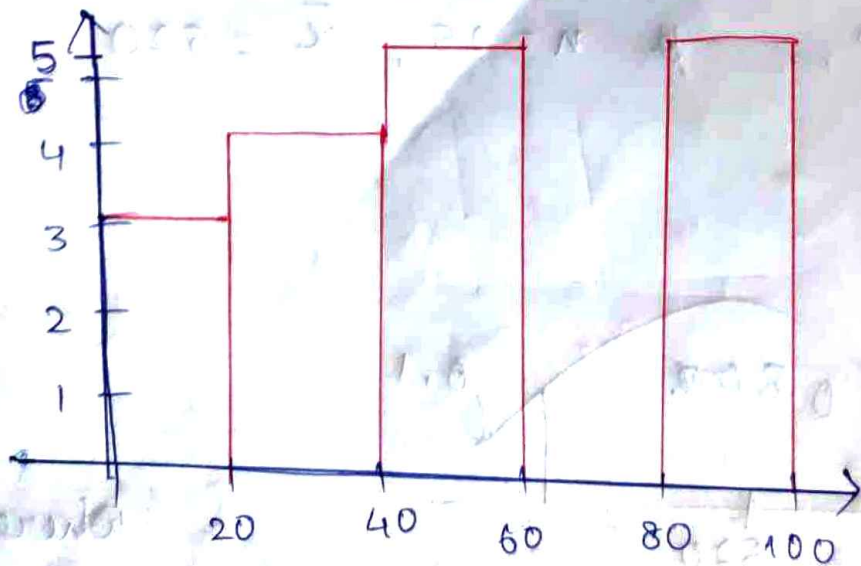


19th June Assignment (Histogram)

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

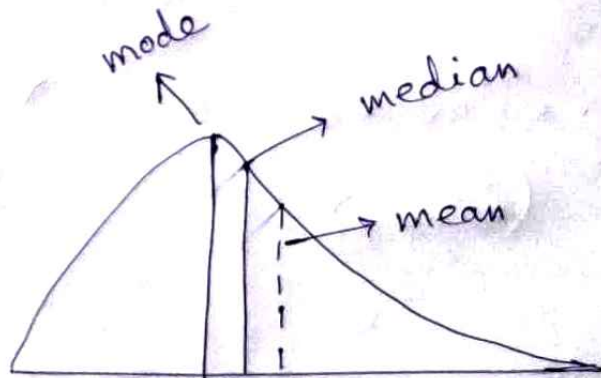
bins = 5

Bin Size = 20



Q.5. In left & right-skewed data, what is the relationship b/w mean, median & mode?
Draw the graph to represent the same.

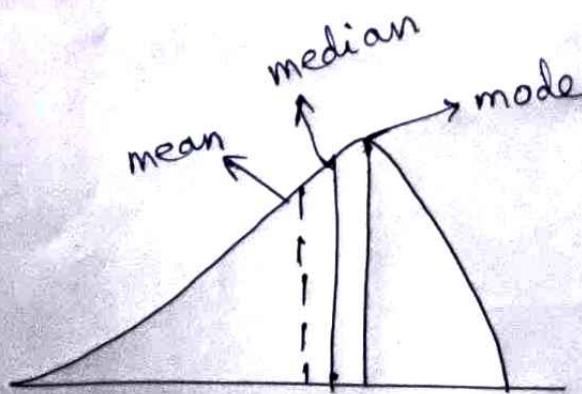
⇒ Right skewed / Positive skew :



Eg: Lengths of Comments

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

⇒ Left skewed / Negative skew :



Eg: Life span of Human being

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

Q. What is the value of 99 percentile?

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

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

$$= \frac{99}{100} \times (20) = 19.8$$

$$\approx 20.79 = 19.8$$

$$\text{Index} = \frac{11 + 12}{2} = \frac{23}{2} = 11.5^{\text{th}} \text{ Index}$$

$$\approx 12^{\text{th}} \text{ Index.}$$

∴ 8 is my 99 percentile.

83. A car believes that the percentage of citizens 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 vehicle.

a) state the null & alternate hypothesis.

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

①

$$H_0: p \leq 60$$

$$H_1: p > 60$$

one-tail.

z-test with proportions

$$n = 250, \quad p_0 = 60\% = 0.6, \quad x = 170$$

Significance level = 10%

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

$$\textcircled{2} \quad q_0 = 1 - p_0 = 1 - 0.6 = 0.4$$

$$\textcircled{3} \quad \text{10\% significance} \quad \text{C.I.} = 90\%$$

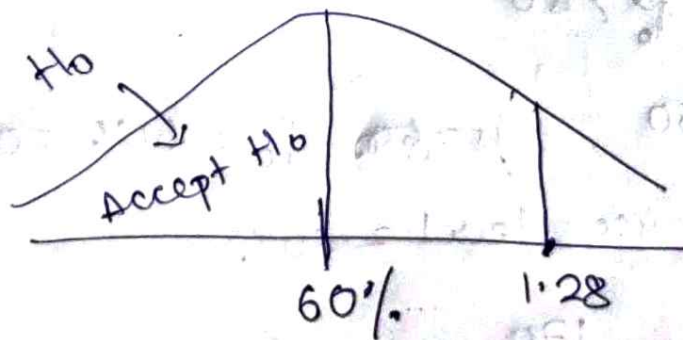
$$\alpha = 1 - 0.9 = 0.1$$

④ Z-test with proportion:

$$Z_{\text{test}} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} \\ = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} \approx \frac{0.08}{0.03} \approx 2.67$$

$2.67 > 1.28$, so, we reject H_0 .

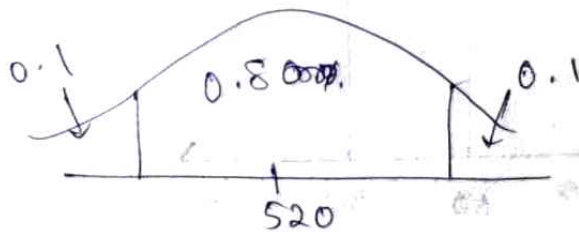
That means vehicle owner in ABC city is 60% or less.



Q2.

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

$$\sigma = 100, \quad n = 25, \quad \bar{x} = 520$$



where,

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

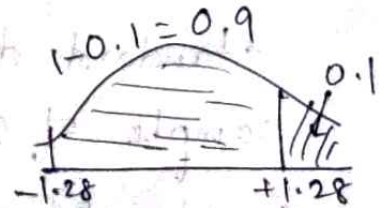
$$\text{Lower Fence} = \bar{x} - z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$$

$$= 520 - 1.28 \times \frac{100}{\sqrt{25}}$$

$$= 520 - 1.28 \times 20$$

$$= 494.4$$

$$z_{\alpha/2} = z_{0.1}$$



$$\therefore z_{\alpha/2} = +1.28$$

$$\text{Higher Fence} = \bar{x} + z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$$

$$= 520 + 1.28 \times 20$$

$$= 545.6$$

So, the C.I. range is 494.4 to 545.6.

