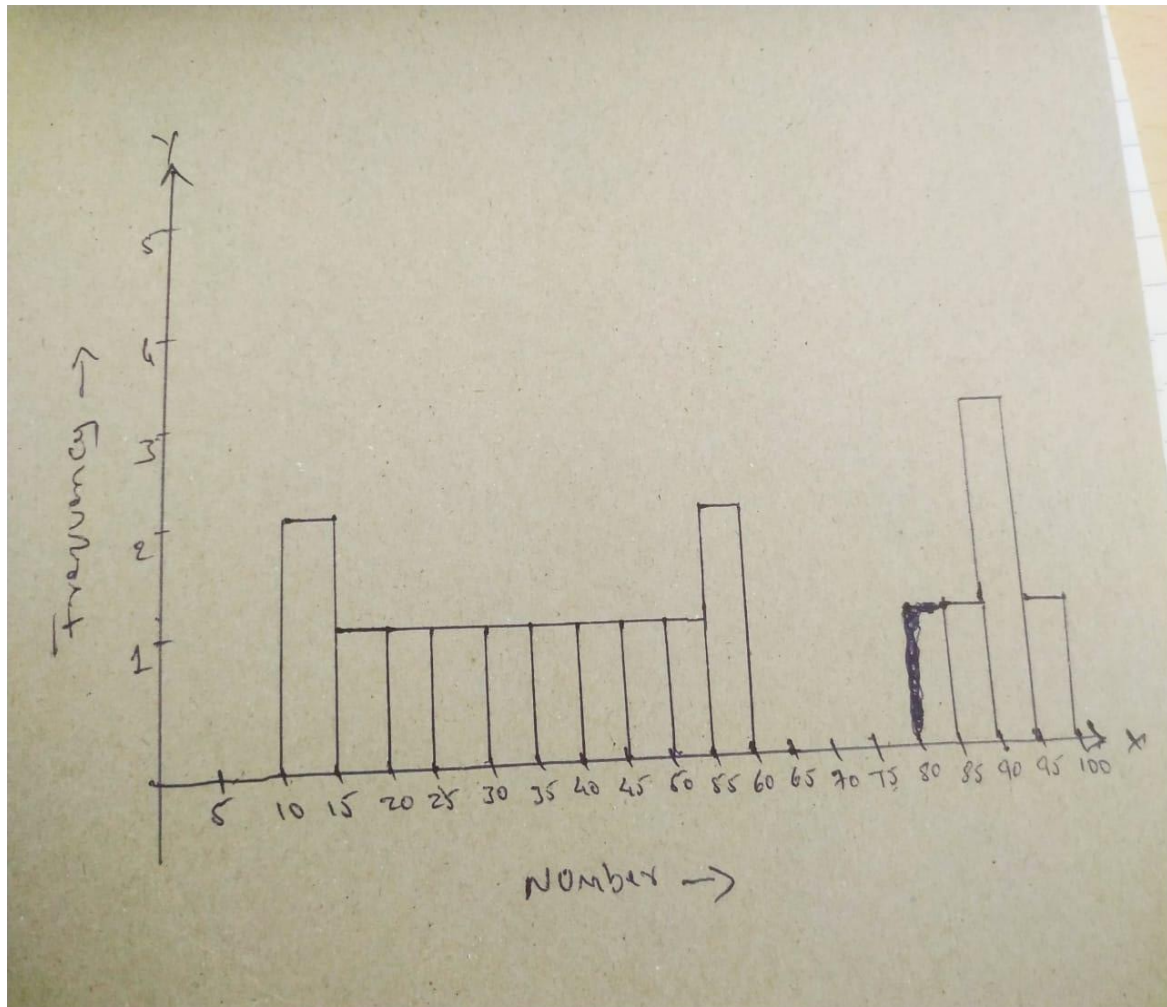


Que 1) Plot a histogram,

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

Bins = 5

Bin size = 20



Que 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

population standard deviation = $\sigma = 100$

Sample $n = 25$

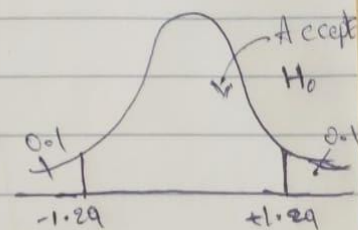
Sample mean = $\bar{x} = 520$

Confidence Interval = $CI = 80\%$

Significance value = $\alpha = 1 - CI$

$= 1 - 0.8$

$\alpha = 0.2$



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

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

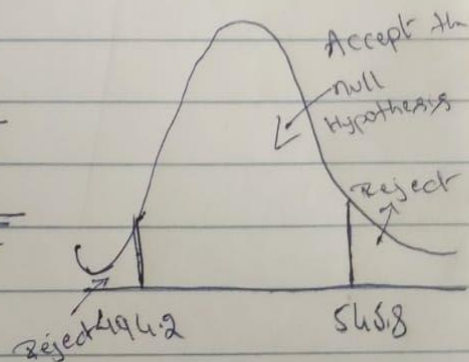
$= 494.2$

$1 - 0.1 = 0.9$

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

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

$= 545.8$



Que 3) 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 a vehicle.

- State the null & alternate hypothesis.
- At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

Null Hypothesis $H_0 = P_0 \leq 60\%$

Alternative Hypothesis $H_1 = P_0 \neq 60\%$

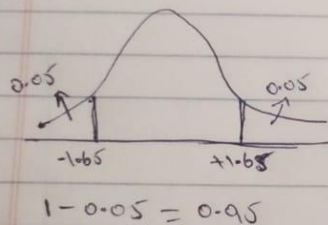
$$n = 250$$

$$x = 170$$

Significance level $\alpha = 10\% = 0.1$

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

$$q_0 = 1 - P_0 \\ = 1 - 0.6 = 0.4$$



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

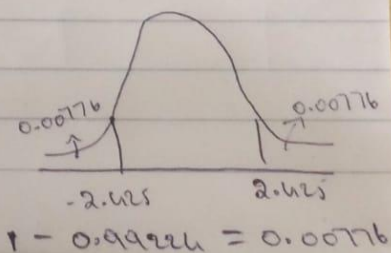
$$= \frac{0.68 - 0.6}{\sqrt{\frac{0.68 \times 0.4}{250}}} = \frac{0.08}{0.0329}$$

$$Z_{test} = 2.425$$

Since 2.425 is greater than 1.65 Reject the null hypothesis.

$$p\text{-value} = 0.00776 + 0.00776 \\ = 0.01552$$

$p\text{-value} < \text{Significance value}$
Reject the null hypothesis



Que 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

Answer:

$$\text{Value of the 99 percentile} = ((\text{Percentile})/100) * (n+1)$$

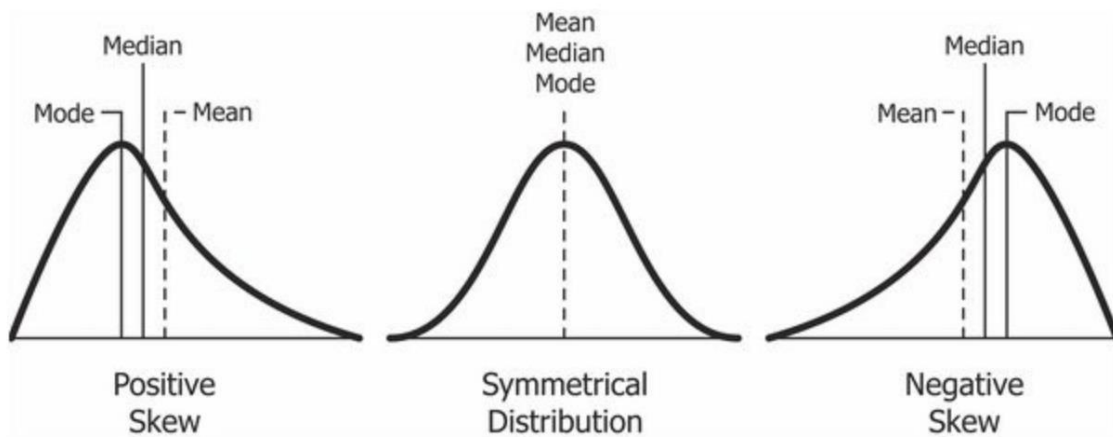
$$\text{Value of the 99 percentile} = ((99)/100) * (20+1)$$

$$= 20.79$$

Since the data has 20 values the value of the 99 percentile is **12**.

Que 5) In left & right-skewed data, what is the relationship between mean, median & mode?

Draw the graph to represent the same.



If the distribution is normal

→ Mean = Mode = Median

If the distribution is left or Negative skewed

→ Mean < Median < Mode

If the distribution is right or positive skewed

→ Mode < Median < Mean