

② A car company believes that the percentage of residents in City ABC that owns a vehicle is 60% or less. A sales manager disagree with this. He conducts a Hypothesis Testing Surveying 250 residents and find that 170 responded yes to Owning a vehicle.

③ State the Null or Alternate Hypothesis

④ At 10% significance level, is there enough evidence to support the idea that Vehicle Ownership in City ABC is 60% or less?

Ans. One Tail test

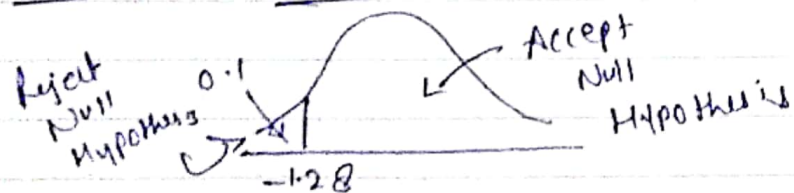
Step I :- Null Hypothesis $H_0, \mu \leq 60\%$
Alternate Hypothesis $H_1, \mu > 60\%$

$$n = 250 \quad x = 170$$

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

Step II :- $\alpha = 0.1$

Step III :- Decision Boundary



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Step IV :- $q_0 = 1 - p_0 = 1 - 0.6 = 0.4$

Z test with Proportion

$$Z_{\text{test}} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.4}{\sqrt{\frac{0.4 \times 0.6}{250}}} = 2.35$$

Conclusion :- Not Accepting Null Hypothesis
Residents Owning More than 60%.

⑤ 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.

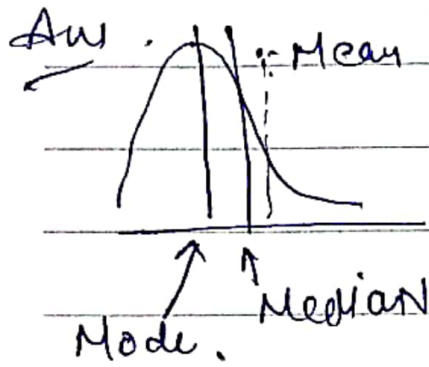
Ans. Value of 99 Percentile = $\frac{99}{100} \times (20+1)$
 $= \frac{99}{100} \times 21 = 20.79$

i.e., 12.

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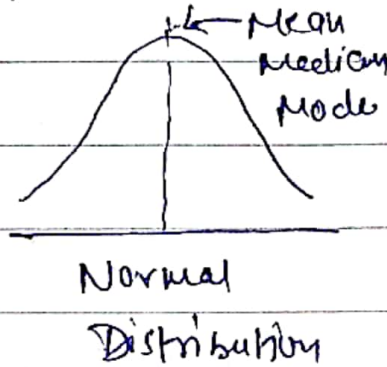


Q In left and right-skewed data, what is relationship between mean, median & mode?
 Draw the graph to represent the same.

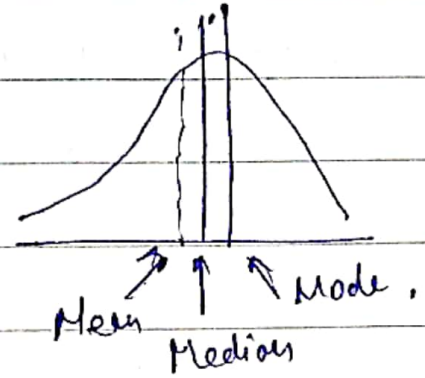


Right Skewed
 Positive Skewed

$\text{Mean} > \text{Median} > \text{Mode}$



Symmetrical
 Distribution



Negative
 Skewed
 Left Skewed

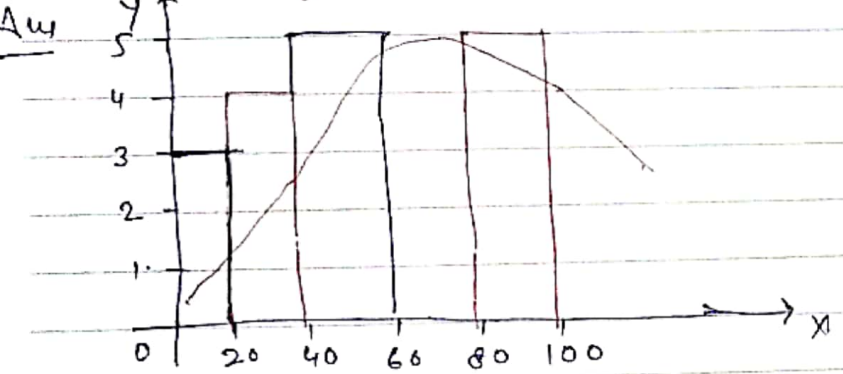
$\text{Mean} < \text{Median} < \text{Mode}$

Assignment

① 10, 13, 18, 22, 27, 32, 38, 48, 45, 51, 56, 57, 88, 90, 92, 94, 99

Bins = 5
 Bin size = 20

what kind of Bell curve?



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.

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

Point estimate \pm Margin of error

$$\bar{x} \pm Z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}} \text{ (Standard error)}$$

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C.I = 80% or 0.8 So, $\alpha = 1 - C.I$

$= 1 - 0.8 = 0.2$

$Z_{\frac{\alpha}{2}} \Rightarrow Z_{0.2} \Rightarrow Z_{0.1}$

for positive side

$1 - 0.1 = 0.9$

from Z table we get

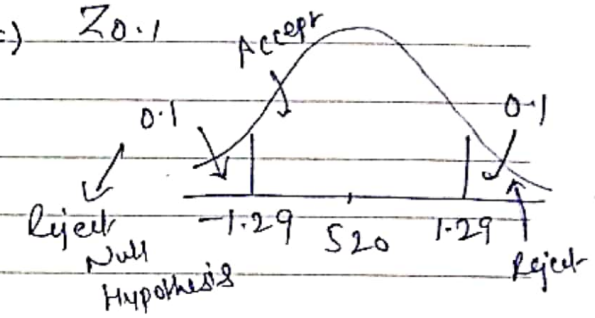
1.29

for Negative side 0.1 is -1.29

Lower fence, $\bar{x} - Z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}} \Rightarrow 520 - 1.29 \times \frac{100}{\sqrt{25}}$

$\Rightarrow 514.72$

Higher fence, $520 + 1.29 \times \frac{100}{\sqrt{25}} \Rightarrow 545.8$



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