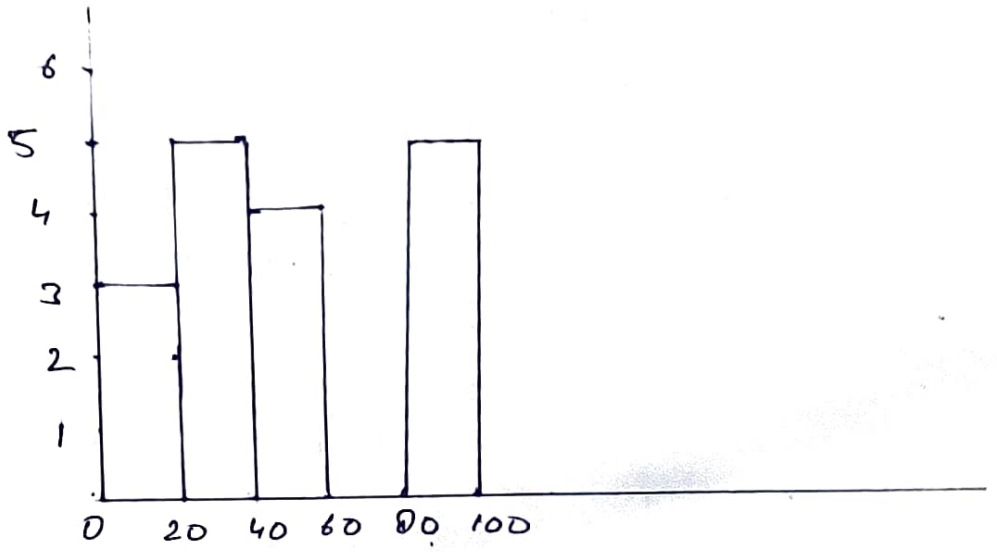
Q1 Histogram

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

Soln Bins = 5

Bin size = $\frac{100}{5} = 20$



Q2 Population, SD(σ) = 100 Mean($\bar{x}$) = 520, Sample(n) = 25

CI = 80%.

Soln Since, CI = 80%, $\alpha = 1 - CI = 0.2$.

$\Rightarrow \alpha/2 = 0.1$

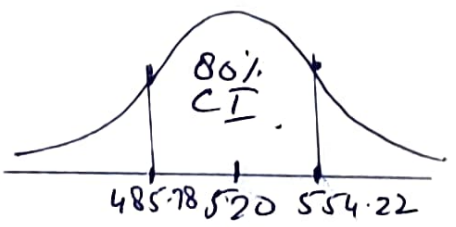
So, $\bar{x} \pm t\alpha/2 \times \left(\frac{\sigma}{\sqrt{n}}\right)$

$\Rightarrow 520 \pm 1.711 \times \left(\frac{100}{\sqrt{25}}\right)$

$\Rightarrow 520 \pm 1.711 \times 20$

$\Rightarrow 520 \pm 34.22$.

$\Rightarrow 554.22$ & 485.78.



Q3 $P_0 = 60\%$.

$n = 250$

$\hat{p} = \frac{170}{250} \times 100 = 68\%$.

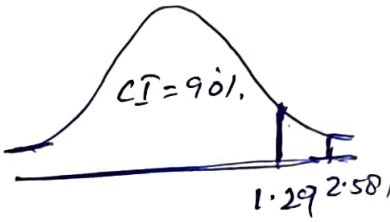
(a) Null hypothesis states less than 60%. of people own car

$\Rightarrow H_0 = \mu \leq 60$

Alternate hypothesis states more than 60%. of people own a car.

$\Rightarrow H_1 = \mu > 60\%$.

(b) Significance level, $\alpha = 0.1$, so, $z = \pm 1.29$



$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

$$z_{score} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.581$$

Since, $1.29 < 2.581$

We reject the null hypothesis.

p value $= 1 - z_{2.581}$

$= 1 - 0.995$

$= 0.005$

$\alpha = 0.1$

Since p value $< \alpha$, we reject null hypothesis

Q4 99 percentile

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

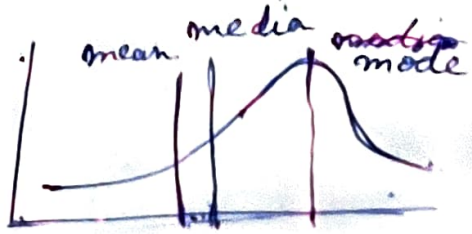
Ans So, 99 percentile $= \frac{99}{100} \times (20+1)$ [$\because$ $\frac{99}{100} \times (n+1)$

$= 20.79$ index

Since, there is no number at 21st index, so,

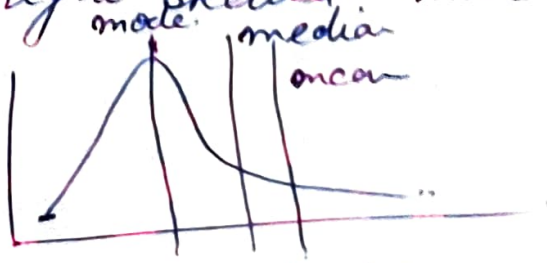
99 percentile = 12.

Q5 In left skewed, mean < median < mode.



left skewed data.

In right skewed, mode < median < mean.



Right skewed data