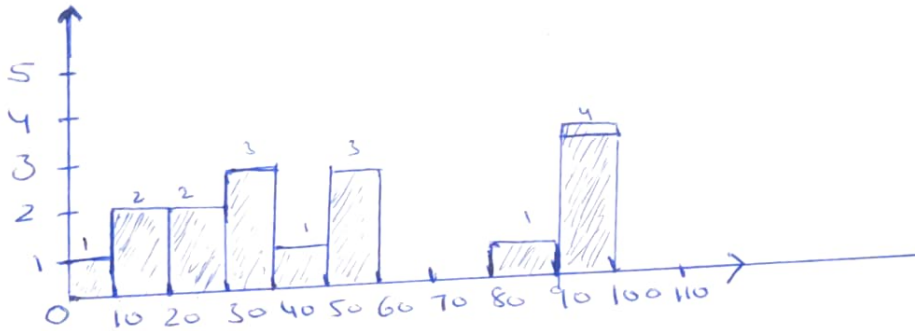


STATISTICS - ASSIGNMENT

Q1. Plot a histogram, 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

Ans Bin Size = $\frac{100}{10} = 10$



Q2. 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.

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

$$\alpha = 1 - 0.80 = 0.20$$

$$\text{So, } \frac{0.20}{2} = 0.10$$



$$\left[\begin{array}{l} AL = \frac{1+CI}{2} \Rightarrow \frac{1+0.80}{2} = \frac{1.80}{2} = \underline{0.90} \\ \text{(OR)} \\ 1 - 0.10 = 0.90 \end{array} \right]$$

Value of 0.90 from Z-table = 1.28

$$\text{Lower fence} = 520 - 1.28 \times \frac{100}{\sqrt{25}}$$

$$= 520 - 1.28 \times \frac{100}{5}$$

$$= 520 - 25.6$$

$$= 494.4$$

$$\text{Higher fence} = 520 + 1.28 \times \frac{100}{\sqrt{25}}$$

$$= 520 + 1.28 \times 20$$

$$= 520 + 25.6$$

$$= 545.6$$



Q3. A Car Company 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 ~~residents &~~ found that 170 a Hypothesis testing & 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.

Ans 3.a) Null Hypothesis = $H_0: P_0 \leq 60\% (0.60)$

alternate Hypothesis = $H_1: P_1 > 60\%$

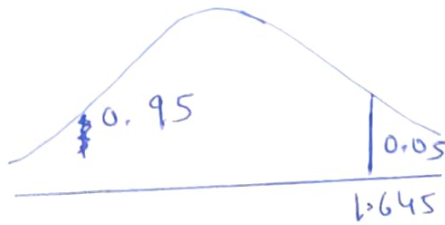
b) $n = 250$ $x = 170$

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

$$\alpha = 1 - CI = 1 - 0.95 = 0.05$$

$$q_0 = 1 - p_0 = 1 - 0.60 = 0.40$$

$$Z\text{-score table} = 1.645$$



$$Z\text{test with Proportion} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

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

$$= \frac{0.08}{\sqrt{\frac{0.24}{250 \times 100}}} = \frac{0.08}{\sqrt{\frac{24}{25000}}}$$

$$= \frac{0.08}{\sqrt{0.00096}}$$

$$= \frac{0.08}{0.03} = 2.67$$

So, $2.67 > 1.645$ (we reject the null hypothesis)

Conclusion

Sales manager was right, more than 60% Citizens own a vehicle.

Q4. What is the value of the 99 percentile?

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

Ans 4

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

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

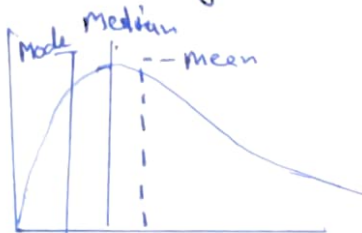
$$= \frac{99}{100} \times 21 = 20.79 \text{ (index)}$$

$$= 12 \text{ Ans}$$

Q5. In left & right-skewed data, what is the relationship between mean, median & mode?

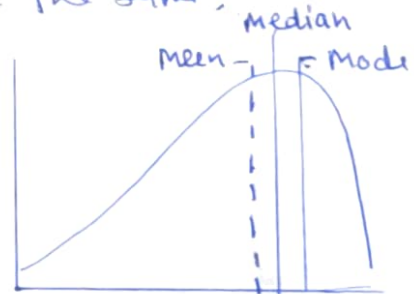
Draw the graph to represent the same.

Ans 5.



right-skewed

$$\text{Mean} > \text{median} > \text{mode}$$



left-skewed

$$\text{mode} > \text{Median} > \text{mean}$$