Ex:-1

=> Plot a histogram

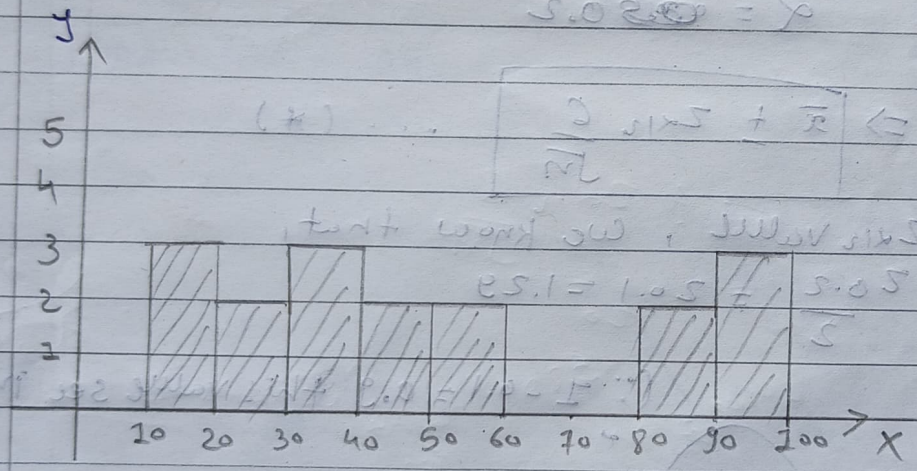
10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

=> Ans:-

Bins = 10 (suppose)

[0 - 100]

Bins size = $\frac{100}{10} = 10$



ex:-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% CI about the mean?

Ans:- given

$\sigma = 100$

$n = 25$

$\bar{x} = 520$

C.I = 80%.

$\Rightarrow \alpha = 1 - C.I$ where α = significant value

$= 1 - 0.80$

$\alpha = 0.2$

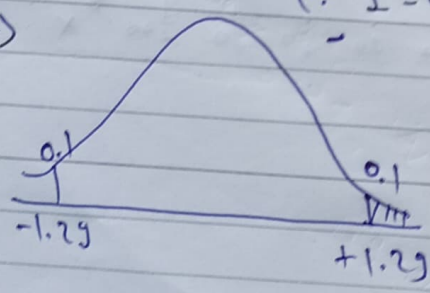
$$\Rightarrow \boxed{\bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}} \quad \ldots (*)$$

$Z_{\alpha/2}$ value, we know that,

$\Rightarrow Z_{\frac{0.2}{2}} = Z_{0.1} = 1.29$

($\because 1 - 0.1 = 0.9$ this value see in z-table)

$\Rightarrow$



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$\Rightarrow$ lower value $= \bar{x} - 2.12 \frac{6}{\sqrt{n}}$

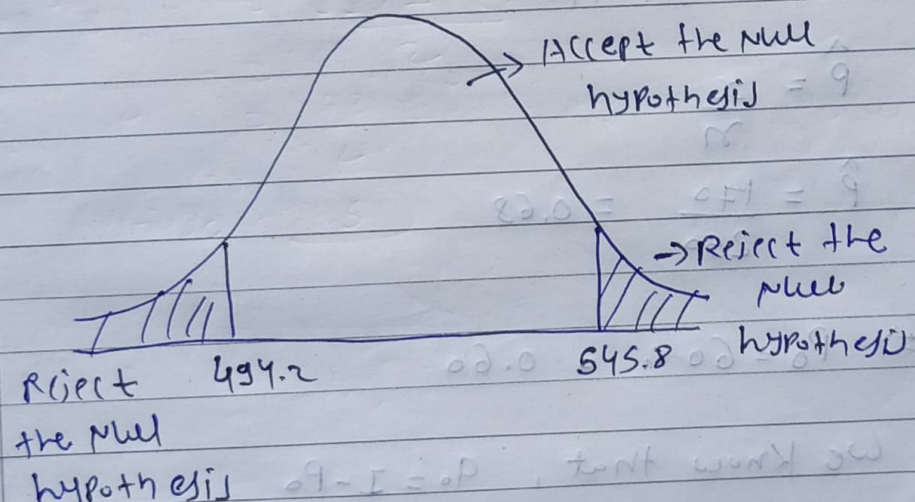
$= 520 - 1.29 \times \frac{100}{\sqrt{25}}$

lower value $= 494.2$

$\Rightarrow$ hight value $= \bar{x} + 2.12 \frac{6}{\sqrt{n}}$

$= 520 + 1.29 \times \frac{100}{\sqrt{25}}$

Hight value $= 545.8$



Ex:3 A Car believes that the percentage of citizen in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducted a hypothesis testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

(a) State the null & alternate hypothesis

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

Ans:- Hypothesis :

$\Rightarrow$ $H_0 : P_0 = 60\%$ vs $H_1 : P_0 < 60\%$

given:- $n = 250$

$\bar{x} = 170$

$$\hat{P} = \frac{x}{n}$$

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

$\Rightarrow P_0 = 60\% = 0.60$

We know that, $q_0 = 1 - P_0$

$= 1 - 0.6$

$= 0.4$

here we know that, 10% significance level

$\alpha = 0.1$

test statistic under H_0,

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

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

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

$$= \frac{0.08}{0.03098}$$

$$Z_{cal} = 2.5823$$

$\Rightarrow$

$Z_{tab} = 1.28$ ($\because 1 - \alpha = 1 - 0.10 = 0.9$)

So $Z_{cal} > Z_{tab}$ So we Reject H_0.

Ex:4

=> 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

Ans:- $n = 20$ } are given
99 Percentile }

$$\text{value} = \frac{\text{Percentile}}{100} \times n$$

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

$$= 19.8 \text{ Index}$$

$$\text{Average} = \frac{19\text{obs}^{n} + 20\text{obs}^{n}}{2}$$

$$= \frac{11 + 12}{2}$$

$$= \frac{23}{2}$$

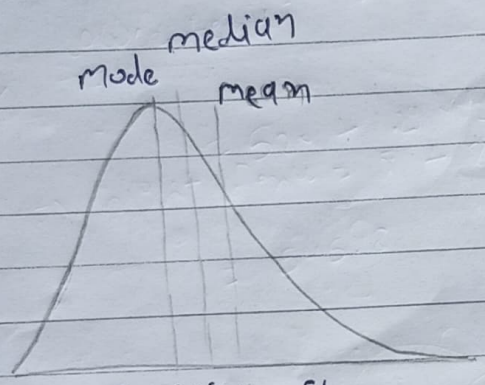
Average = 11.5

ex:-5 in left & Right - skewed data, What is the relationship between mean, median & mode.

Draw the graph to represent the same.

Ans:-

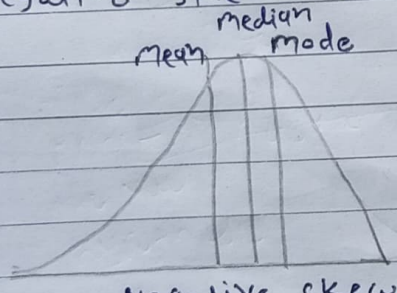
=> Positive Skew (left skewed)



Positive Skew

Positive skew is mean > median > mode.

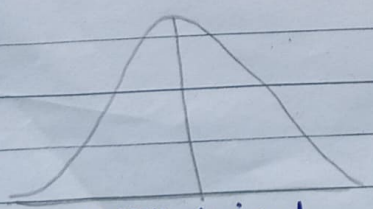
=> Negative skew (Right - skewed)



Negative skew

Negative skew is mean < median < mode.

=>



mean = median = mode

symmetrical distribution