

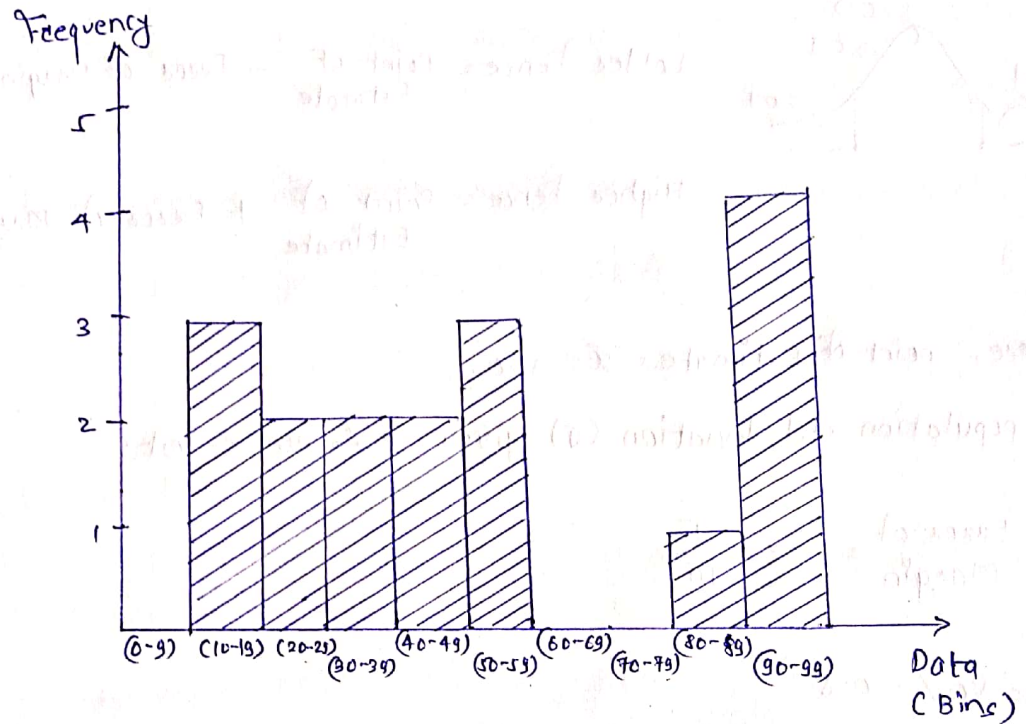
Q.1] Plot a histogram.

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

→ let's Bin size = 100

Total Bins = 10

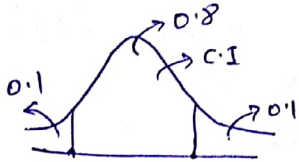
Bins	Freq.
(0-9)	0
(10-19)	3
(20-29)	2
(30-39)	2
(40-49)	2
(50-59)	3
(60-69)	0
(70-79)	0
(80-89)	1
(90-99)	4



Q.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.

→ # Given:-

$$\sigma = 100, n = 25, \bar{x} = 520, CI = 80\%$$



Lower Fence = Point of Estimate - Error of Margin

Higher Fence = Point of Estimate + Error of Margin

① Here, point of Estimate =  $\bar{x} = 520$ .

As population std. deviation ( $\sigma$ ) given  $\rightarrow \therefore$  use z-Test.

$$\therefore \text{Error of Margin} = Z_{\frac{\alpha}{2}} \cdot \frac{\sigma}{\sqrt{n}}$$

$$CI = 80\% = 0.8$$

$$\therefore \text{significance value} = \alpha = 1 - 0.8 = 0.2$$

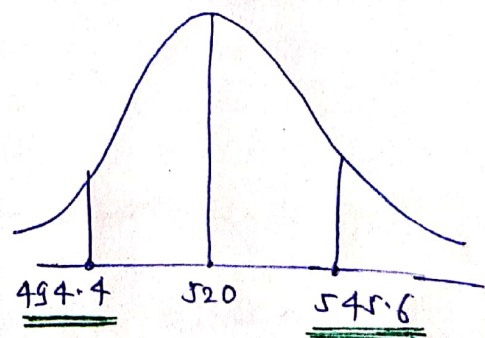
$$\therefore Z_{\frac{\alpha}{2}} = Z_{\frac{0.2}{2}} = Z_{0.1} \Rightarrow \text{From z-table value} = 1.28$$

Now,

$$\therefore \text{Error of Margin} = Z_{\frac{\alpha}{2}} \cdot \frac{\sigma}{\sqrt{n}} = 1.28 \times \frac{100}{\sqrt{25}} = 1.28 \times 20 = 25.6$$

$$\textcircled{2} \therefore \text{Lower Fence} = 520 - 25.6 = 494.4$$

$$\text{Higher Fence} = 520 + 25.6 = 545.6$$



Q.3] A car believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagree with this. He conducted a hypothesis testing surveying 250 residents & 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 owners in ABC city is 60% or less.



① # Null Hypothesis = percentage of citizens in city has car is 60% or less.

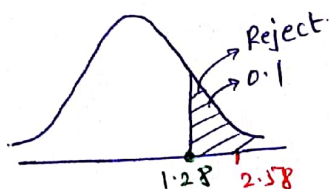
Alternate hypothesis = percentage is greater than 60%.

②  $n = 250$ ,  $x = 170$

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

③ C.I = 90%  $\rightarrow \alpha = 0.1$

1 Tail Test As  $n > 20 \rightarrow$  Use z test. = 1.28



④ z-test with proportion statistics:-

$$z\text{-test} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 \cdot q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.58$$

As z-score value = 2.58  $>$  1.28  $\Rightarrow$  Reject Null Hypothesis.

# conclusion :-

$\Rightarrow$  % percentage of citizens in city ABC that owns a vehicle is greater than 60%.

Q.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

$$\rightarrow \text{Value of 99 percentile} = \frac{99}{100} \times (\overset{20}{\cancel{21}} + 1)$$

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

$$= 20.79^{\text{th}} \text{ index} \Rightarrow \boxed{12}$$

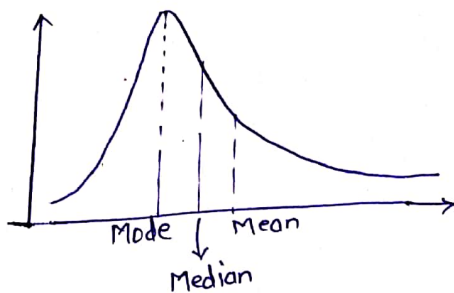
$$\therefore \boxed{\text{value of 99 percentile} = 12}$$

xox

xox



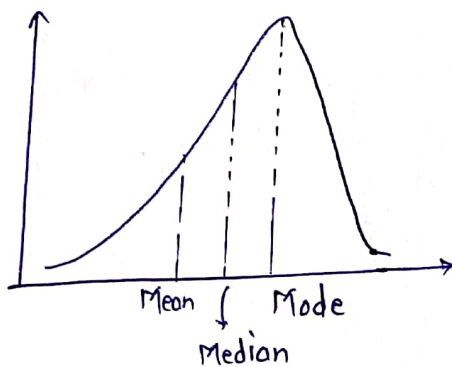
Q.5] # Right skewed graph:-



$\text{Mean} > \text{Median} > \text{Mode}$ .

e.g. Wealth distribution of a country.

# Left skewed graph:-



$\text{Mode} > \text{Median} > \text{Mean}$ .

e.g. Age distribution.