Plot a histogram
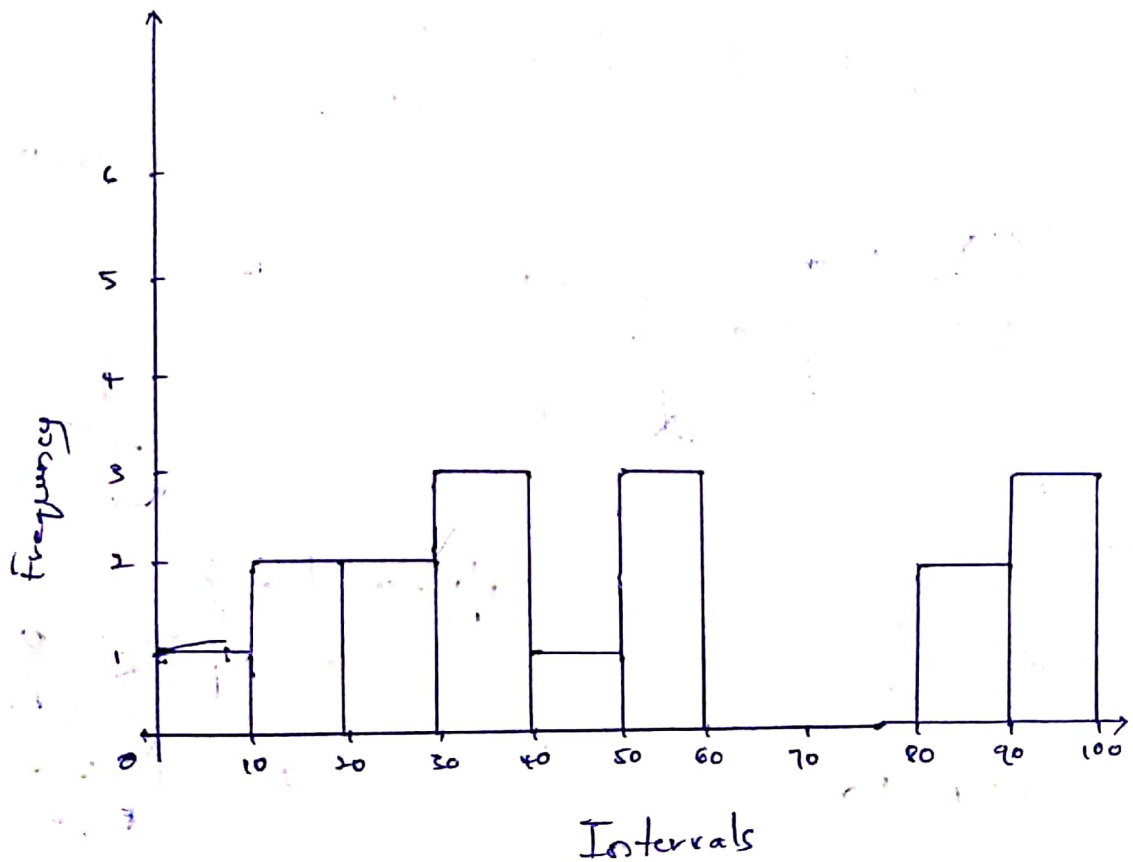
① → 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88,

90, 92, 94, 99

Consider   Bins = 10

then Bins size = $\frac{100}{10}$ = 10

Intervals

② 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.
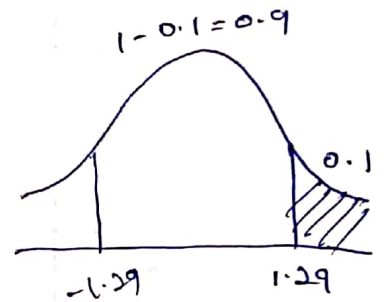
→ S.D = 100   n = 25 $\bar{x} = 520$ C.I = 80%.

α = Significance value

$$1 - C.I = 0.2$$

Point estimate ± Margin of Error

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

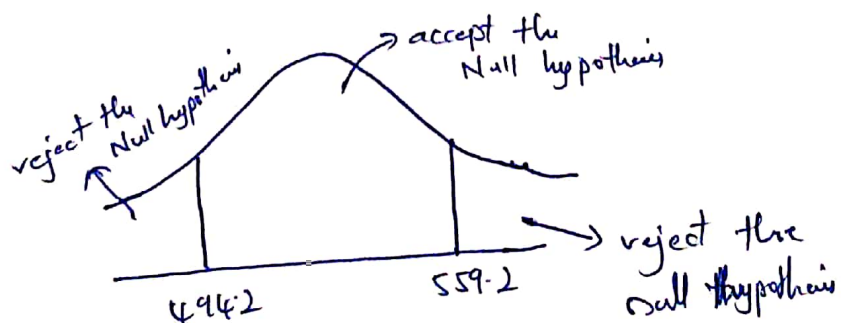$$Z_{\frac{0.2}{2}} = Z_{0.1} = 1.29$$

$1 - 0.1 = 0.9$

0.1

-1.29 1.29

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

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

$$= 494.2$$

Higher Fence
$$= \bar{x} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 + 1.96 \times \frac{100}{\sqrt{25}}$$

$$= 545.8$$

reject the Null hypothesis

accept the Null hypothesis

reject the Null hypothesis

494.2   559.2

③ A car believes that the 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 residents & found that 170 residents responded yes to owing 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 less.
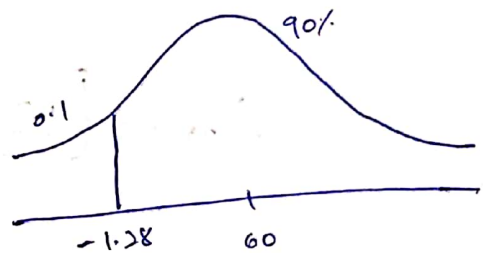
$\Rightarrow H_o : P_o = 60\%$

$n = 250$ $\quad x = 170$

$H_1 : P_o < 60\%$

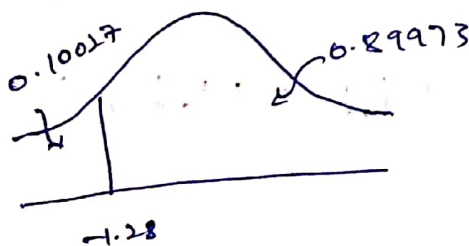$\hat{P} = \dfrac{x}{n} = \dfrac{170}{250} = 0.68$

$q_o = 1 - P_o = 1 - 0.6$
$= 0.3$

$\alpha = 0.1 \quad\quad C \cdot I = 90\%$

$Z_{tat} = \dfrac{\hat{P} - P_o}{\sqrt{\dfrac{P_o q_o}{n}}}$

$= \dfrac{0.68 - 0.6}{\sqrt{\dfrac{0.68 \times 0.6}{250}}} = 1.985$

$1.985 > -1.28$ {Accept the Null hypothesis}

$1 - 0.10027 = 0.89973$

$P_v = 0.10027$

$P_{value} > $ Significance value

$0.10027 > 0.1$ {Accept the Null hypothesis}

④ What is the value of the 99 percentile?

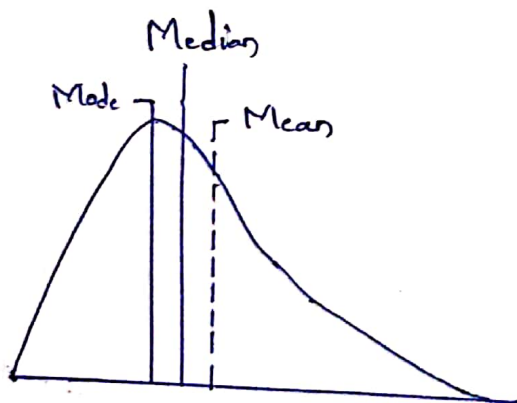2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12

$$= \frac{99}{100} \times (n+1) = \frac{99}{100} \times (20+1)$$

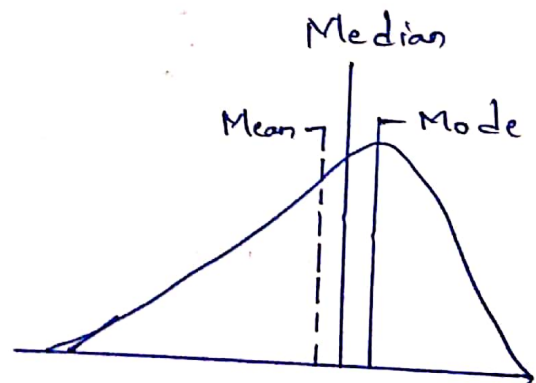$$= \frac{99}{100} \times 21 = 20.79 \text{ index}$$

Ans => $\boxed{12}$

⑤ In left & right-skewed data, What is the relationship b/w mean, median & mode? Draw the graph to represent the same.

Right Skewed

Median
Mode
Mean

Mean > Median > Mode

Left Skewed

Median

Mean
Mode

Mode > Median > Mean