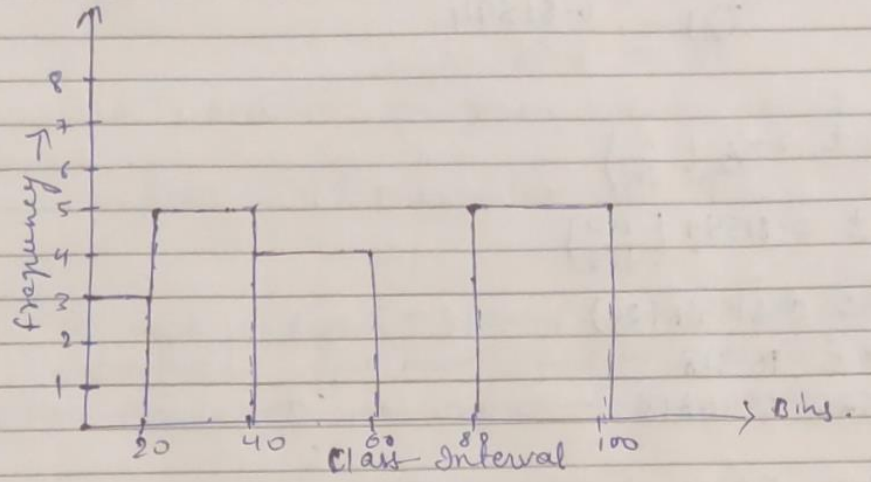
STATISTICS - Assignment-1.

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

Ans:- bins size = 20

Bins = 5.



Q2. In a quant test of the CAI Exam, the population standard deviation is known to be 100. A sample of 25 tests taken has a mean of 520. Construct an 80% CI about the mean.

Ans: $\mu = 100$ $\bar{x} = 520$

$n = 25$ CI = 80%.

degree of freedom $= n-1$
$= 25-1 = 24$

$CI = \frac{89}{100} = 0.8$

$\alpha = 1 - 0.8 = 0.2$

$Z\frac{\alpha}{2} = Z\left(\frac{0.2}{2}\right)$

$Z\left(\frac{\alpha}{2}\right) = Z_{0.1}$

$Z\left(\frac{\alpha}{2}\right) = 0.81594.$

$\bar{x} \pm 2\alpha/2 \left(\frac{\sigma}{\sqrt{n}}\right)$

$\bar{x} \pm 0.81594 \left(\frac{100}{\sqrt{25}}\right)$

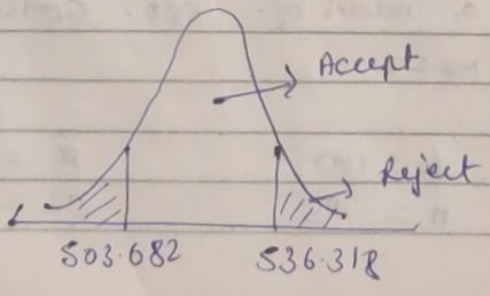
$\bar{x} \pm 0.81594\,(20)$

$\bar{x} \pm 16.318$

520 ± 16.318

lower fence $= 520 - 16.318$
$= 503.682$

Higher fence $= 520 + 16.318 = 536.318$



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.

Ans:- $n = 20$

for 99 Percentile $= 99\% \times 20$

$$\frac{99}{100} \times 20 = \frac{99}{5}$$

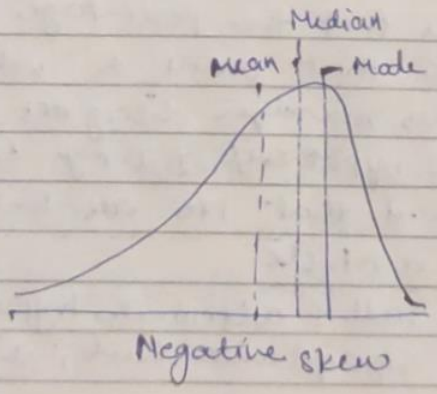
$$= 19.8 \simeq 20$$

20^{th} position of given value is 12.

Ans:- 99 percentile is 12.

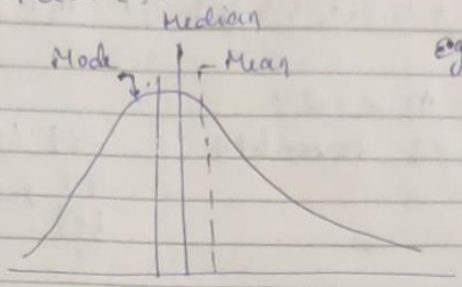
Q5:- In Left & Right → Skewed data, what is the relationship b/w mean, median & Mode?
Draw the graph to represent the same.

Ans:- Left Skewed data :-



Eg:- Life span of human being

Right skewed data :-



Eg:- · wealth distribution

∴ positive skew

In Right skewed distribution curve distributed along Right hand side and on the other hand Left hand side distributed along left.

In Right skew :-

Mean > Median > Mode

Left skew :- Mode > Median > Mean.

Q3:- A car believes that the percentage of citizen in a city ABC that owns a vehicle is 60% or Less. A sales manager disagrees 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 a 10 % significance level, is there enough

evidence to support idea that vehicle owner in ABC city is 60% or less:

Ans:- $n = 250$ $\quad \mu = 60\%$

$x = 170$ $\quad = \frac{60}{100}$

$\bar{x} = \frac{170}{250}$ $\quad \mu = 0.60$.

$\alpha = 10\% = 0.10$

① $\mu_1 > 0.60$

$\mu_0 \leq 0.60$

② $\alpha = 10\% = 0.10$.

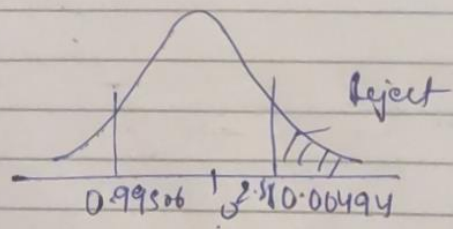
$$\text{Z score} = \frac{\frac{170}{250} - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}}$$

$\text{Z}_{\text{score}} = 2.58$

from z score table

z	0.08
2.5	0.99506

③ Decision Boundary



p-value.

We Reject the Null Hypothesis.