1Q Plot a histogram

10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90
92, 94, 99

Bin = 5
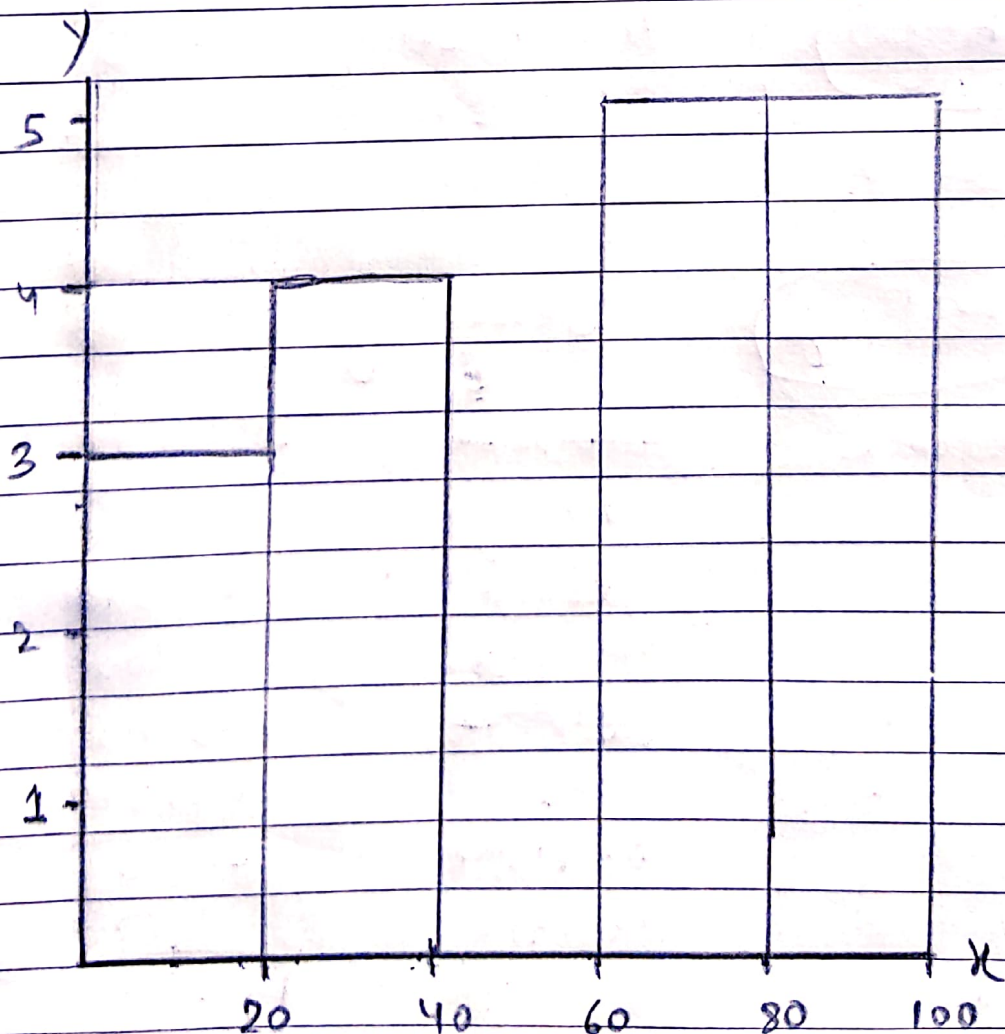Bin size = 20

Ans Short no. [Accending]

① 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

② Bin = 5

3 Bin size = 20

Q2 In a quant test of the CAT Exam, the population Standard deviation is known to be 100. A Sample of 25 tests taken has a mean of 520. Construct on 80% CI about the mean.
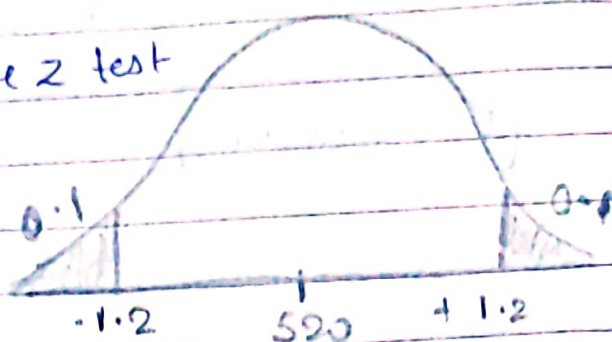
Ans:- $\sigma = 100 \implies$ w. use z test

$n = 25$

$x = 520$

$\alpha = 1 - C.I = 0.2$

0.1

$-1.2 \quad 520 \quad +1.2$

0.4

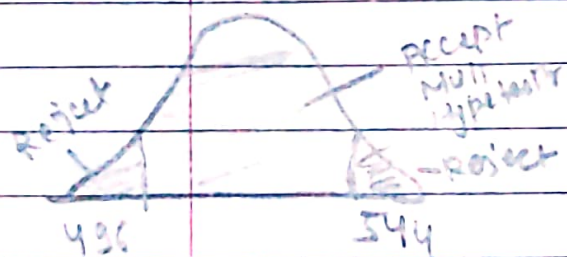Point Estimate $\pm$ margin of error

$$x \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$= \quad Z_{\alpha/2} = \frac{0.2}{2} = 0.1$

We use z-Score table, we got $0.1 = 1.2$

Now we Calculate

Lower fence : $x - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$

accept
Null
hypothesis

reject

$= 520 - 1.2 \times \frac{100}{\sqrt{25}}$

$= 520 - \frac{1.2 \times 100}{5}$ ²⁰

$= 520 - 1.2 \times 20$

$= 520 - 24$

$= \boxed{496}$

496   544

Higher fence $= x + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$

$= 520 + 1.2 \times \frac{100}{\sqrt{25}}$

$= 520 + 1.2 \times \frac{100}{5}$ ²⁰

$= 520 + 24$

$= 544$

3. A Car believes that the percentage of Citizens in the City ABC that owns a vehicles is 60% or less. A Sales manager disagree with this. He Conducted a hypothesis testing Surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

(a) State the null & alternate hypothesis.

(b) At 0 lo % Significance level, is there enough evidence to support the Idea that vehicle owner in ABC City is 60% or less.

Sol

Null Hypothesis $= H_0 = 60\%$ or less then 60%.
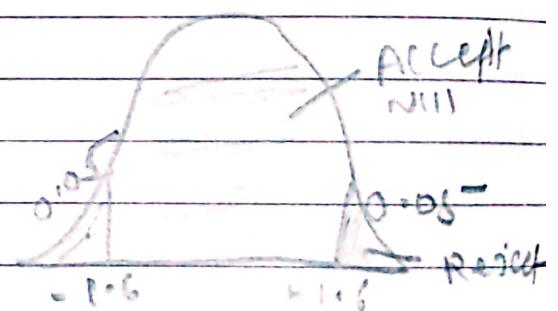
$H_1 = $ More than 60%

C I

$N = 250$

$x = 170$

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

$$P_0 = q_0 = 1 - P_0 = 1 - 0.6 = 0.4$$

$\Rightarrow$ $\alpha = 1 - C.I = 1 - .90 = 0.1$

$\Rightarrow$ Z-test $= \dfrac{\hat{p} - P_0}{\sqrt{\dfrac{P_0 q_0}{\sqrt{n}}}}$
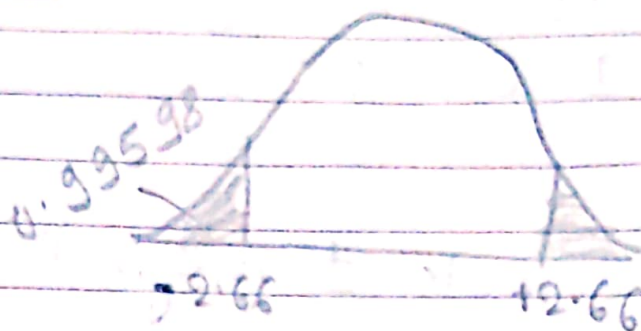
$$= \frac{0.68 - 0.6}{\sqrt{\dfrac{0.6 \times 0.4}{\sqrt{250}}}} =$$

$$= \frac{0.08}{\frac{0.489}{15.811}}$$

$= 2.666$ Reject Null Hypothesis

P value =

Pr value : $1 - 0.99598$

$= 0.00402 + 0.00402$

$= 0.00804$

$0.00804 < 0.1$

P value < Significance level → Reject Null Hypothesis

$0.00804 < 0.1$

Q4 What is the value of the 99 percentile?

Data set :- 2, 2, 3, 4, 3, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, [11, 12]

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

$$Value = \frac{Percentage}{100} \times n$$
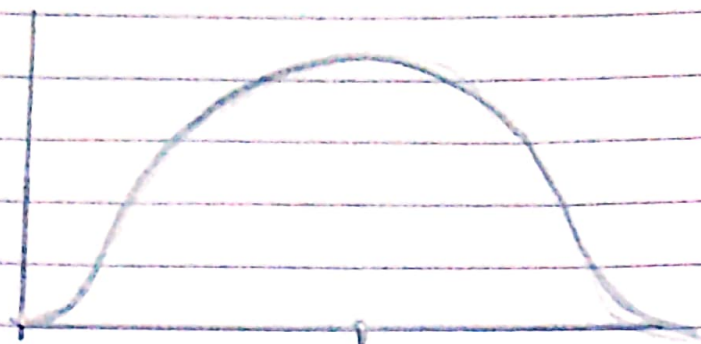
$$= \frac{99}{100} \times 20$$

$$= 6.99 \times 20$$

$$= 19.8 \quad index$$

$$value \ of \ 99 \ Percentile = \frac{11 + 12}{}$$

$$= 11.5$$

Q5 In left & right-Skewed data, what is the relationship between mean, median & mode?

Draw the graph to represent the same.

①

Symetric Distribution
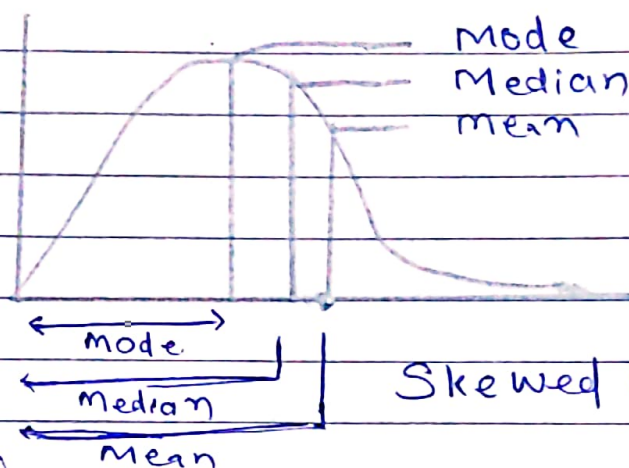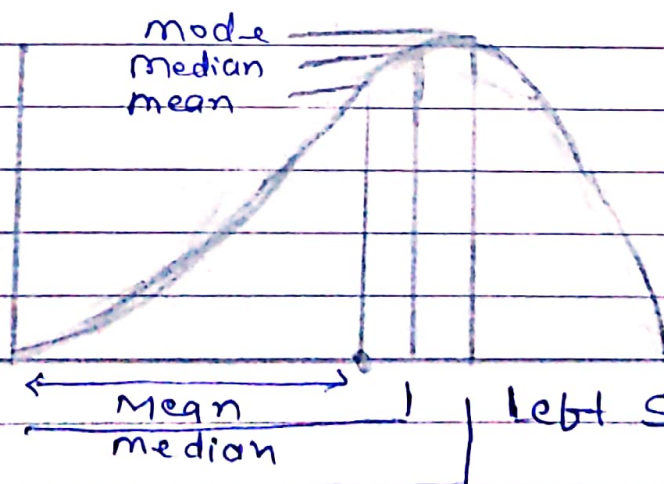
Mean = Mode = Median

②

mode
Median
mean

mode
Median
Mean

Skewed Right (positive)

(Mean > median > Mode)

Mean is grater than median, median is greater than mode

③

mode
Median
mean

Mean
medion

Mode

Left Skewed (Negative)

(Mode > Median > mean)

Mode is greater than medium
Medium is greter than mean.