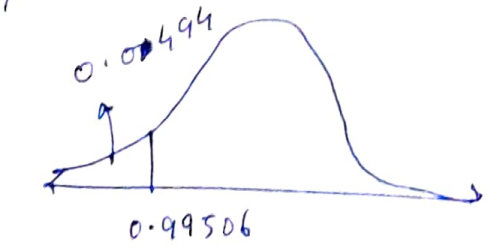


$$Z_{test} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}}$$

$$= \frac{0.08}{0.0309} = 2.588$$

$2.588 > -1.645$, we accept the H_0

p-value.



$1 - 0.99506 = 0.00494$

$= 0.0049$

i.e $0.0049 < 0.10$, we reject the null H_0.

Q What is the value of the 99 percentile?

2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12

↓ 99th percentile

Ans) 99 percentiles → It means the person has got better marks than 99% of the entire students.

(I) first sort the dataset (or observe) whether the dataset is sorted or not.

i) percentile rank of x = $\frac{\text{No of value below } x}{n} \times 100$

$= \frac{17}{20} \times \cancel{100}^{5}$

$= 85$ percentile

Again

ii) percentile rank of x = $\frac{\text{No of value below } x}{n} \times 100$

$= \frac{19}{20} \times \cancel{100}^{5}$

$= 95$ percentile

So, $\frac{\text{No of value below } x}{n} \times 100 = \frac{20}{20} \times \cancel{100}^{5} = 100$ percentile

=) So the value of 99 percentile will be in between 95 — 100 percentile. somewhere between 19.8

The 99th percentile is 11.81

Ques} In left and right skewed data, what is the relationship between mean, median & mode? Draw the graphs to represent the same.

Ans} The Empirical relationship between mean, median, mode is —

$$\text{Mean} - \text{Mode} = 3(\text{Mean} - \text{Median})$$

or

$$\text{Mode} = 3\,\text{Median} - 2\,\text{Mean}$$

Graphical representation