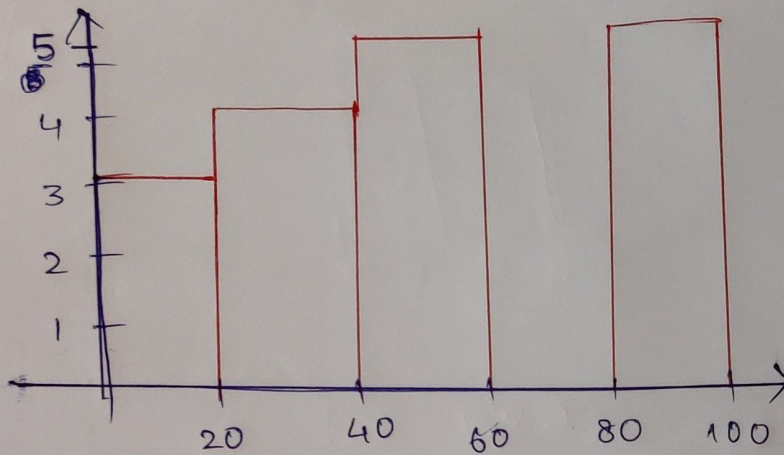# 19th June Assignment (Histogram)

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

bins = 5

Bin size = 20
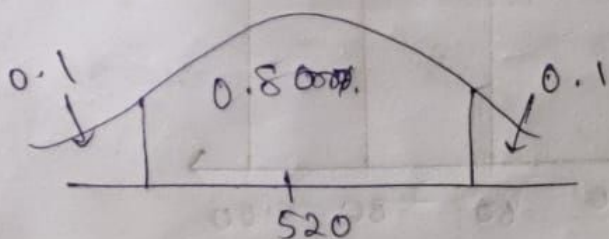

Histogram

Q.2.

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,

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

lower Fence $= \bar{x} - z_{\alpha/2} \cdot \dfrac{\sigma}{\sqrt{n}}$

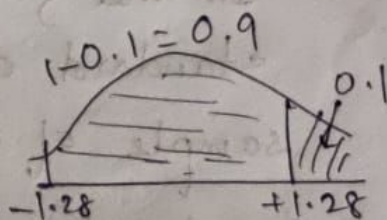$$= 520 - 1.28 \times \frac{100}{\sqrt{25}}$$

$$= 520 - 1.28 \times 20$$

$$= 494.4$$

$$z_{\alpha/2} = z_{0.1}$$
$$1 - 0.1 = 0.9$$

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

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

$$= 520 + 1.28 \times 20$$

$$= 545.6$$

So, the C.I range is 494.4 to 595.6.

Reject No

Reject No
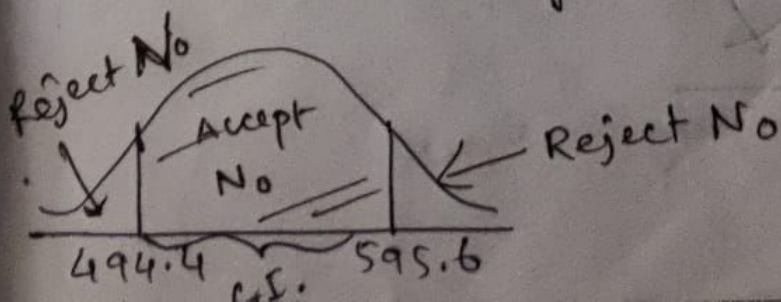
83. A Car believes that the percentage of citizens in city ABC that owns a vehicle is 60%. or less. A sales manager disagrees with this. He conducted a hypothesis testing surveying 250 residents & found that 170 residents reponded yes to owning vehicle.

a) state a 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.

One-tail.
Z-test with proportions

① $H_0 : P_0 \leq 60$

$H_1 : P_0 > 60$

$n = 250$, $P_0 = 60\% = 0.6$, $x = 170$

Significance level = 10%.

$\hat{P} = \dfrac{x}{n} = \dfrac{170}{250} = 0.68$

② $q_0 = 1 - P_0 = 1 - 0.6 = 0.4$

③ C.I = 90%

10% significance

$\alpha = 1 - 0.9 = 0.1$
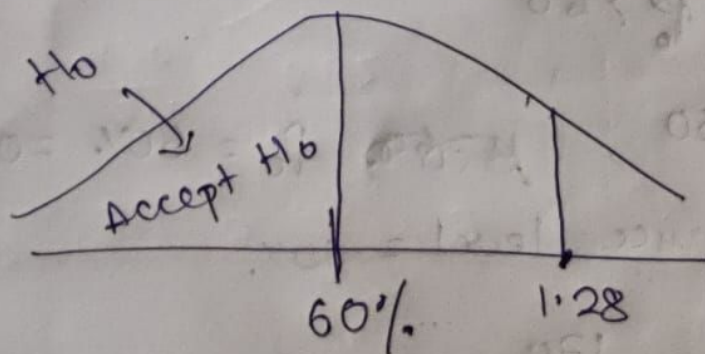
④ Z-test with proportion :

$$Z_{test} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} \cong \frac{0.08}{0.03} \approx 2.67$$

∵ 2.67 > 1.28 , so, <u>we reject H_0</u>.

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

Accept H_0

60%   1·28

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, 11, 12

$$value = \frac{Percentile}{100} \times (n) + 1$$

$$= \frac{99}{100} \times (20) + 1 = \frac{99}{100} \times 21$$

$$= 20.79 = 19.8$$

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

$$= 12^{th} \, Index.$$

∴ 8 is my 99 percentile.

Q5.

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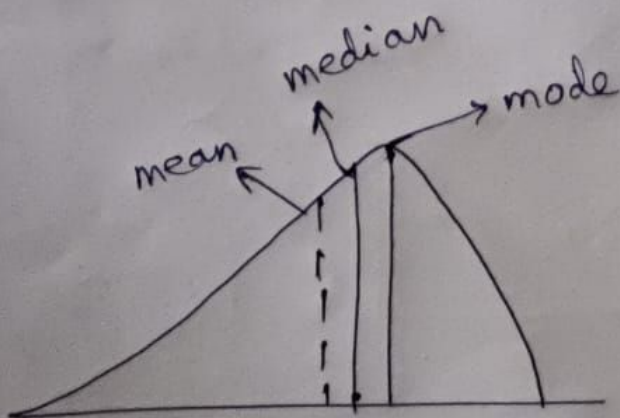
→ Right skewed / Positive skew :

mode

↑
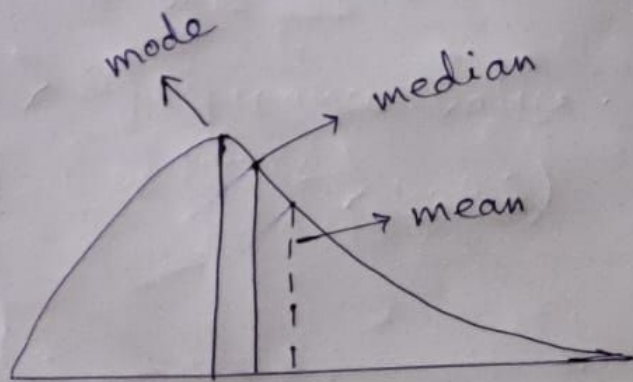
median

mean

Eg: Lengths of Comments

mean > median > mode

→ Left Skewed / Negative skew:

median

↑

mode

mean

Eg: Life span of Human being

mode > median > mean