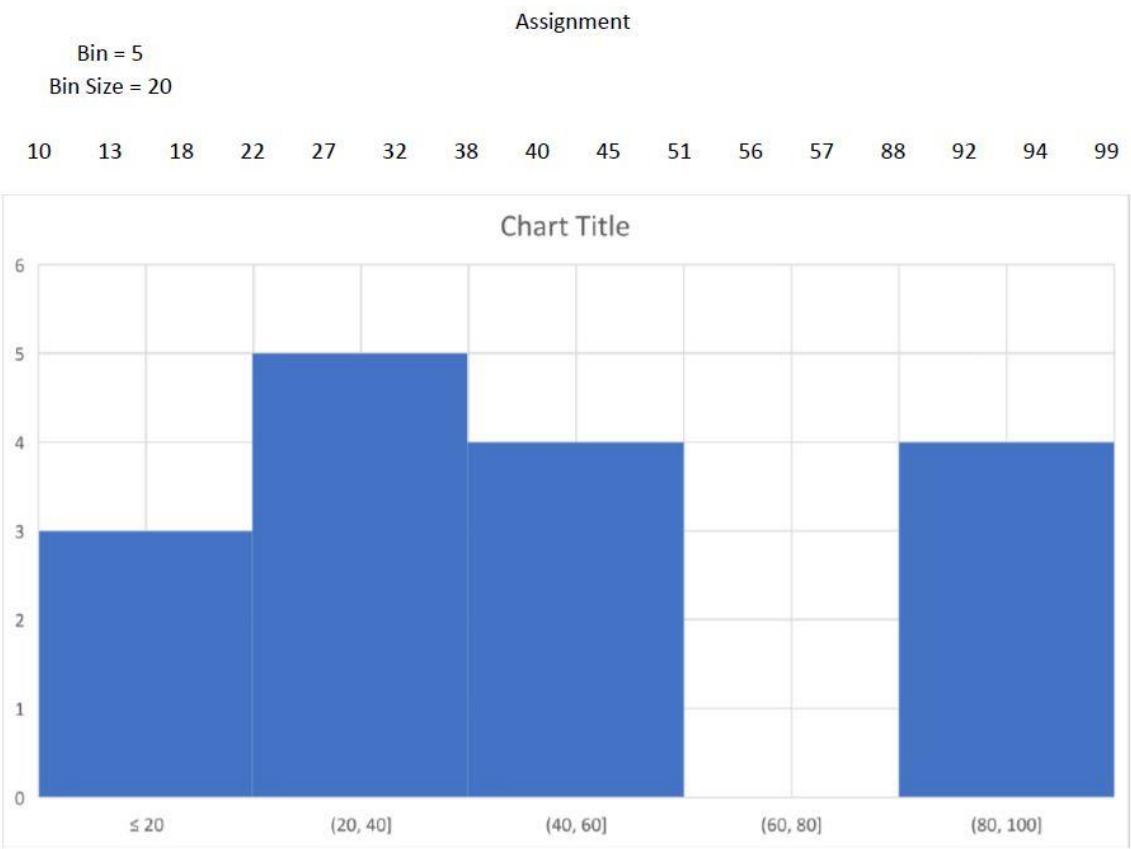


Statistics Assignment

Que 1) Plot a histogram,
10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

Answer: **Excel sheet result**



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.

03/07/22 Assignment

- 1) In the quant test of CAT exam the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct an 80% Confidence interval about the mean.

$$\sigma = 100, \quad n = 25, \quad \bar{x} = 520$$

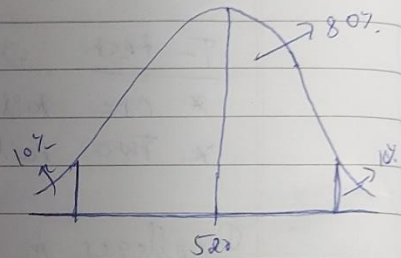
CI = Point Estimate \pm Margin of error

$$\text{Margin of error} = Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}}$$

$$\alpha = 10\% = 0.1$$

$$1 - 0.10 = 0.9$$

$$Z_{\alpha/2} = Z_{0.05} = 1.29$$



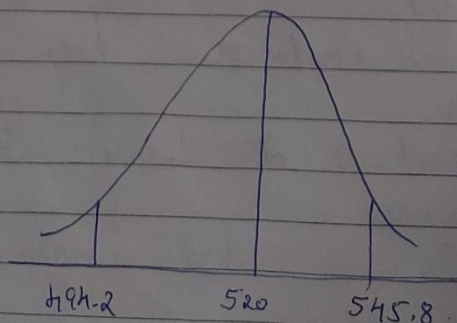
$$\text{Lower fence} = \bar{x} - \left(Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}} \right)$$

$$= 520 - \left(1.29 \times \frac{100}{\sqrt{25}} \right)$$

$$= 520 - (1.29 \times 20) = \underline{494.2}$$

$$\text{Higher fence} = \bar{x} + \left(Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}} \right)$$

$$= 520 + (1.29 \times 20) = \underline{545.8}$$



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.

Answer :

Assignment
09/07/22

A car company believes that the percentage of Resident in a city ABC that owns a vehicle is 60% or less. A sales manager disagree with this. He conducts a hypothesis testing surveying 250 resident and found that 170 residents responded Yes to owning vehicle.

① State the Null and Alternate hypothesis.
 ② At 10% significance level, is there enough evidence to support the idea that vehicle that vehicle ownership in city ABC 60% or less.

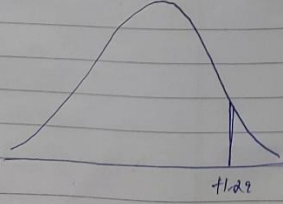
= ① Null Hypothesis, $H_0 \Rightarrow$
 Resident in a city ABC that own a vehicle is 60% or less.
 $P_0 = 60\% \text{ or less}$

Alternate Hypothesis, $H_1 \Rightarrow$
 Resident in a city ABC that own a vehicle is more than 60%.
 $P_0 > 60\%$

② $\alpha = 10\%$ $n = 250$, $x = 170$, $CI = 90\%$
 ~~$\alpha = 0.1$~~
 $\alpha = 0.1$ $\hat{p} = \frac{x}{n} = \frac{170}{250} = 0.68$

$P_0 = 0.6$
 $q_0 = 1 - 0.6 = 0.4$ $[1 - 0.1 = 0.9]$

$Z_{table} \Rightarrow 1.29$



$Z_{test} = \frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$

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

$= \frac{0.08}{0.034} = 2.59$

$2.59 > 1.29$

Null Hypothesis is rejected.

P-value $\Rightarrow Z_{test} = 2.59$

0.9952
 $1 - 0.9952 = 0.0048$

$P_{value} = 0.9952$
 $0.9952 < 1.29$

Null Hypothesis is rejected

Conclusion: There is "no" enough evidence to support the idea that vehicle ownership in city ABC 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

Answer :

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.

$n = 20$

$$\text{Value} = \frac{(\text{percentile}) \times (n)}{100}$$
$$= \frac{99 \times 20}{100}$$

Value = 19.8 19.8 Index

19.8 ≈ 20

Value is ~~20~~ 12

Excel Sheet Result :

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

2	2	3	4	5	5	5	6	7	8	8	8	8	8	9	9	10	11	11	12
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Value of 99 Percentile	11.81
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Que 5) In left & right-skewed data, what is the relationship between mean, median & mode?
Draw the graph to represent the same.

Answer :

2) What is the differences between mean, median & mode Right skewed & left skewed graph.

Left

= Right Skewed

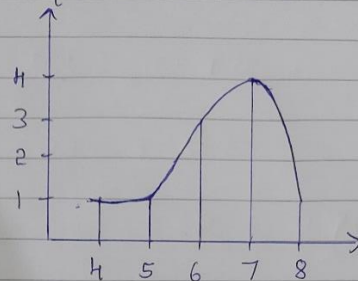
"Mean" is less than "Median" and they both are less than "Mode".

Right ~~Left~~ Skewed.

"Mode" is less than "Median" and they both are less than "Mean".

Example: Left skewed.

Data = {4 5 6 6 6 7 7 7 7 8}



$$\text{Mean} = \frac{(4+5+6+6+6+7+7+7+7+8)}{10} = \frac{63}{10} = 6.3$$

$$\text{Mean} = \underline{6.3}$$

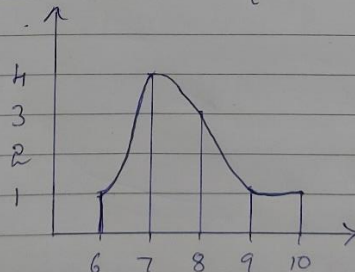
$$\text{Mode} = \underline{7}$$

$$\text{Median} = \frac{6+7}{2} = \frac{13}{2}$$

$$\text{Median} = \underline{6.5}$$

Conclusion: "Mean" is less than Median & they both are less than Mode.

Right skewed: Data = {6 7 7 7 7 8 8 8 9 10}



$$\text{Mean} = \frac{6+7+7+7+7+8+8+8+9+10}{10} = \frac{77}{10}$$

$$= \underline{7.7}$$

$$\text{Median} = \frac{7+8}{2} = \frac{15}{2} = 7.5$$

$$\text{Mode} = \underline{7}$$

Conclusion: "Mode" is less than Median & they both are less than Mean.