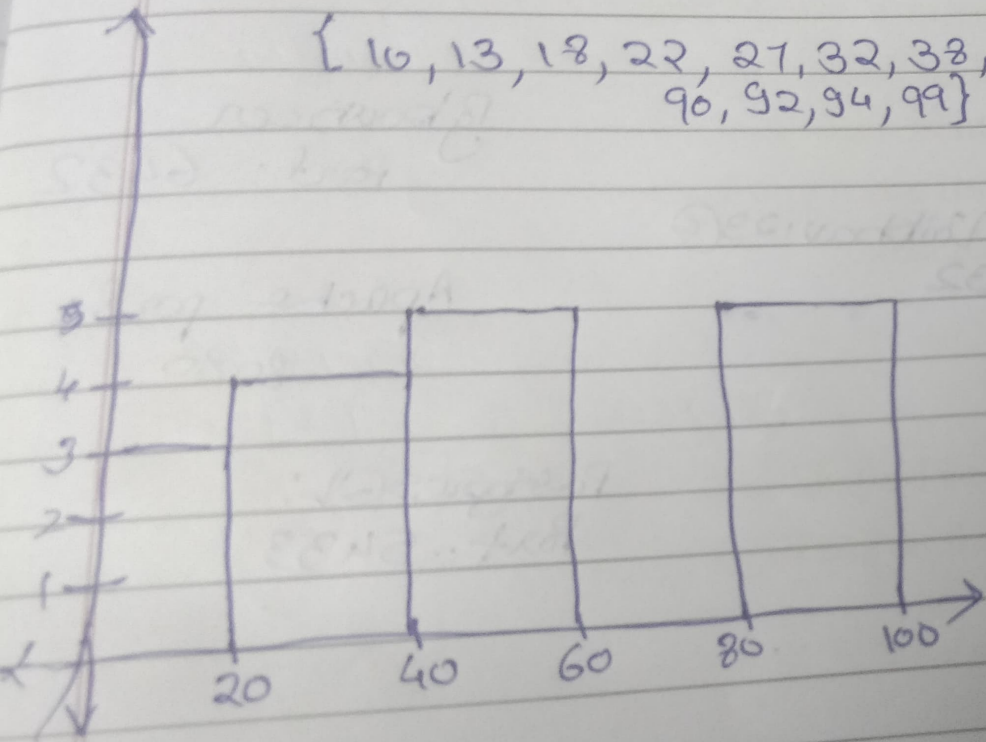


{ 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99 }



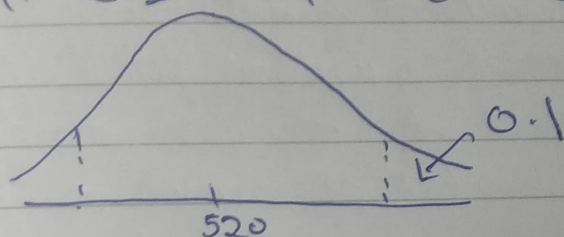
In a Quant test of CAT exam, the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct a 80% C.I. about mean?

$$\sigma = 100$$

$$n = 25$$

$$\bar{x} = 520$$

$$\alpha = 1 - \text{C.I.} = 1 - 0.8 = 0.2$$



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

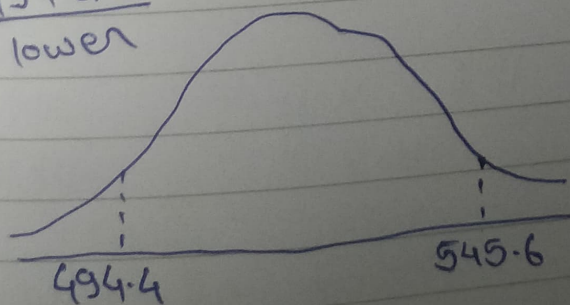
$$\Rightarrow 520 \pm Z_{0.1} \frac{100}{\sqrt{25}}$$

$$\Rightarrow 520 \pm Z_{0.1} \times 20$$

$$\Rightarrow 520 \pm 1.28 \times 20$$

$$\Rightarrow \frac{494.4}{\text{lower}}$$

$$\frac{545.6}{\text{higher}}$$



\* A car company believes that the percentage of residents in city ABC that owns a vehicle is 60% or 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.

- i) State the null and alternate hypothesis.
- ii) At 10% significance level, is there enough evidence to support the idea that vehicle ownership in city ABC is 60% or less.

Ans:-  $H_0: p \leq 60\%$

$H_1: p > 60\%$

$$n = 250$$

$$x = 170$$

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

$$p_0 = 0.60$$

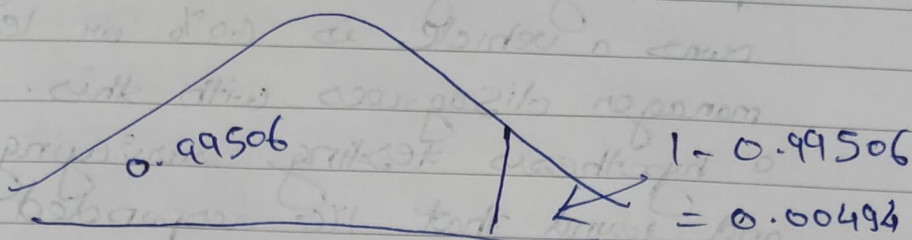
$$q_0 = 1 - p_0 = 1 - 0.6 = 0.40$$

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}}$$

$$= 2.582$$



$p$ -value of  $z = 2.58 = 0.99506$



$$\alpha = 0.1$$

$$p\text{-value } 0.00494 < 0.1$$

$\therefore$  Reject the null hypothesis.

$$n = 250$$

$$x = 150$$

$$\hat{p} = \frac{x}{n} = \frac{150}{250} = 0.6$$

$$p_0 = 0.6$$

$$p_0 = 1 - p_0 = 1 - 0.6 = 0.4$$

$$z = \frac{\hat{p} - p_0}{\sqrt{p_0(1-p_0)}} = \frac{0.6 - 0.6}{\sqrt{0.6 \times 0.4}} = \frac{0}{\sqrt{0.24}} = 0$$

$$z = 0$$

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.

Soln:-

$$\text{Value} = \frac{99}{100} \times (n+1)$$

$$= \frac{99}{100} \times \cancel{20} \ 21$$

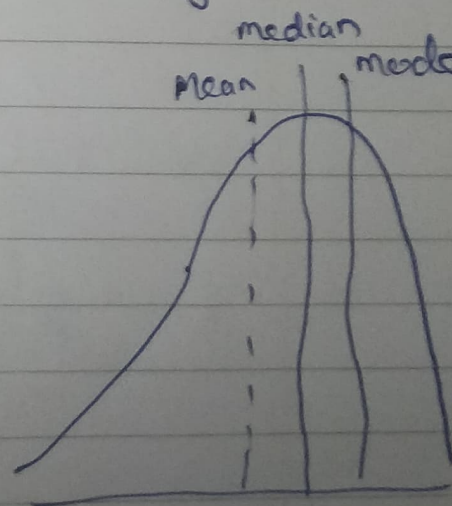
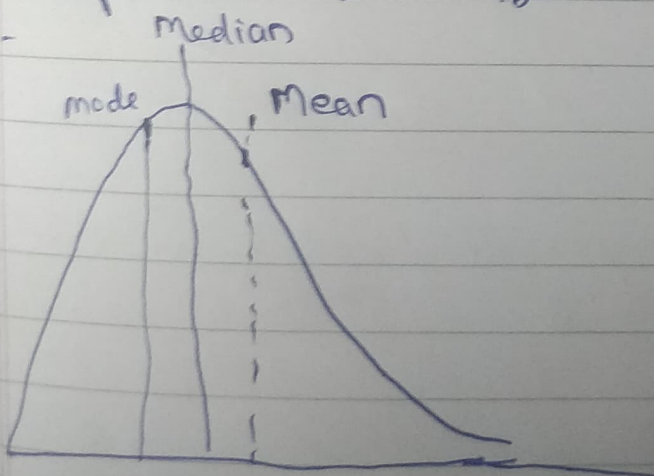
$$= \cancel{20.79} \ \cancel{19.8} \ \underline{\underline{20.79}}$$

Index

$$99\% \text{ value} = \cancel{21} \ 12$$

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

Soln:-



In left right skewed:

~~med~~ ~~mode~~  $\leftarrow$  median  $\leftarrow$  mode

mode  $<$  median  $<$  mean

In left skewed:

mean  $<$  median  $<$  mode



Assignment:

$$n = 100K$$

$$s = 500 \quad (300XL, 200L)$$

$$C.I = 95\%$$

$$n_1 = 300$$

$$n_2 = 200$$

$$= \hat{p} \pm \frac{Z_{\alpha}}{2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$= \frac{300}{500} \pm Z_{0.025} \sqrt{\frac{0.6(1-0.6)}{250}}$$

$$= 0.6 \pm 1.96 \sqrt{\frac{0.6 \times 0.4}{250}}$$

$$= 0.6 \pm 0.0607$$

$$= 0.6607, 0.5393$$

$$\therefore C.I \text{ of } XL \text{ shirts} = 0.5393, 0.6607$$

$\therefore$  Total XL shirts to be ordered

$$= 53.93K \text{ to } 66.07K$$

$$\therefore \text{Total L shirts} = 52.93K$$

$$\text{to } 65.07K$$

$$= 46.07K$$

$$\text{to } 33.93K$$