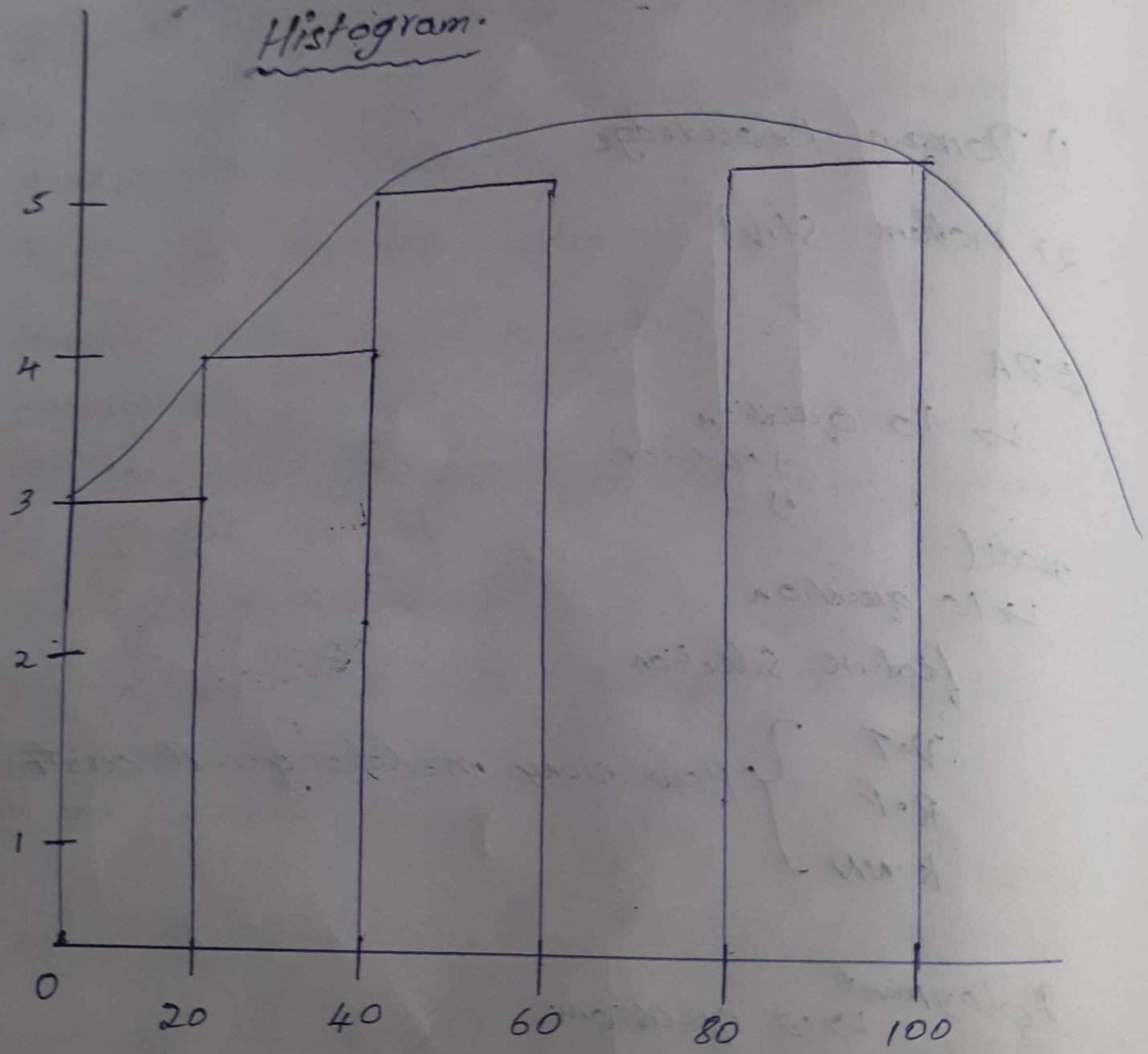
18) 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

Histogram:



bin_size = 20

bins = 5

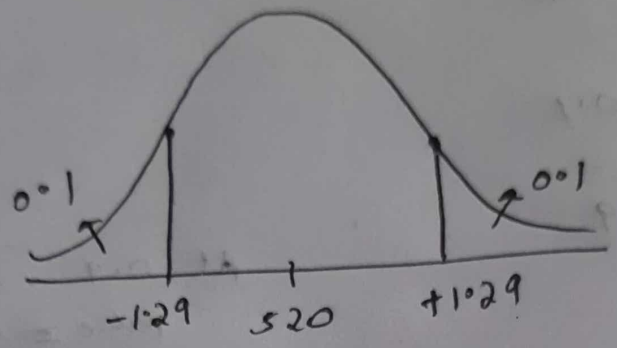
2A) $\sigma = 100$

$n = 25$

$\bar{x} = 520$

C.I = 80%

$\alpha \Rightarrow 1 - 0.8 = 0.2$



point estimate ± margin of error

$$\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

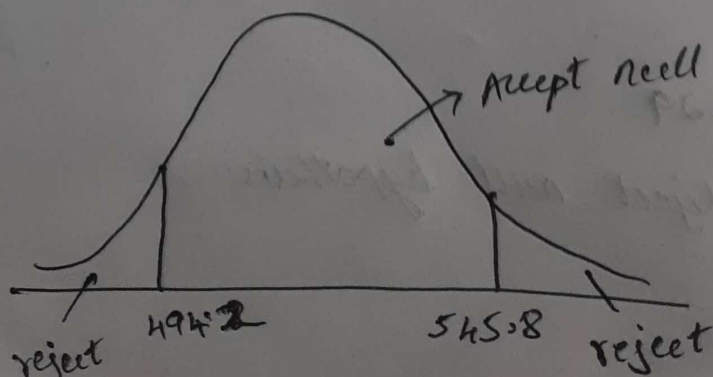
lower fence $\Rightarrow \bar{x} - z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$

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

$= 494.2$

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

$= 520 + 1.29 \times \frac{100}{\sqrt{25}} = 545.8$



3A) Null hypothesis

$H_0 : P_0 \leq 60\%$

$H_1 : P_0 > 60$ {one tail test i.e right tail}

$n = 250$

$x = 170$

$\hat{P} = \frac{170}{250} \left\{\frac{x}{n}\right\} = 0.68$

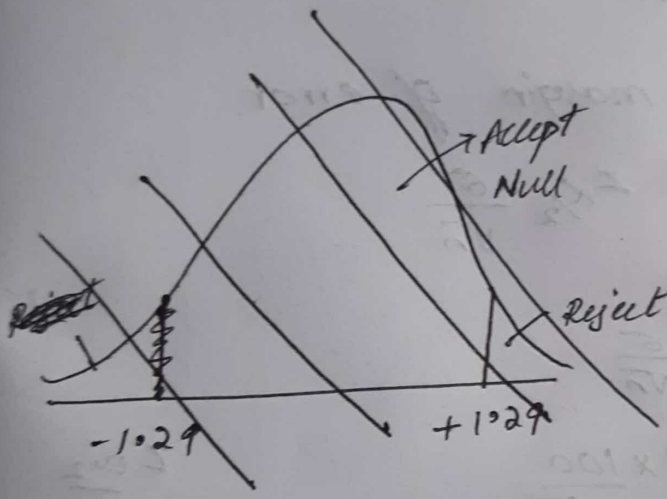
$q_0 = 40\% = 0.4$

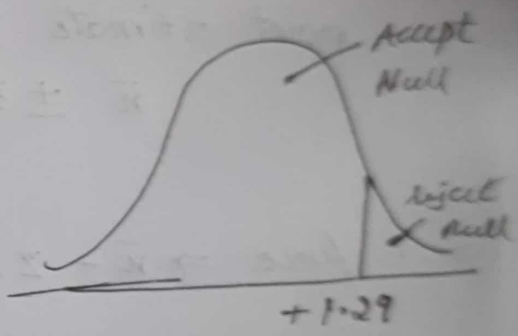
$\alpha = 10\% = 0.1$

$1 - 0.1 = 0.9$

At 0.9

Value = 1.29





$$Z_{test} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}}$$

$$= 2.58$$

$\because 2.58 > 1.29$

$\therefore$ Reject null hypothesis.

4A) Value of 99 percentile

$\Rightarrow \frac{99}{100} \times (n+1)$

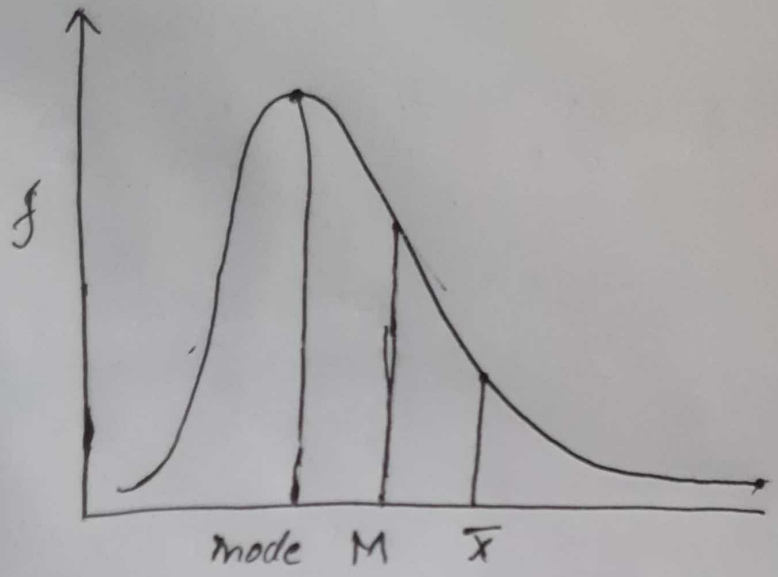
$= \frac{99}{100} \times 21 = 20.79$

i.e value at 20^{th} index

$\therefore$ value of 99 percentile is 12.

5A) Right Skewed data

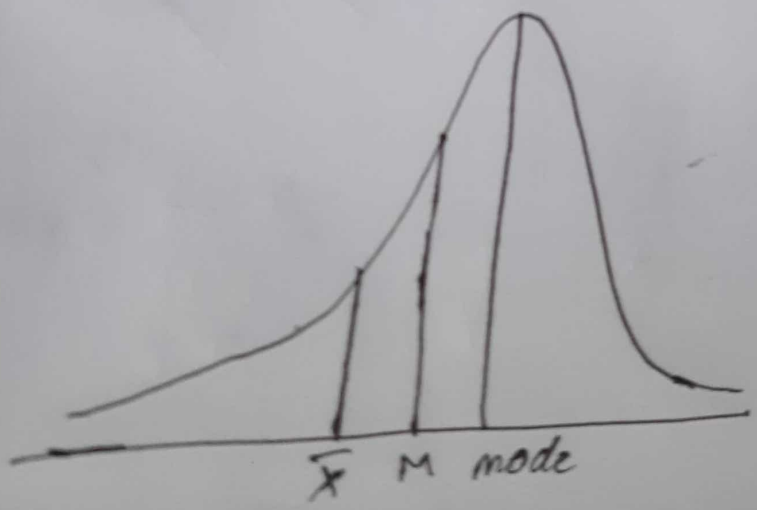
(+ve Skewed)



→ In right skewed data mean > median > mode.

Left skewed data

(-ve skew)



→ In left skewed data mode > median > mean