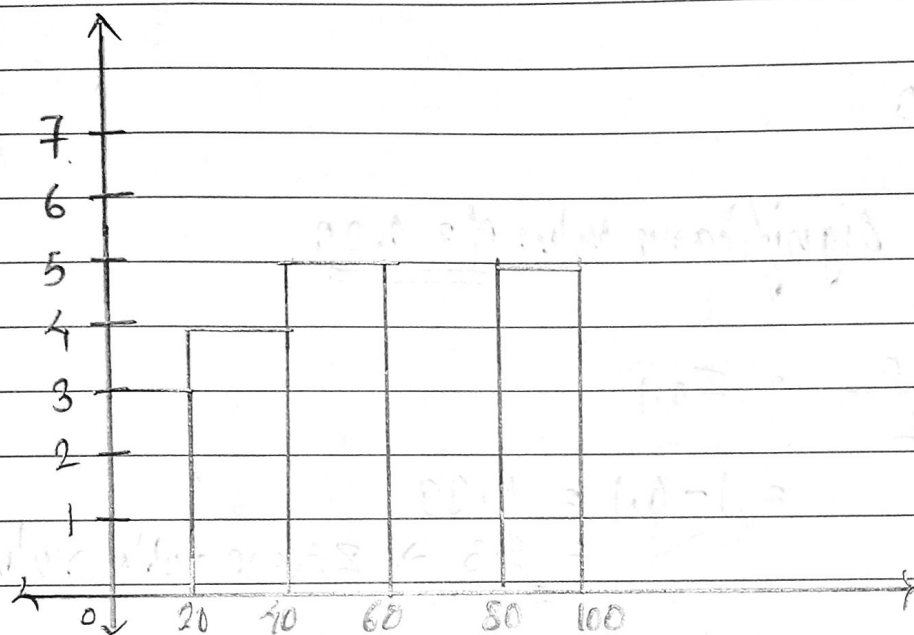Que. 1)   Plot a histogram.

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

Solⁿ →   Let's consider,

bins = 5

bin size = 20

* Intervals :

1) 0 to 20 → 10, 13, 18
2) 20 to 40 → 22, 27, 32, 38
3) 40 to 60 → 40, 45, 51, 56, 57
4) 80 to 100 → 88, 90, 92, 94, 99

Que.2. In the 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 an 80% CI about the mean.

Solu^n $\sigma = 100$, $n = 25$, $\bar{x} = 520$

$$CI = 80\%$$
$$\alpha = 1 - CI$$
$$= 1 - 0.80$$
$$= 0.20 \qquad \boxed{\therefore \alpha = 0.20}$$

$$Z_{\alpha/2} = \frac{0.20}{2} = Z_{0.1} = \mp 2.3$$

* Lower fence

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

$$= 520 - 2.3 \frac{100}{\sqrt{25}}$$

$$= 520 - 2.3 \times 20$$
$$= 474$$

* Higher fence

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

$$= 520 + 2.3 \frac{100}{\sqrt{25}}$$

$$= 520 + 2.3 \times 20$$
$$= 566$$

* If value drops in interval of 474 to 566 they accept the null hypothesis. If not then reject the null hypothesis.

Qw.3 A car company believes that the percentage of accidents in city ABC that own a vehicle in 60% and less. A sales manager disagrees with this. he conducts a hypothesis testing surveying 250 residents and found that 170 responded yes. to owning a vehicle.

(a) State the null or Alternate hypothesis.
(b) At 10% significance level, is there enough evidence to support the idea that vehicle ownership in city ABC is 60% or less.

Solu^n :→

① $H_0 = P_0 = 60\%$

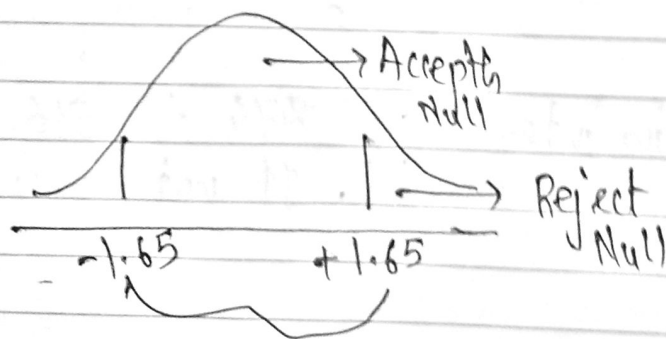$H_1 = P_0 < 60\%$

$n = 250$ & $x = 170$

$\hat{P} = x/n = \dfrac{170}{250} = \underline{0.68}$

P_0 $q_0 = 1 - P_0 = 1 - 0.6 = \underline{0.4}$

② $\alpha = 0.10$ $1 - 0.05 = 0.950$

③

→ Accept Null

→ Reject Null

-1.65   +1.65

(4) z test with poopootion

$$z \text{ test } = \frac{\hat{P} - P_0}{\sqrt{\dfrac{P_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.60}{\sqrt{\dfrac{0.60 * 0.40}{250}}}$$

$$= 0.258$$

$$z \text{ test } = 0.2.58$$

(5) P value =

$$= 1 - 0.9951$$
$$= 0.0049.$$

$$= 0.0049 + 0.0049$$
$$= 0.0098.$$

P value < significance value.

$$0.0098 < 0.10.$$

where, Reject the null hypothesis.

Que-4   What is the value of the 99 pescentile?

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

Solu^n → $\underline{N = 20}$

99th pescentile $= \dfrac{3(n+1)}{4}$ th tesm

$= \dfrac{3(20+1)}{4}$

$= \dfrac{3 \times 21}{4}$ $= 15.75^{th}$ tesm

$= 15^{th}$ tesm $+ 0.75 \times (16^{th}$ tesm $- 15^{th}$ tesm$)$
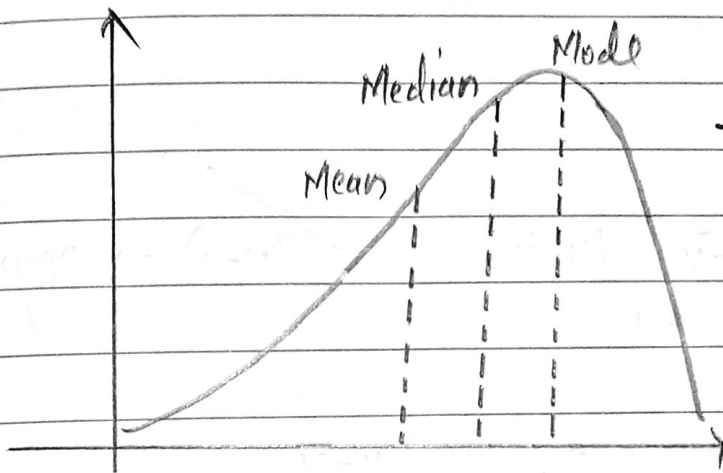
$= 9 + 0.75 * (9 - 9)$

$= 9 + 0.75 * 0$

$= \underline{9}$

$\boxed{99^{th} \text{ pescentile} = 9}$

Que. 5) In the left & right Skewed data, what is the relationship between mean, median & mode? Draw the graph to represent the same.

Soluⁿ →

1) Left Skewed Data.

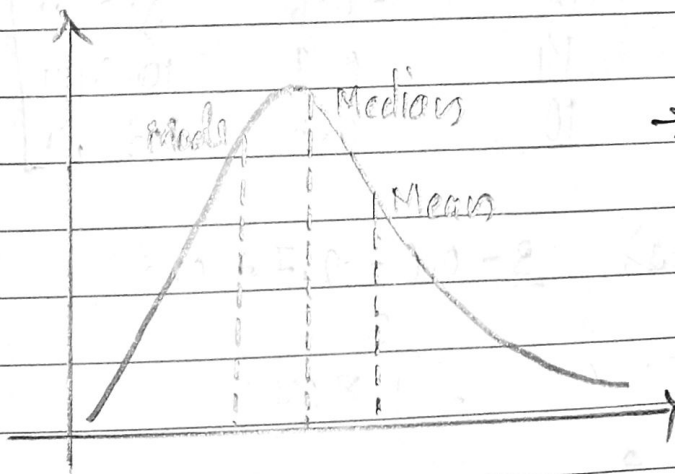Left Skewed (Negative Skewed)

Relationship →

→ Mode > Median > Mean

2) Right Skewed Data

Relationship →

→ Mean > Median > Mode.