

## Statistics Assignment

Que 1) Plot a histogram

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

Que 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.

Que 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.

Que 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

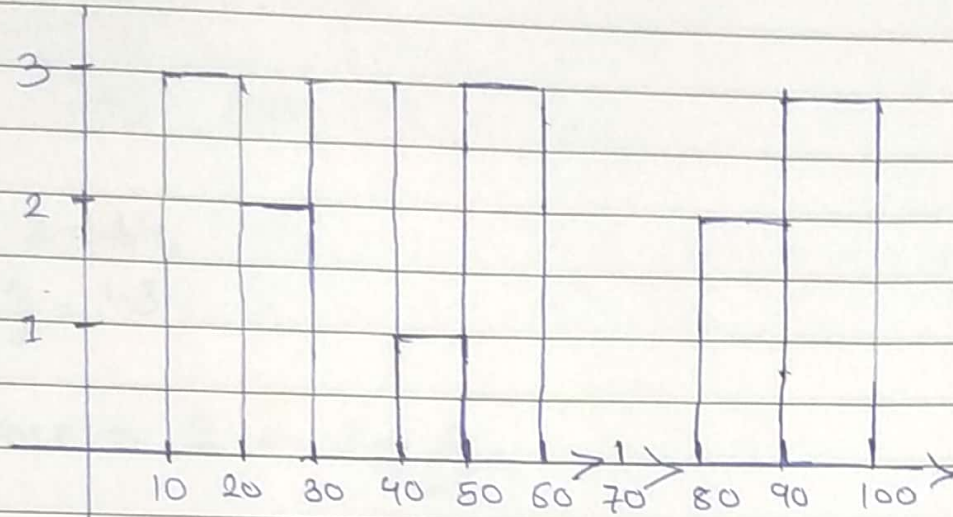
Que 5) In left & right-skewed data, what is the relationship between mean, median & mode?

Draw the graph to represent the same.

# Statistics Assignment

Q1) Plot histogram.

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



Que 2)

Given :  $\sigma = 100$ ,  $n = 25$ ,  $\bar{x} = 520$ , C.I. = 80%

Significant value =  $1 - \text{C.I.} = 1 - 80\% = 0.20$

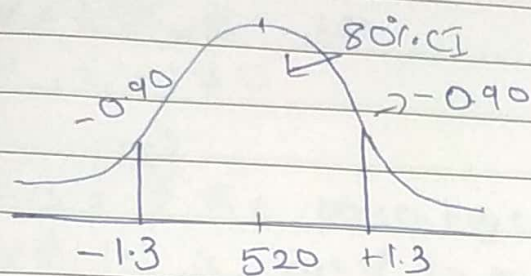
point estimate  $\pm$  Margin of error

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

$$\frac{Z_{\frac{\alpha}{2}}}{2} = 0.10$$

$$\therefore 1 - 0.1 = 0.90$$

↓  
we have to find this  
in z table

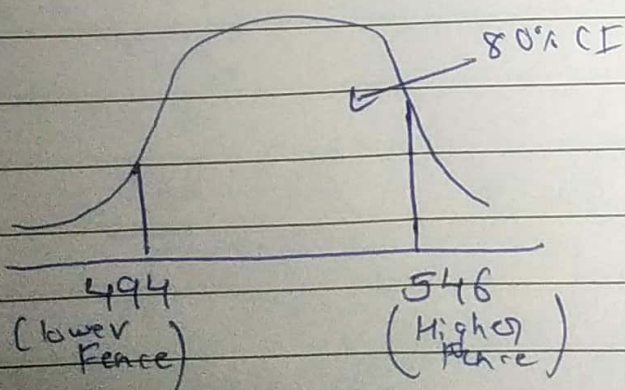


From Z-table,

$$Z_{\frac{\alpha}{2}} = 1.3$$

$$\begin{aligned} \text{Lower Fence} &= \bar{x} - Z_{\frac{\alpha}{2}} \frac{s}{\sqrt{n}} \\ &= 520 - 1.3 \times \frac{100}{\sqrt{25}} \\ &= 520 - 1.3 \times 20 \\ &= 494 \end{aligned}$$

$$\begin{aligned} \text{Higher Fence} &= \bar{x} + Z_{\frac{\alpha}{2}} \frac{s}{\sqrt{n}} \\ &= 520 + 1.3 \times \frac{100}{\sqrt{25}} \\ &= 520 + 1.3 \times 20 \\ &= 546 \end{aligned}$$





Que 3

Given :  ~~$N = 250$~~ ,  ~~$\sigma = 130$~~ 

$$n = 250, x = 170$$

Null hypothesis <sup>(H<sub>0</sub>)</sup> → The percentage of citizens in city ABC that owns a vehicle is equal to or greater than 60%.

Alternate Hypothesis <sup>(H<sub>1</sub>)</sup> → The percentage of citizens in city ABC that owns a vehicle is less than 60%.

Significance level = 0.11

By one-tailed z-test,

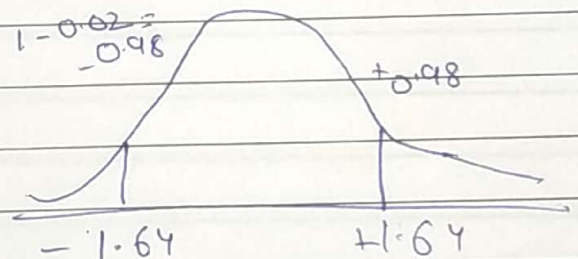
$$\hat{p} = \text{sample proportion} = \frac{170}{250} = 0.68$$

$$p_0 = \text{given} = 0.60$$

↓  
hypothesized proportion

$$1 - p_0 = q_0$$

$$q_0 = 1 - 0.60 = 0.40$$



z-test with proportion

$$Z_{\text{test}} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}} \approx 2.6$$

$$\sqrt{\frac{0.60 \times 0.40}{250}}$$

$$\therefore 2.6 > 1.64$$

∴ ~~we~~ we reject Null hypothesis and conclude that there is enough evidence to support idea that percentage of vehicle owners in ABC city is less than 60%.

Que 4)

→ 2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12  
(↑)

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

$$= \frac{99}{100} \times 20$$

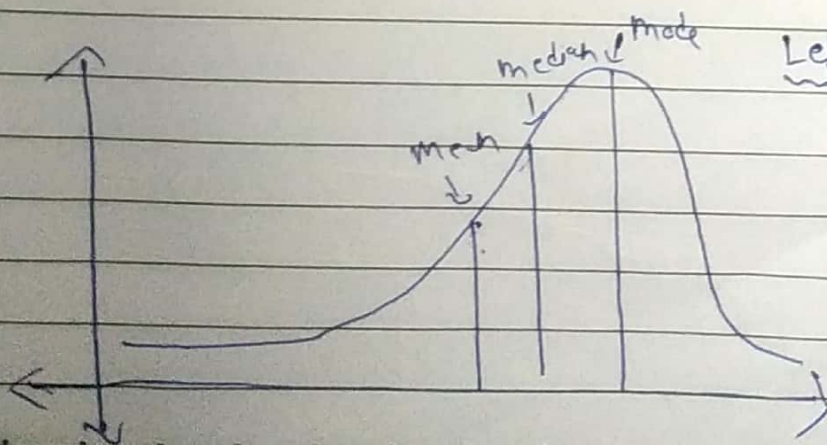
$$= \frac{99}{5}$$

$$= 19.8$$

∴ 19.8<sup>th</sup> Index i.e. the value between 11 and 12

Que 5)

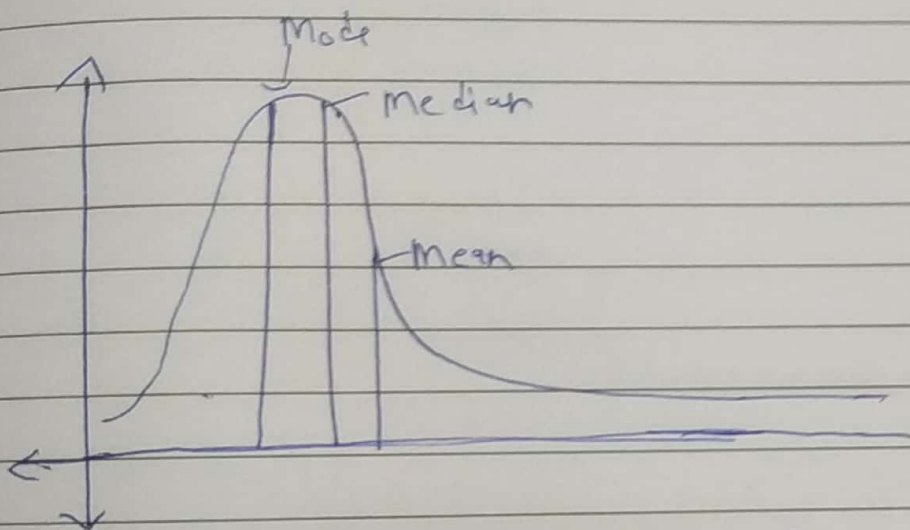
→ In left-skewed data, the mean is less than median, and the median is less than mode. This means that majority of data is on right side of graph, with a few extreme values on left side.



Left-Skewed Data  
Graph



In right-skewed data, the mean is greater than median, and median is greater than the mode. This means that the majority of data is on left side of graph, with a few extreme values on right side.



Right-skewed Data Graph