Statistics assignment

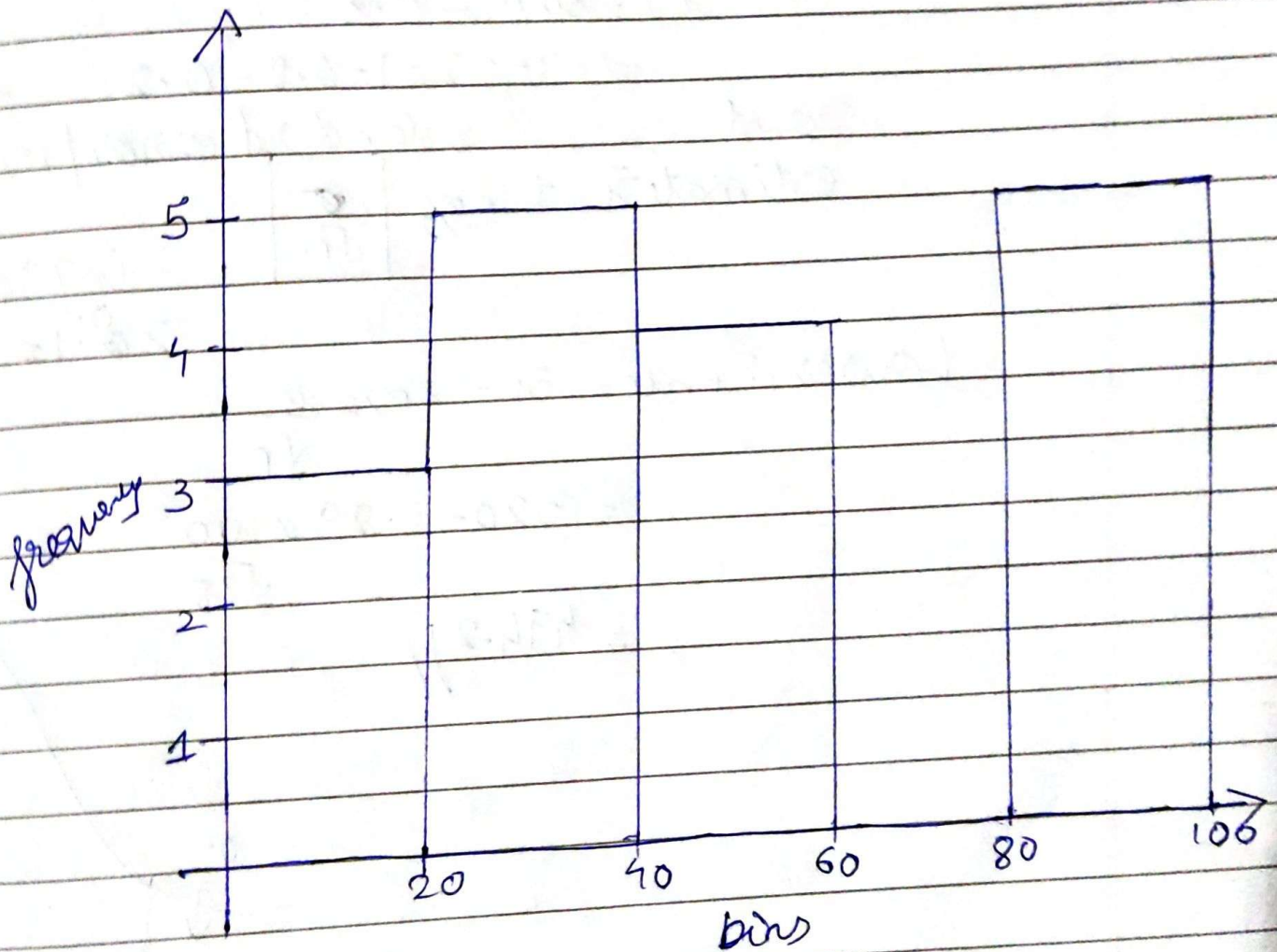**Que 1]** Plot a histogram

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

→ range [0-100]
  Here no of bins = 5
  $$bin size = \frac{100}{5} = 20$$

Histogram //

Que2} 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

$$\rightarrow \quad \sigma = 100$$
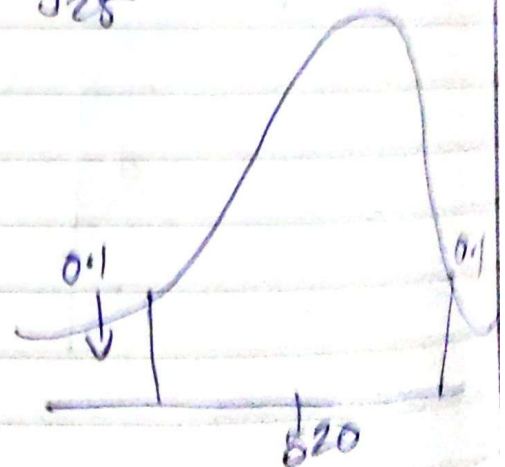$$n = 25$$
$$\bar{x} = 520$$
$$CI = 80\% = 0.8$$
$$\alpha = 1 - CI = 1 - 0.8 = 0.2 \qquad \alpha/2 = 0.1$$
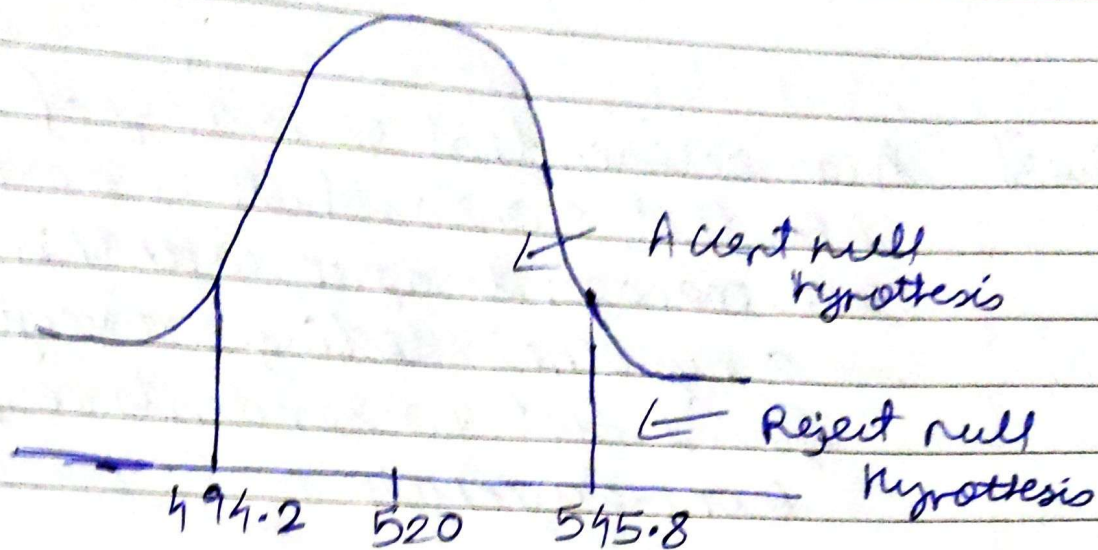
Point estimate $\bar{x} \pm z_{\alpha/2} \left| \dfrac{\sigma}{\sqrt{n}} \right|$ ← standard error / margin error

in Z Table
$$z_{0.1} = 1.29$$

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

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

$$= 494.2 //$$

Higher Fence $= \bar{x} + z_{\alpha/2} \dfrac{\sigma}{\sqrt{r}}$

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

$$= 545.8 //$$

Accept null hypothesis

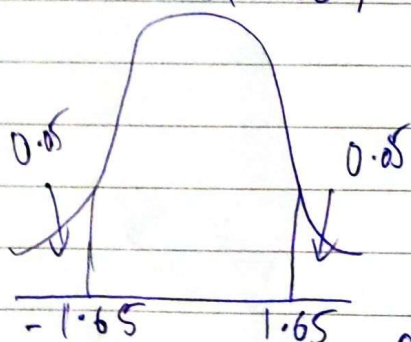Reject null hypothesis

494.2   520   545.8

Que 3] A car believes that 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 resident & found that 170 residents responded yes to owning a vehicle

a) State the null & alternate hypothesis

b) at a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or les

→ Null Hypothesis $H0 : P0 \leq 60\%$

alternate Hypothesis $H1 :> 60\%$

$\alpha = 10\% = 0.1$ \qquad $C \cdot I = 90\%$

0.05 \qquad 0.05

-1.65 \qquad 1.65

$x = 170, n = 250$

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

$P0 = 0.6$

$q0 = 1 - 0.6 = 0.4$

Here $z\text{-test} = \dfrac{P - P0}{\sqrt{\dfrac{P0 \times q0}{n}}}$

$= \dfrac{0.68 - 0.6}{\sqrt{\dfrac{0.6 \times 0.4}{250}}} = \dfrac{0.08}{\sqrt{0.00096}}$
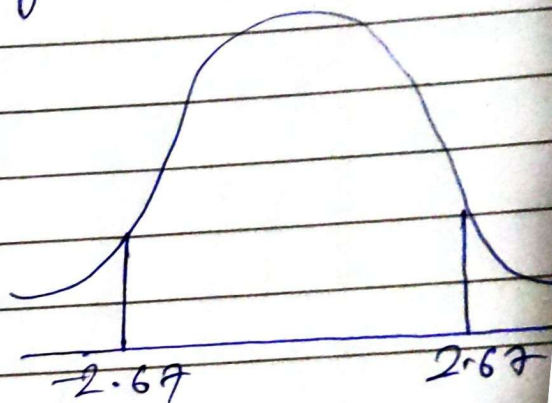
$= 2.67$

$2.67 > 1.65$
so we reject null hypothesis

For p-value

$1 - 0.9962) + 0.9962)$
z

p value $= 0.00379$ //

P value $< \alpha$
$0.00379 < 0.1$
So we reject null hypothesis

-2.67 2.67

Que4] 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, 1

Sample size $n = 20$

Here $n + 1 = 20 + 1 = 21$

For 99 percentile

$$\frac{99 \times \cancel{100}^{21}}{100} =$$
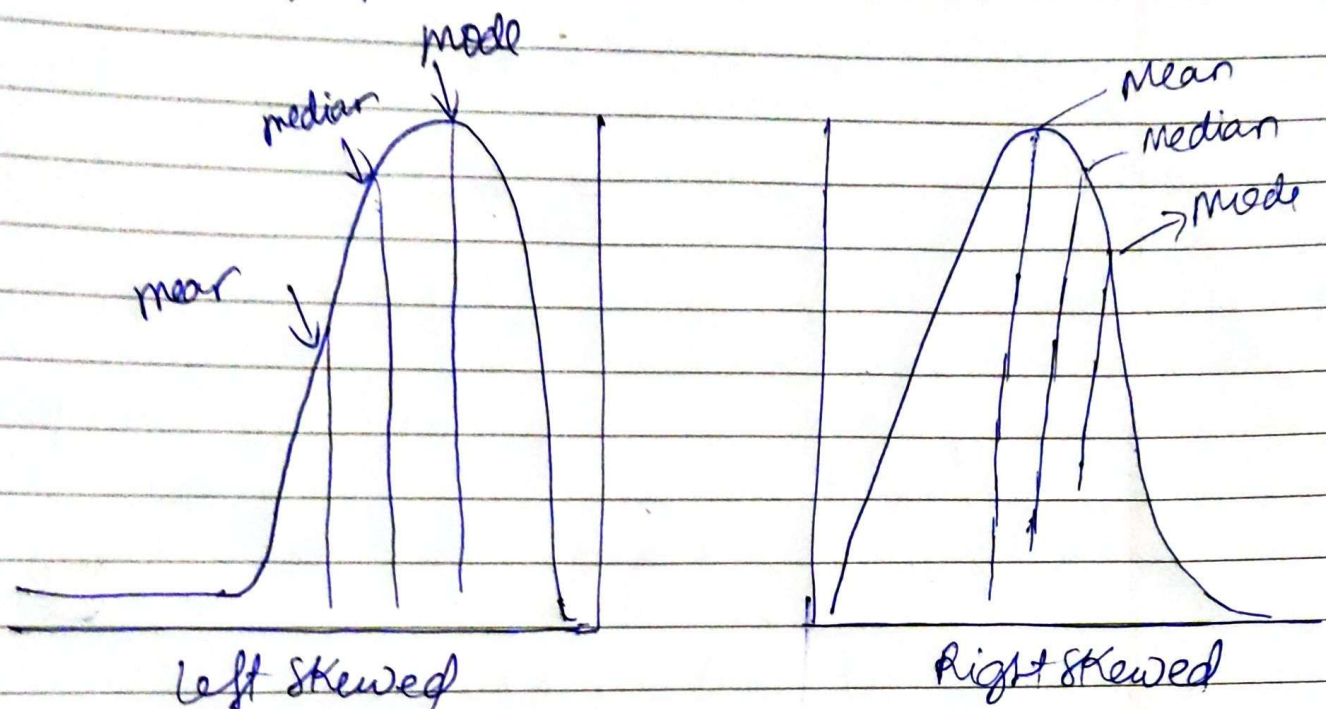
$$value = \frac{Percentile \times (n+1)}{100}$$

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

$$= 20.79 \text{ index}$$

$$\boxed{value = 12}$$

Ques5] In left & right-skewed data, what is th relationsh
between mean, median, & mode?

Draw th graph to represent th same

mode

median

mean

left skewed

Mean
median
mode

Right skewed

In left skewed
        Right
    Mean > median > mode

In left skewed
    mean < median < mode

In Right skewed
            Mean is Highest, mode Lowest

In left skewed
        Mode is Highest, mean is Lowest