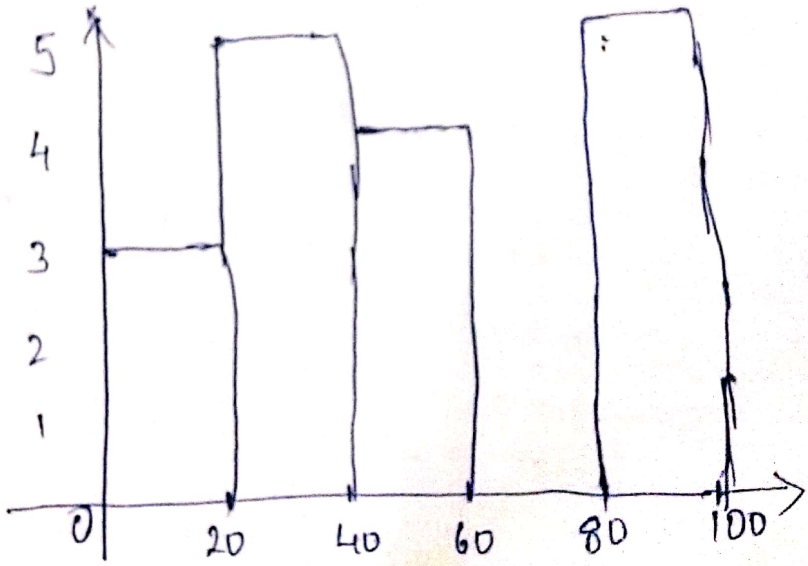
21) Assignment :- Plot a Histogram

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

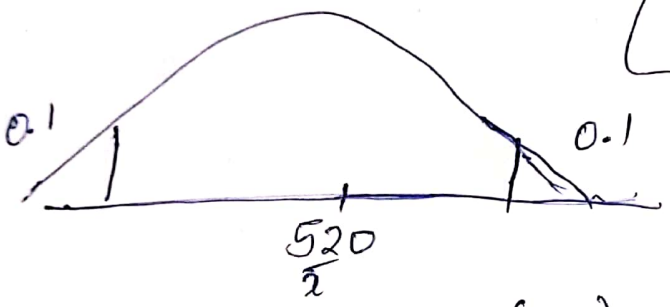
Bins = 5

Bin Size = 20



Q)2) In a Quant test of the CAT exam. the population stdev is known to be 100. A sample of 25 tests taken has a mean of ~~250~~ 520. Construct a 80% CI about the mean.

A) $\sigma = 100$, $n = 25$, $\bar{x} = 520$ $CI = 80\%$ $\alpha = 20\%$



[C.I = Point Estimate ± Margin of Error

$\bar{x} \pm Z_{\alpha/2} \times [\sigma/\sqrt{n}]$

↳ std error

$Z_{\alpha/2} = 20/2 = 10\%$ (or) 0.1

Z table for (0.1) is 1.28

$\Rightarrow 520 \pm (1.28)\left(\frac{100}{\sqrt{25}}\right)$

~~Lower fence~~: $= \bar{x} + Z_{\alpha/2} [\sigma/\sqrt{n}]$

Higher fence: $= 520 + 1.28 \times \left(\frac{100}{\sqrt{25}}\right)$

$= 520 + 1.28 \times 20 = 520 + 25.6$

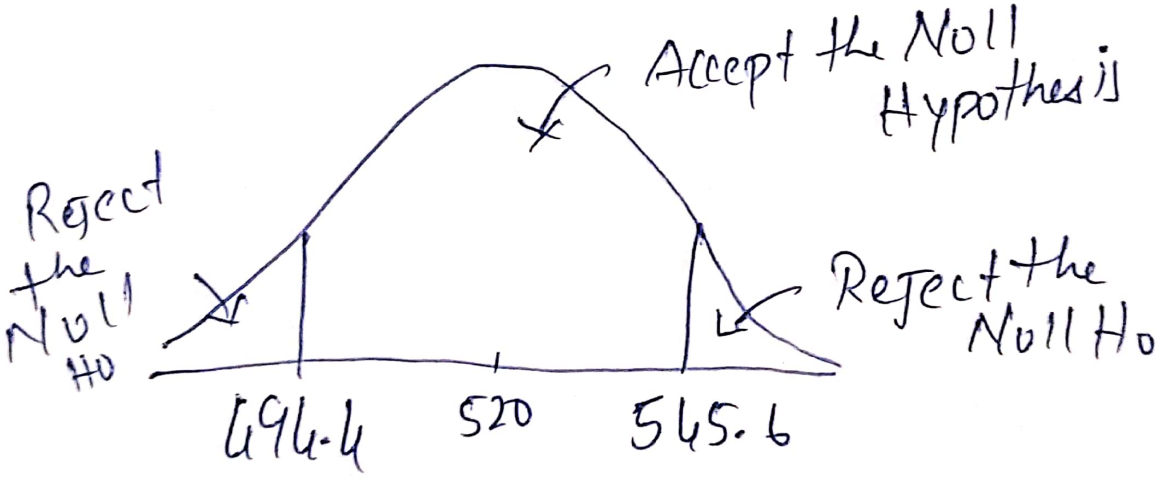
$= 545.6$

Lower fence: $\bar{x} - Z_{\alpha/2} [\sigma/\sqrt{n}]$

$= 520 - (1.28)(100/\sqrt{25})$

$= 520 - 25.6$

$= \underline{494.4}$



Q3) A Cable 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 conduct a Hyp testing surveying 250 Residents and found that 170 Responded yes. to owning a vehicle.

(a) state the Null & Alternative Hyp

(b) At 10% Significance level, is there enough evidence to support the claim that vehicle ownership in ABC is 60% or less?

A. This is a Z-test with Proportions

(a) Null Hypothesis $H_0 : \mu > 60\%$ } → This is a
Alternative Hypothesis $H_A : \mu \leq 60\%$ } One-tail test.

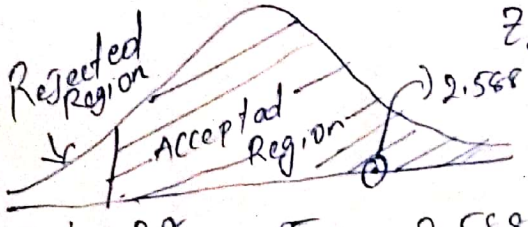
$n = 250$, $x = 170$, $\alpha = 10\%$, $CI = 90\%$

$\hat{p} = x/n = 170/250 = 0.68$, $P_0 = 60\% = 0.6$; $q_0 = 1 - P_0 = 1 - 0.6$
$q_0 = 0.4$

$$Z_{score} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 \times q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}} = \frac{0.08}{0.0309} = 2.5889$$

Level of Significance = 0.10

Z_α for One tail test = -1.28



as $H_A : \mu \leq 60$ it is a left tail test

[As $2.588 > -1.28$ we accept $H_0 : \mu > 60\%$]

ie we accept Null H_0 & Reject $H_A : \mu \leq 60\%$

* At 10% α there is not enough evidence to support the claim that vehicle ownership in ABC is 60% or less

Q)4) What is the value of the 99 percentile?

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

A) Value that exists at 99 percentile

$$V = \left(\frac{K}{100}\right)n$$

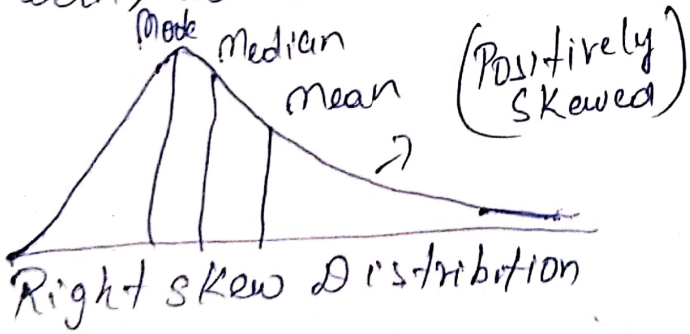
V = Value, K = percentile, n = No of values

$$= \left(\frac{99}{100}\right) \times 20 = 19.8 \sim 20^{th} \text{ position}$$

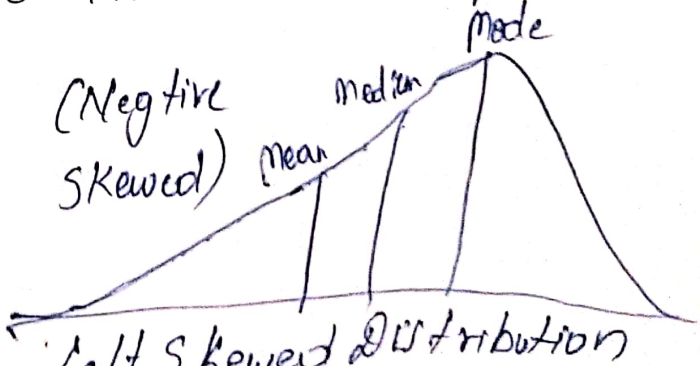
Here 12 is the value at 20th position which is the 99 percentile value.

Q5) In left skew & Right skew data, what is the relationship b/w mean, median & mode.

A)



Mean > Median > Mode



Mean < Median < Mode.