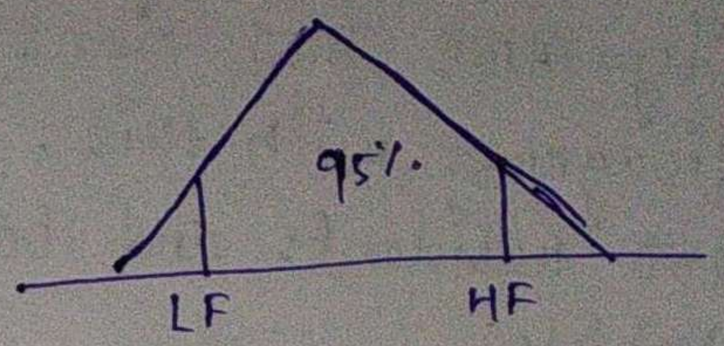
:- ASSIGNMENTS :-

(1) (S) = 80, $\bar{x}$ = 520, CI = 95%, α = 0.05, n = 25



↓
t-test

degree of freedom = df = n-1 = 25-1 = 24

α = 0.05

t-table = (2.064)

Lower Ference = $\bar{x} - t_{\alpha/2} \times \frac{s}{\sqrt{n}}$

$520 - 2.064 \times \frac{80}{5}$ 16

= 520 - 33.024

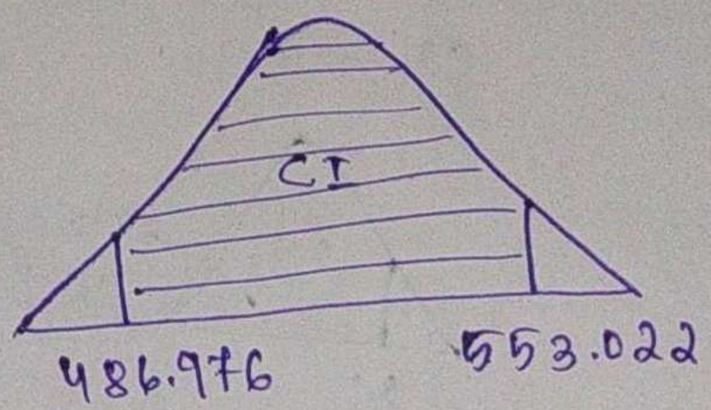
= 486.976

Higher Ference = $\bar{x} + t_{\alpha/2} \times \frac{s}{\sqrt{n}}$

$520 + 2.064 \times 16$

= 520 + 33.024

= 553.022



(2) Total employees (Populat°) = 1 lakh

Sample = 300 → XL α = 0.5

200 → L CI = 99.5

HR asked how many XL, L t-shirts u need to order.

XL

n = 300 $\sqrt{n} = \sqrt{300} = 17.3$

$\bar{x}$ = 150.5

$s = \sqrt{\frac{(x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{(300-150.5)^2}{299}}$

$= \sqrt{74.75} = 8.64$

α = 0.5

df = 299

t-table = 0.67

$LF = 150.5 - 0.67 \times \frac{8.64}{17.3}$

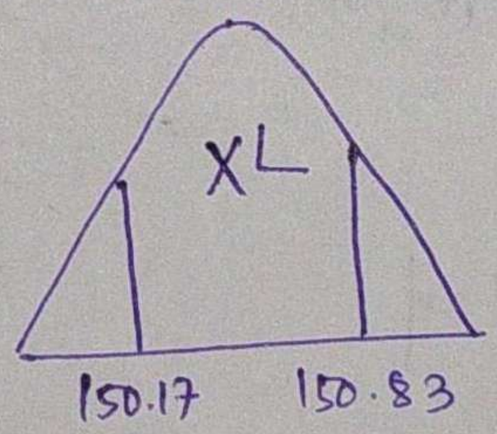
= 150.5 - 0.33

= (150.17)

$HF = 150.5 + 0.67 \times \frac{8.64}{17.3}$

= 150.5 + 0.33

= (150.83)



L

n = 200 $\sqrt{n} = \sqrt{200} = 14.14$

$\bar{x}$ = 100.5

$s = \sqrt{\frac{(200-100.5)^2}{199}} = \sqrt{49.75}$

= 7.05

α = 0.5

df = n-1 = 200-1 = 199

t-table = 0.68

$LF = 100.5 - 0.68 \times \frac{7.05}{14.14}$

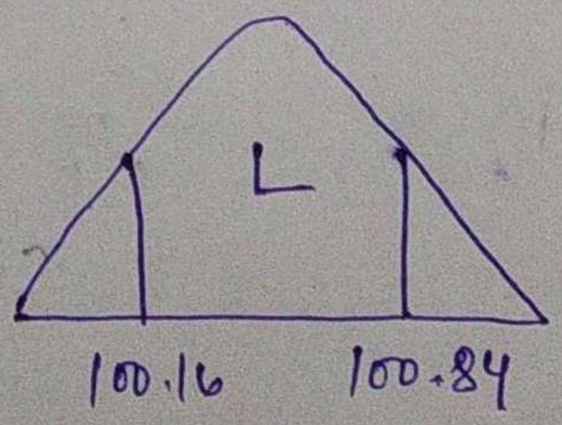
= 100.5 - 0.34

= (100.16)

$HF = 100.5 + 0.68 \times \frac{7.05}{14.14}$

= 100.5 + 0.34

= (100.84)



(3) A car 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 conducts a Hypothesis testing surveying 250 residents and found that 170 responded yes to owning a vehicle.

(a) State of H_0 & H_A

(b) At 10% significance level, is there enough evidence to support of idea that vehicle ownership in city ABC is 60%.

Ans (1) $H_0 : P_0 \geq 60\%$

$H_A : P_0 < 60\%$

$n = 250$

$x = 170$

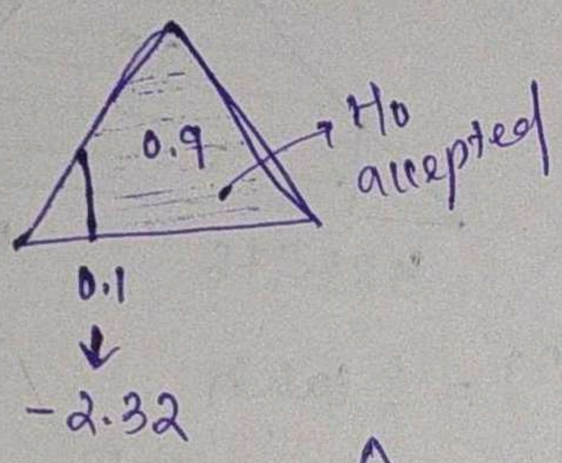
$\hat{P} = \frac{x}{n} = \frac{170}{250} = 0.68$

$P_0 = 60\% = 0.6$

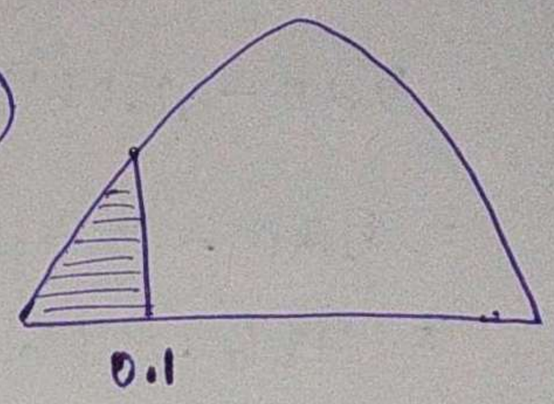
$q_0 = 1 - P_0 = 0.4$

(2) $\alpha = 10\% = 0.1$

$CI = 0.9$



(3)



Z-table statistics

$Z_{0.1} = -2.32$

(4) Z-test $= \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$ with Proportn

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

$= \frac{0.08}{\frac{\sqrt{0.24}}{\sqrt{250}} = \frac{0.49}{15.81}}$

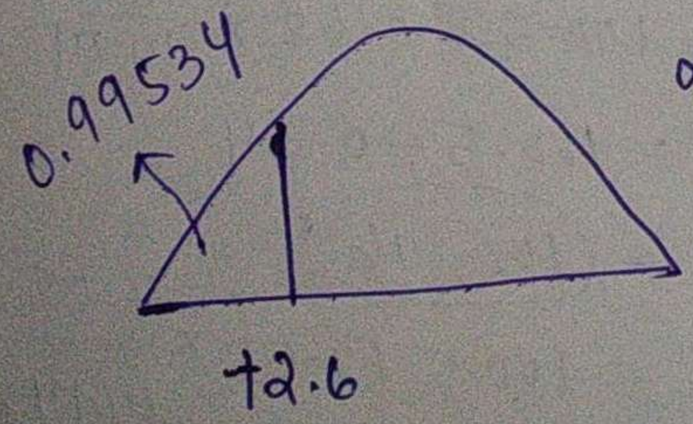
$= \frac{0.08 \times 15.81}{0.49}$

$= 2.6$ //

(5) Conclusion

$2.6 > -2.32 = H_0$ accepted

P-value Estimate :-



P-value $= 0.99534 > \alpha$

$= H_0$ is accepted

∴ Percentage of residents in city ABC that owns a vehicle is more than or equal to 60%.

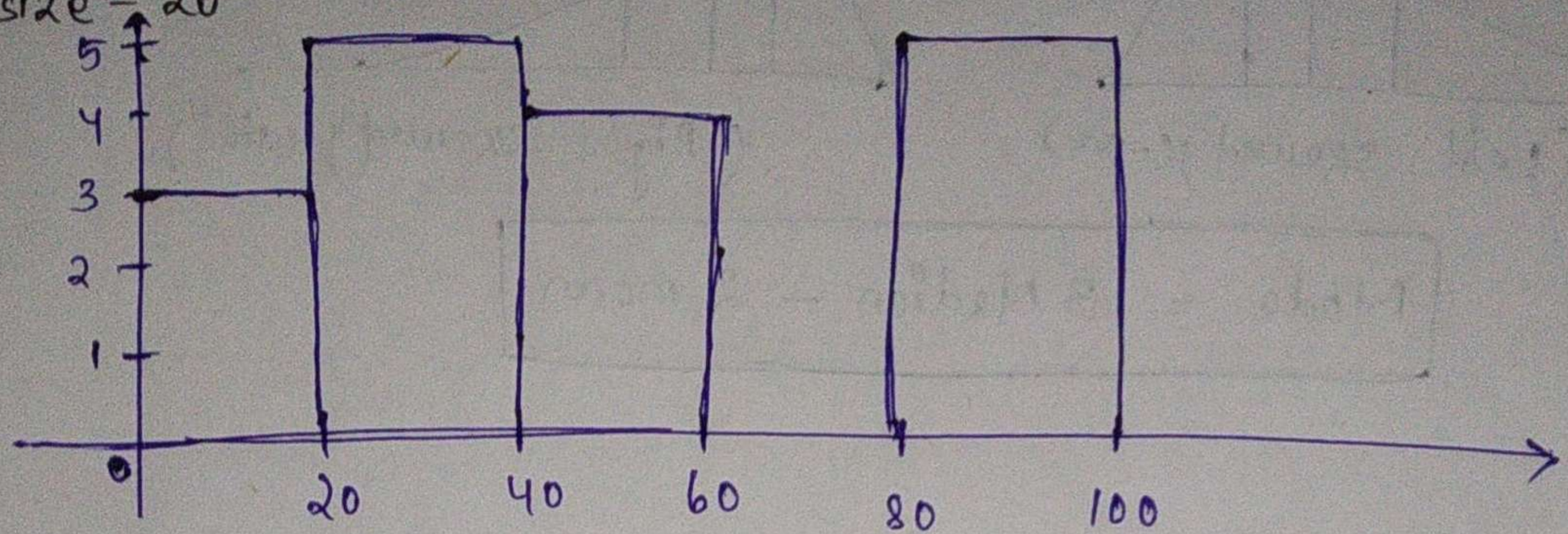
∴ Ans b

(4) Plot a histograms

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

bins = 5

bin size = 20



(5) In the quant test of the CAT exam, the population standard deviat is known to be 100. A sample of 25 tests taken has a mean of 520. Construct an 80% CI about the mean.

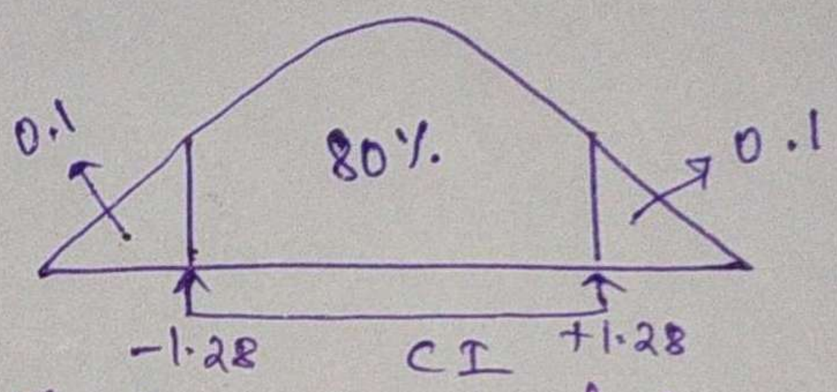
$\sigma = 100$

$n = 25$

$CI = 80\% = 0.8$

$\alpha = 0.2$

$\bar{x} = 520$



Point Estimate ± Margin of Error = Parameter

$$\bar{x} \pm z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}} = 520 \pm (z_{0.1}) \times \frac{100}{5}$$

$z_{0.1} = \pm 1.28$

Lower Ference $= 520 - 1.28 \times 20$

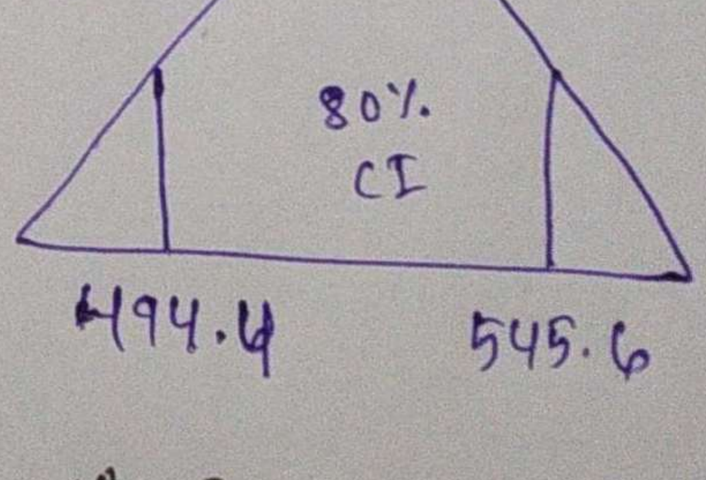
$= 520 - 25.6$

$= 494.4$

Higher Ference $= 520 + 1.28 \times 20$

$= 520 + 256$

$= 545.6$



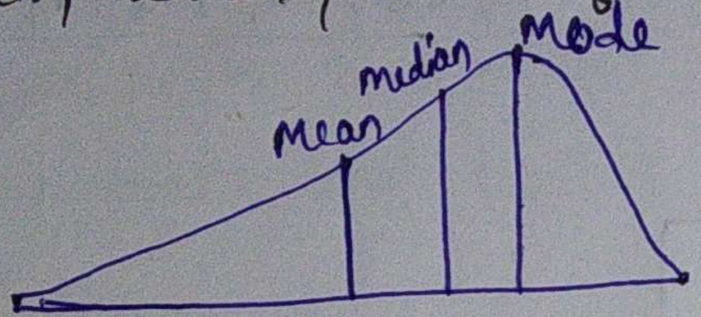
<Ans>

(6) What is the value of the 99 percentile?

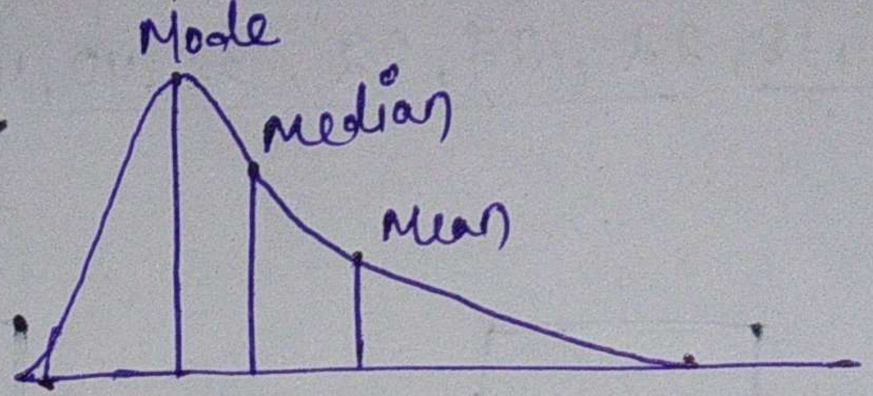
$x = \{ 2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12 \}$

$99\% = \frac{99}{100} \times (n+1) = \frac{99}{100} \times 21 = 20.79$ index = 12 value

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



(Left skewed)(-ive)



(Right skewed) (+ive)

$$\text{Mode} = 3\,\text{Median} - 2\,\text{mean}$$