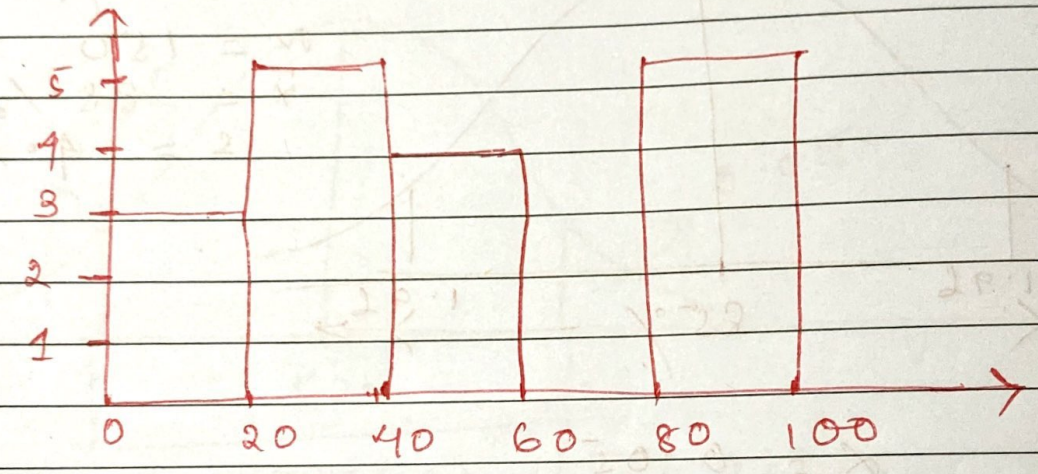
Question-1 - plot a histogram

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

Ans with Bins = 5

$$\text{Bin size} = \frac{100}{5} = 20$$



Question 2 - In a Quant test of the CAT exam the population SD is known to be 100. A sample of 25 tests taken has a Mean of 520. Construct an 80% CI about the Mean.

Ans - $\sigma = 100$ $N = 25$ $\bar{x} = 520$ CI = 80%

$$\alpha = 1 - 0.8$$
$$= 0.2$$
$$\alpha/2 = 0.1$$
$$z_{\alpha/2} = 1 - 0.1 = 0.90$$
$$= 1.29$$

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$$LF = \bar{x} - Z_{\alpha/2} \times \left(\frac{\sigma}{\sqrt{n}}\right)$$

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

$$= 520 - 1.29 \times 20$$

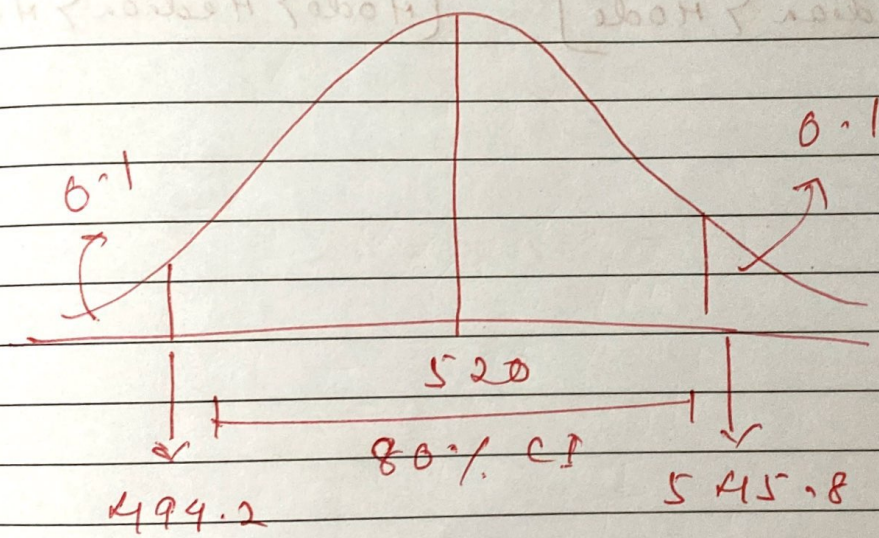
$$= 520 - 25.8$$

$$= \boxed{494.2}$$

$$HF = \bar{x} + Z_{\alpha/2} \times \left(\frac{\sigma}{\sqrt{n}}\right)$$

$$= 520 + 25.8$$

$$= \boxed{545.8}$$



Question - 4 — What is the value of the 99 percentile?

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

$$99 \text{ percentile} = \frac{99 \times (N+1)}{100}$$

$$= \frac{99 \times 20}{100} = 19.8 \text{ Rader}$$

$$= \boxed{12}$$

99 percentile = 12

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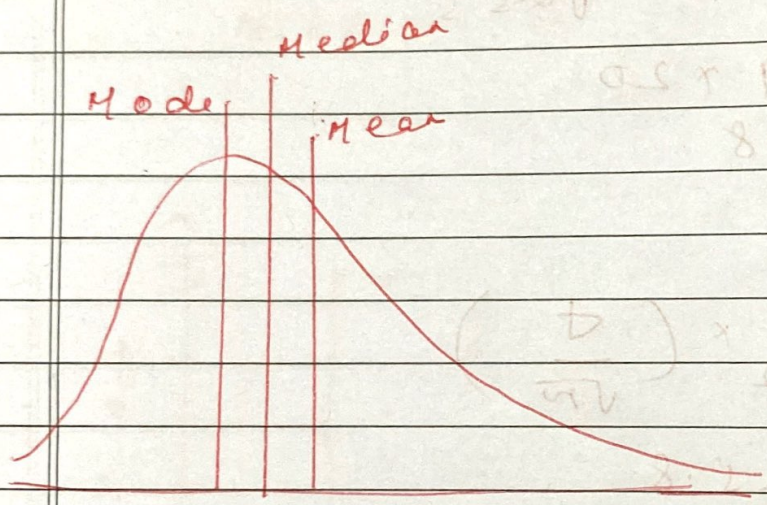
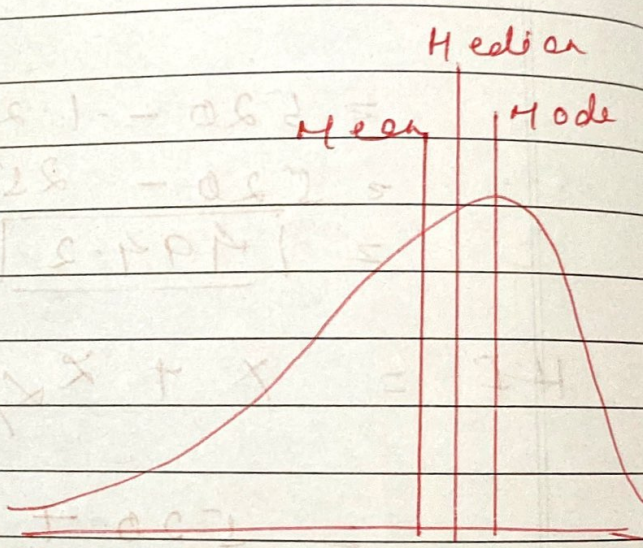
Question-5

In Left and Right skewed data what is the relationship between Mean, median and mode? Draw the graph to represent the same.



RIGHT SKEWED

[Mean > Median > Mode]



LEFT SKEWED

[Mode > Median > Mean]

8 A car company believes that the percentage of residents in city ABC that own a vehicle is 60%. A sales manager disagrees with him and conducts a hypothesis testing for 250 residents and found that only 170 responded Yes to owning a Vehicle

(a) State the Null and alternate hypothesis
(b) At 10% Significance level State if there enough evidence to support the idea that Vehicle Ownership in city ABC is 60% or less

Ans $p = 60$ $x = 170$ $N = 250$

[Z test with proportion]

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(1) Null hypothesis = $H_0 = 60\%$

$H_1 \leq 60\%$

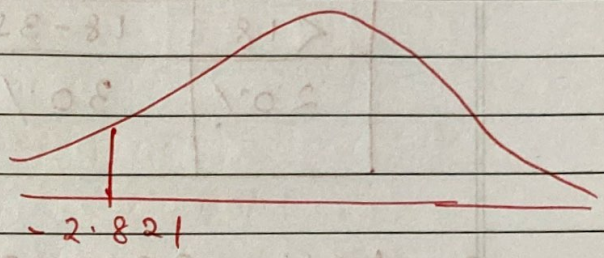
(2) $\alpha = 0.01$

$P_0 = 0.6$

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

$q_0 = 1 - P_0$

$= 0.4$



(3) ~~Test statistics~~

$$Z_{test} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}}$$

$$= \frac{0.08}{\sqrt{0.24}} \times 15.811$$

$$= \frac{1.264}{0.48} = 2.63$$

(4) Conclusion

Since $2.63 > -2.821$

→ ~~Test~~ Alternate hypothesis is rejected

→ Vehicle ownership in city ABC is not less than 60%.