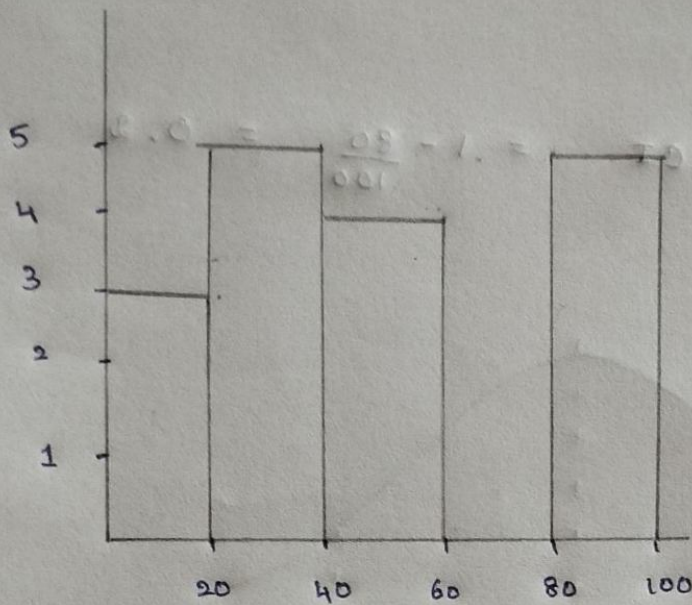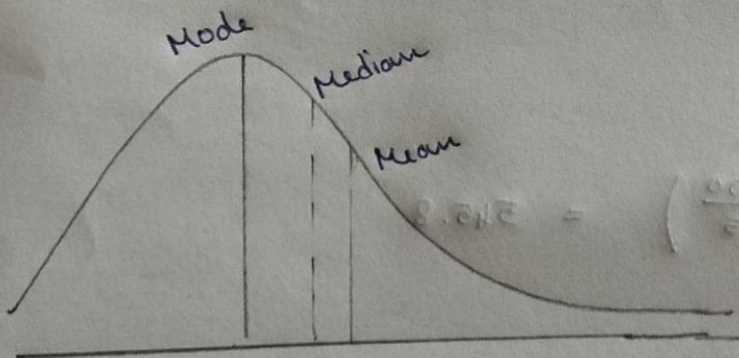① Plot a Histogram :

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

Bins = 20
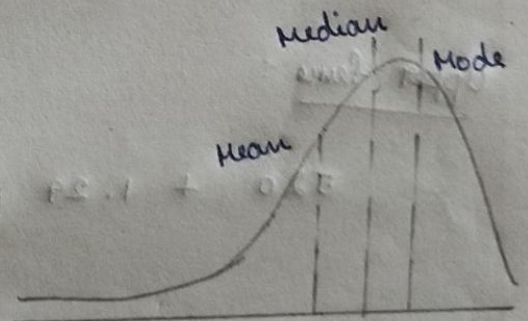
⑤ In left & right-skewed data, What is the relationship between mean, median & mode? Draw the graph to represent the same.

Right Skewed data

Left Skewed data

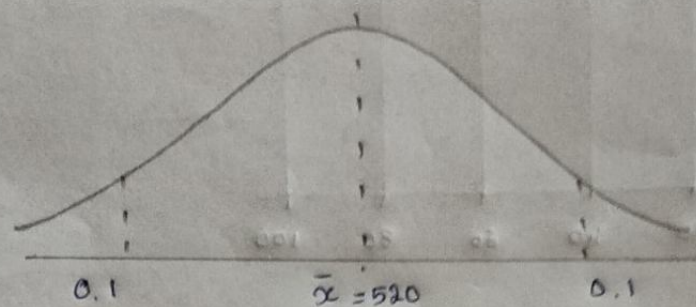Mean > Median > Mode

Mode > Median > Mean

eg: Wealth distribution

eg: Life Span of human

① In a quant test of the CAT Exam, the population standard deviation is known to be 100. A sample of 25 test taken has a mean of 520. Construct an 80% CI about the mean.

C.I = 80%

Significance value, $\alpha = 1 - CI = 1 - \frac{80}{100} = 0.2$

$\alpha = 0.2$

0.1 $\bar{x} = 520$ 0.1

Point estimate $\pm$ Margin of error

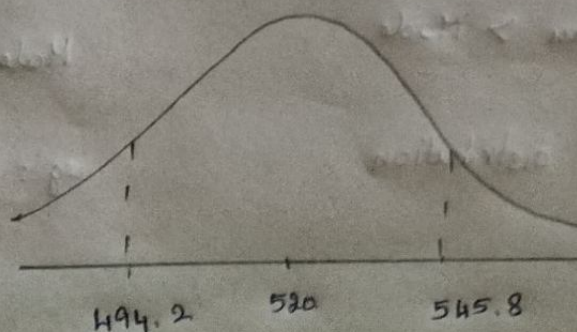$$\bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$520 \pm Z_{0.1} \left(\frac{100}{\sqrt{25}} \right)$$

Lower fence :

$$520 - 1.29 \left(\frac{100}{5} \right) = 494.2$$

upper fence :

$$520 + 1.29 \left(\frac{100}{5} \right) = 545.8$$

494.2   520   545.8

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 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 less.

Null hypothesis, $H_0 \Rightarrow$. $P_0 \leq 60\%$.

Alternate hypothesis, $H_1 \Rightarrow$ $P_1 \neq 60\%$.

$$n = 250$$

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

$P_0 = 0.6$

$q_0 = 1 - P_0 = 0.4$

$C.I = 10\%$.

$\alpha = 1 - \frac{10}{100} = 0.9$

$\%$ - Test with proportion : $\dfrac{\hat{P} - P_0}{\sqrt{\dfrac{P_0 q_0}{n}}}$

$$= \frac{0.68 - 0.6}{\sqrt{\dfrac{0.6 \times 0.4}{250}}} = 2.58$$

P. value

Area under curve $= 0.99506$

$1 - 0.99506 = 0.00494 \Rightarrow < 0.9$

P value $= 0.00494$ $+ 0.00494 = 0.00988 < 0.9$

Accept null hypothesis

4. What is the value of 99 percentile?

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

$$\text{Value} = \frac{\text{Percentile}}{100} \times n + 1$$

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

$$= 20.79$$

99th percentile value is 12