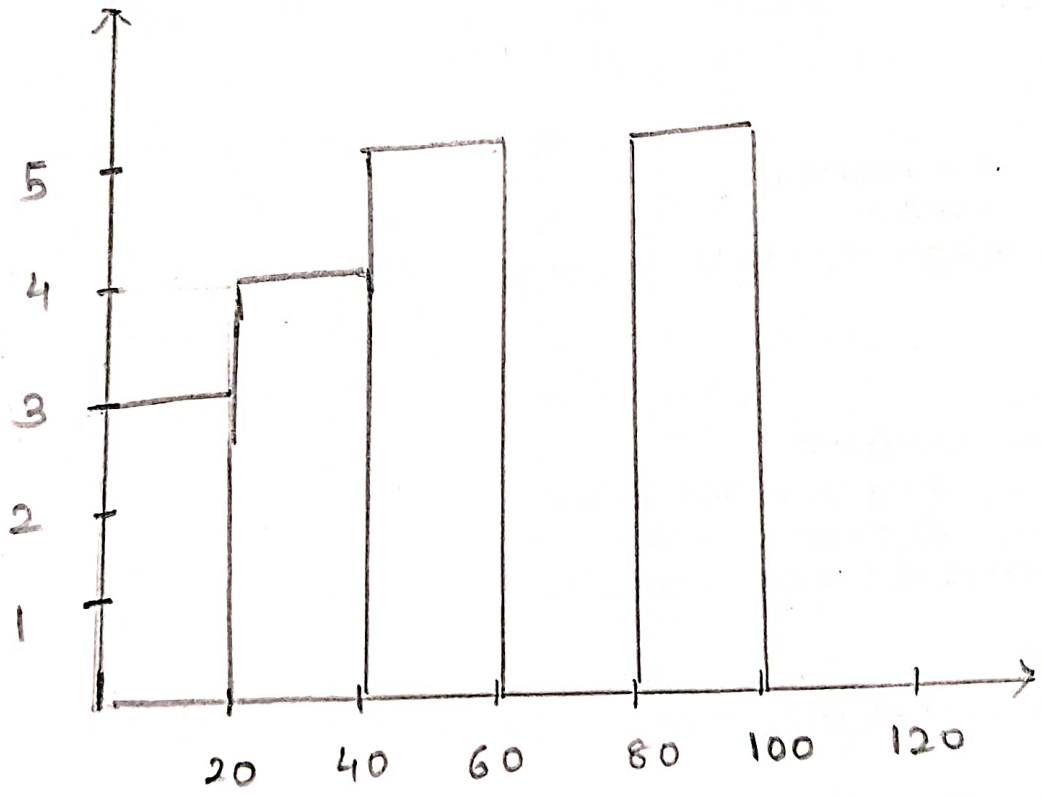
Statistics Assignment

Q 1) Plot a histogram

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

Ans:- Bins = 5

Bin Size = 20



Q 2:- 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 an 80-1. CI about the mean?

Ans:- $\bar{x} = 520$, CI = 80-1. $\alpha = 0.20$, $n = 25$

$\sigma = 100$

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

(i) Degree of freedom = $n-1 = 25-1 = 24$

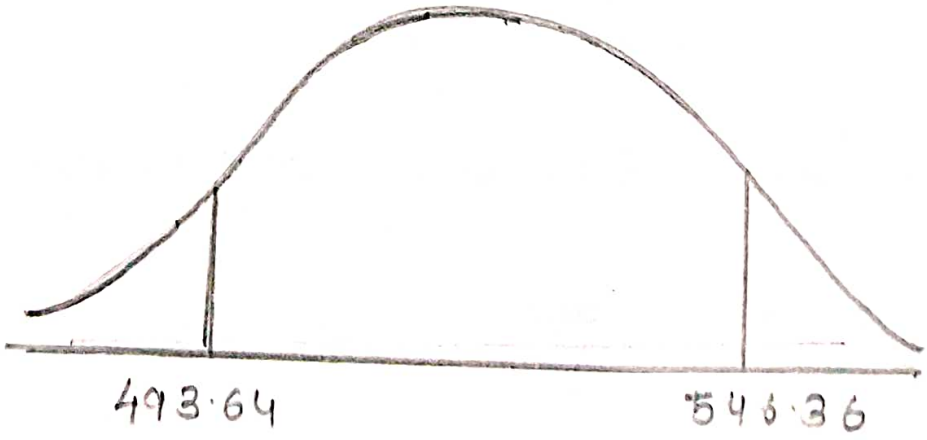
From t-table = $t_{\alpha/2} = 1.318$

Lower Fence = $520 - 1.318 \times \frac{100}{\sqrt{25}} = 520 - 26.36$

$= 493.64$

Higher Fence = $520 + 1.318 \times \frac{100}{\sqrt{25}} = 520 + 26.36$

$= 546.36$



Q3 A car company believes that the percentage of citizens in city ABC that owns a vehicle is 60.1% or less. A sales manager disagrees with this. He conducted a hypothesis testing surveying 250 resident & found that 170 residents responded yes to owing a vehicle.

a) State the null & Alternate Hypothesis
b) At a 10.1% significance level, is there enough evidence to support that vehicle owner in ABC city is 60.1% or less.

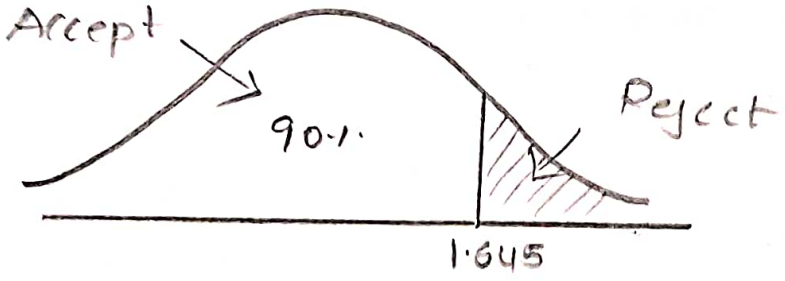
Ans a) Null Hypothesis : H_0 :- $P \leq 60.1\% = 0.60$

Alternate Hypothesis = H_1 :- $P > 60.1\% = 0.60$

b) $n = 250$, $x = 170$, So $\hat{p} = \frac{x}{n} = \frac{170}{250} = 0.65$

$P_0 = 0.60$, $q_0 = 1 - 0.60 = 0.40$

3) = $\alpha =$ 0.1



$$Z = \frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.65 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}} = \frac{0.05}{\sqrt{0.00096}} = \frac{0.05}{0.0309}$$

$$= \boxed{2.58}$$

$2.58 > 1.645$

Hence we Reject the Null Hypothesis

Q4:- What is the value of the 99 percentile?

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

Ans :- $\frac{\text{Percentile}}{100} * (n+1) = \frac{99 \times 21}{100} = 20.79$

99 percentile is 12

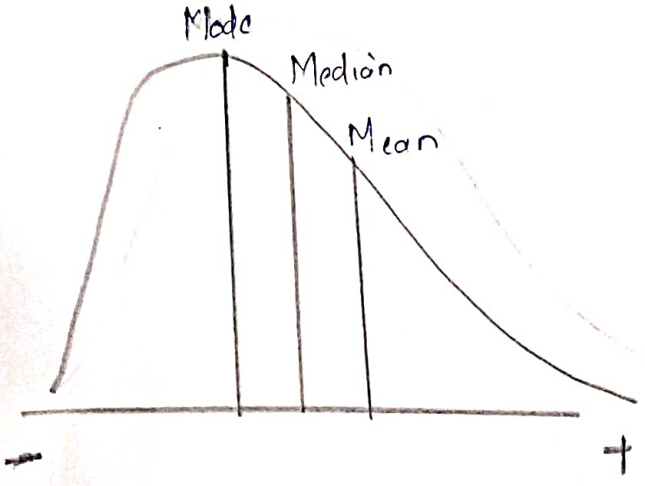
Q5:- In, left & right skewed data what is the relationship between mean median & mode? Draw the graph and represent the same

(1) In positively / Right skewed distribution

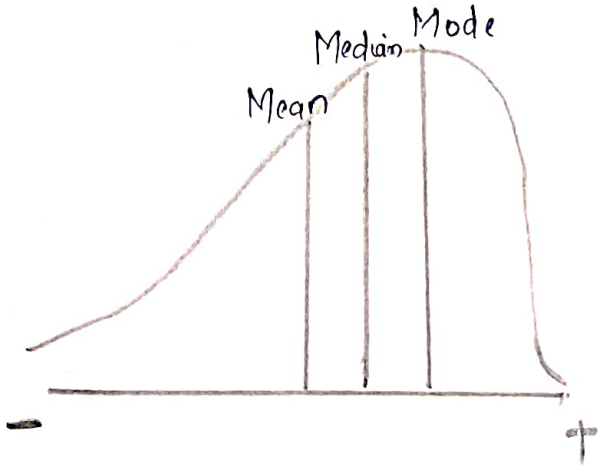
Mean > Median > Mode

(2) In Negatively / Left skewed distribution

Mode > Median > Mean



Right / Positively Skewed.



Left / Negatively Skewed