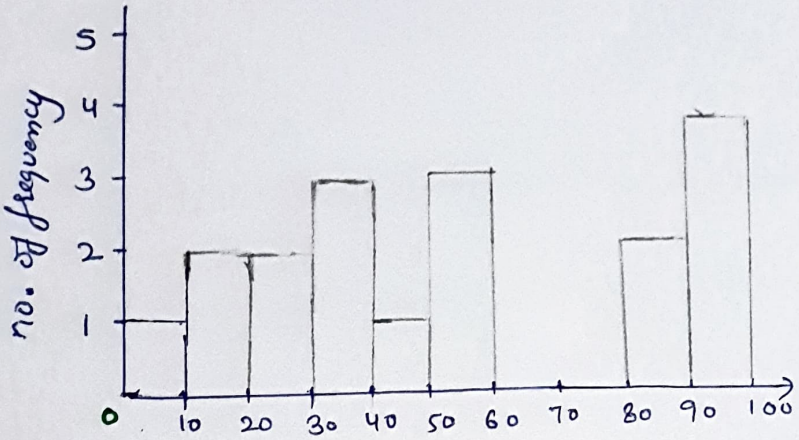
STATISTICS - ASSIGNMENT

Question no1 :- Plot a histogram

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

Answer



Question no2 :- 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.

Answer

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

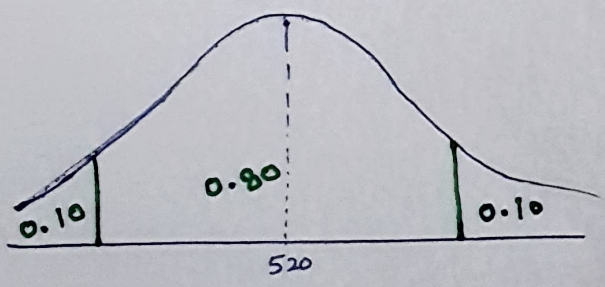
α = Significance value

$\alpha = 1 - C.I$

$= 1 - 0.80 = 0.20$

So,

$\frac{0.20}{2} = 0.10$



$AL = \frac{1+CI}{2} = \frac{1.80}{2} = 0.90 \quad (Z_{\alpha/2} = 1.28)$

value of 0.90 from Z-Table $= 1.28$

Lower fence $= \bar{x} - Z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$

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

$= 520 - 25.6$

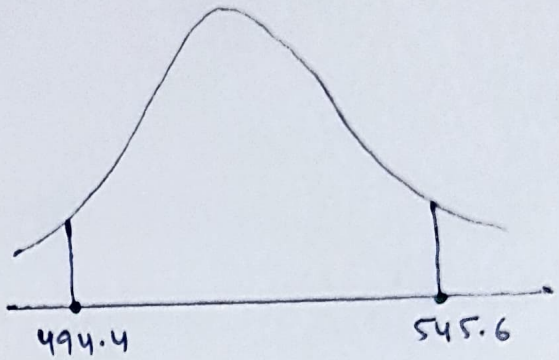
$= 494.4$

Higher fence $= \bar{x} + Z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$

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

$= 520 + 25.6$

$= 545.6$



Question no 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 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 no3:-

(a) Null hypothesis $= H_0 : P_0 \leq 60\% \ (0.60)$

Alternate hypothesis $= H_1 : P_1 > 60\%$

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

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

$\alpha = 1 - CI = 0.05$

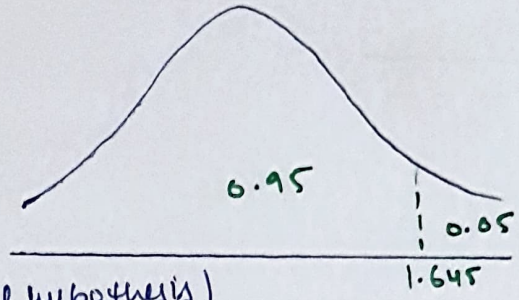
$q_0 = 1 - P_0 = 1 - 0.60 = 0.40$

Z-Score table = 1.645

Z-Test with proportion $= \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$

$= \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}} = \frac{0.08}{\sqrt{\frac{0.24}{250}}}$

$= 2.67$



So, 2.67 > 1.645 (we reject the Null hypothesis)

Conclusion

Sales Manager was right, more than 60% citizens own a vehicle

Question no-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

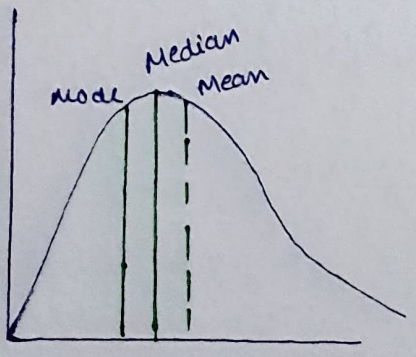
Ans

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

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

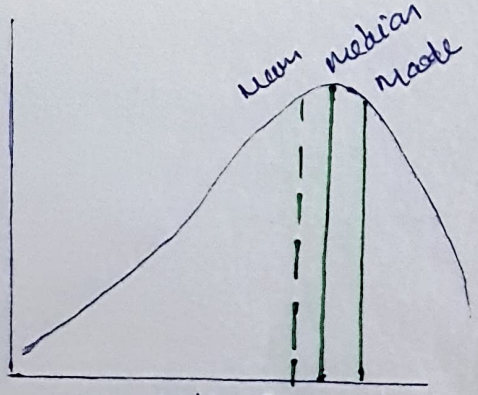
$= 12$

Question no5 In left & right - Skewed data, what is the relationship between mean, median, mode ? Draw the graph to represent the same.



Right - Skewed

Mean > median > mode



Left Skewed

mode > median > mean