

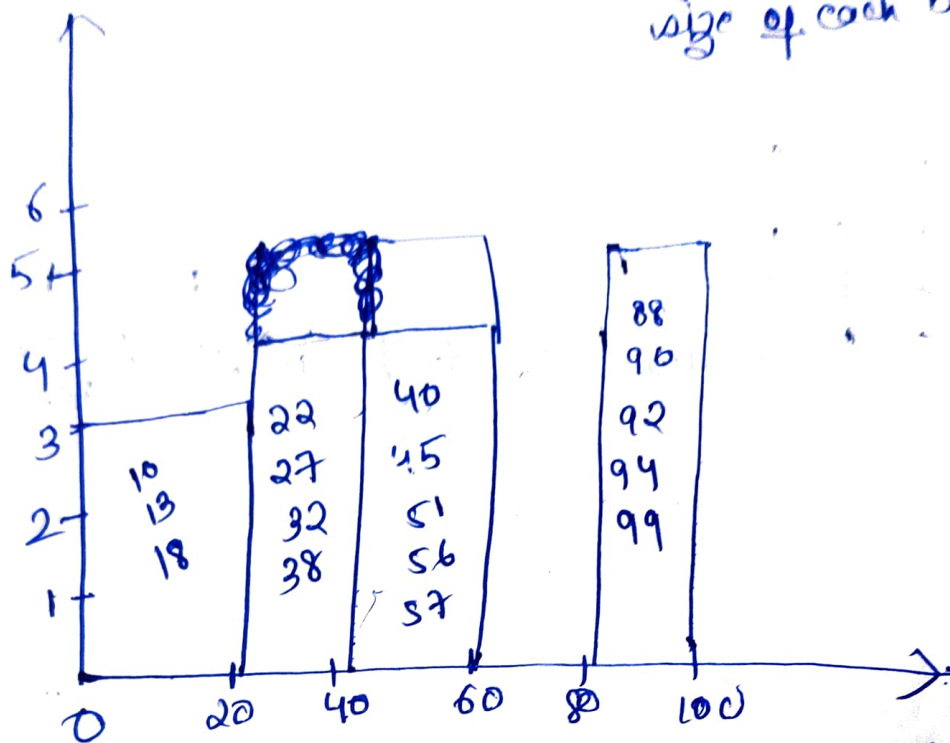
# STATISTICS ASSIGNMENT

Q1 Plot a histogram,

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

no of bins = 5

size of each bin =  $\frac{100}{5} = 20$

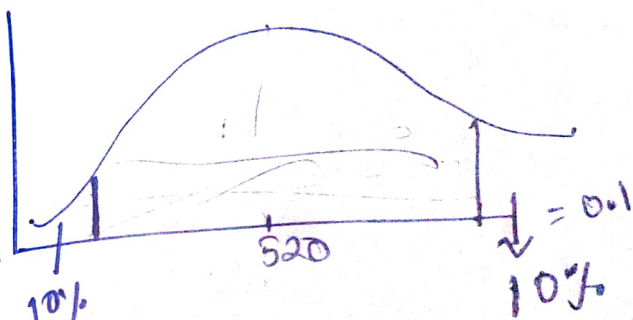


Q2. In a quant test of CAT Exam, the population SD = 100, A sample of 25 test taken has a mean of 520, construct a 80% CI about mean.

$$\sigma = 100$$

$$n = 25$$

$$\bar{x} = 520$$



$$\alpha = 1 - 0.8 = 0.2$$

$$\bar{x} \pm Z_{\alpha/2} \left[ \frac{\sigma}{\sqrt{n}} \right]$$

$$\bar{x} \pm Z_{0.2} \left[ \frac{100}{\sqrt{25}} \right]$$

$$520 \pm Z_{0.1} \left[ \frac{100}{5} \right]$$

$$1 - 0.1 = 0.9$$

$$\Rightarrow 520 \pm 20.1(20)$$

$$\Rightarrow 520 \pm 1.29(20)$$

$$\{ Z_{0.1} = 1.29 \}$$

$$\Rightarrow 520 + 1.29(20)$$

$$\& 520 - 1.29(20)$$

$$\Rightarrow 545.8$$

$$\& 520 - 25.8$$

$$\Rightarrow 545.8$$

$$\& 494.2$$

$$\underline{\text{Ans}} \quad 494.2 \text{ to } 545.8 (CI).$$

Q3 what is value of 99 percentile?  
2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 8, 9, 10, 11, 11, 12.

$$\text{Value} = \frac{\text{percentile} + 1}{100} \times n + 1$$

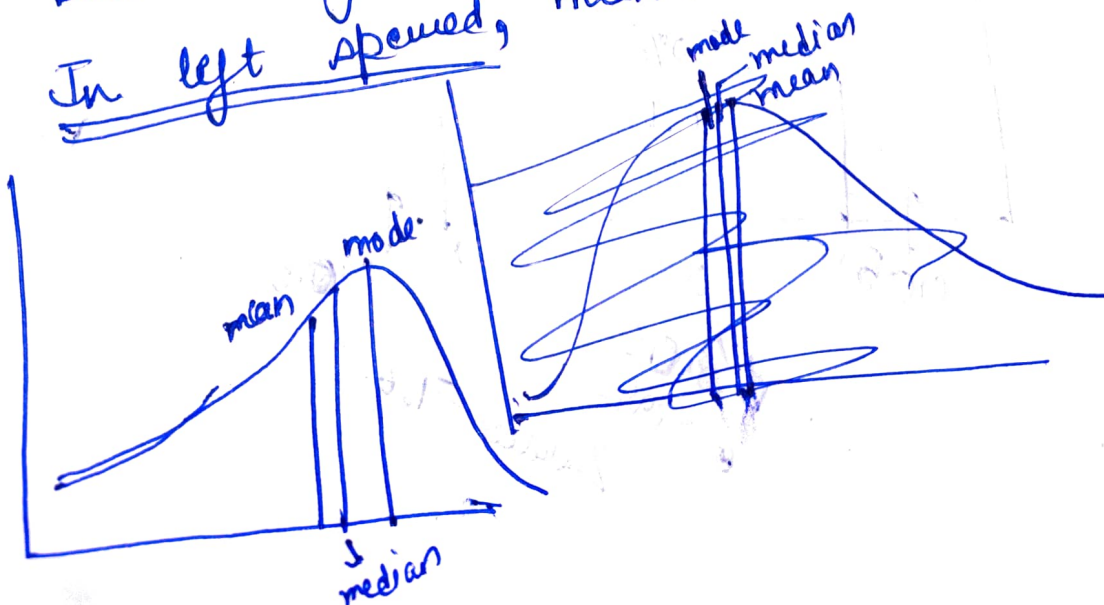
$$= \frac{99}{100} \times 20$$

$$= 19.8 = 19^{\text{th}} \text{ index}$$

$$= 12^{\text{th}}$$

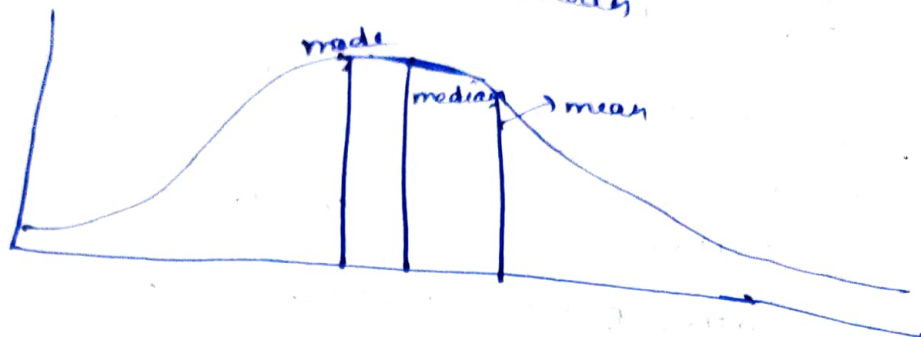
Q4 In left or right skewed data, what is relationship between mean, median and mode? Draw the graph to represent the same.

In left skewed, mean < median < mode.



In right skewed

$$\text{mode} < \text{median} < \text{mean}$$



Q5 A car believes that % of citizen in city ABC that own a vehicle is 60% or less. A sales manager disagree with this. He conducted a hypothesis testing surveying 25 residents & found that 170 residents responded yes to owning a vehicle.

① State null & alternate hypothesis?

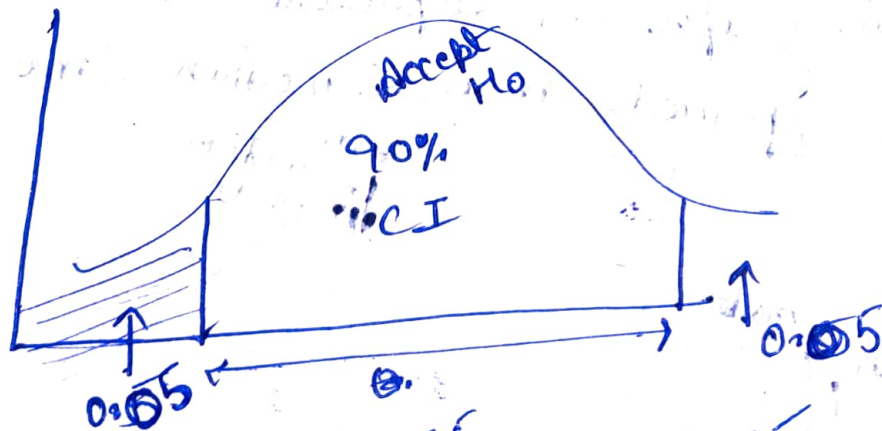
② At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

①  $H_0 \leq 60 \leq 0.6$  ②  $\alpha = 0.1$

$H_1 > 60$

$$\begin{array}{r} 0.10 \\ 0.05 \\ \hline 0.90 \\ 0.90 \\ 0.5 \\ \hline 1.65 \end{array}$$

③



$$\begin{aligned} &= 1 - 0.05 \\ &= 0.95 \end{aligned}$$

$Z_{\text{value}} = 1.65$

$$\begin{array}{r} 1.6 \\ 1.09 \\ \hline 1.65 \end{array}$$



$$⑨ \quad Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

$$\bar{p} = \frac{174}{250} = 0.68$$

$$Z \text{ test with proportion} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

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

$$= \frac{0.08}{\sqrt{\frac{0.24}{250}}}$$

$$= \frac{0.08}{\sqrt{0.00096}}$$

$$= \frac{0.08}{0.030} = 0.05$$

Since,  $-1.65 < 0.05$

$\therefore$  ~~Reject~~ Accept  $H_0$ .

0.68  
0.60