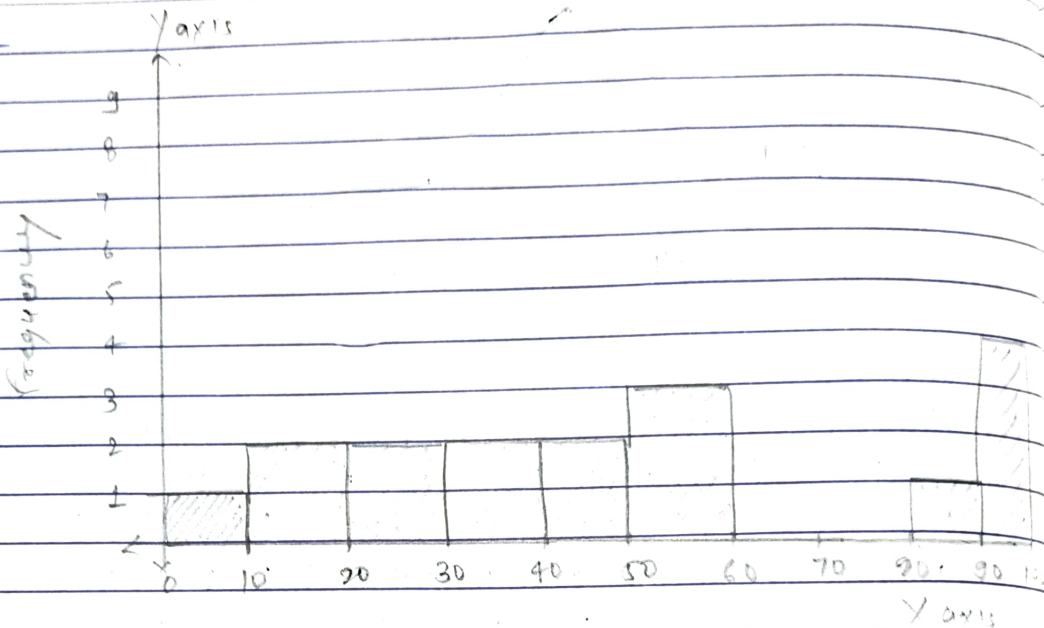


Naresh Prayapati Assignment 1.

Q1 Plot the histogram

10, 13, 18, 22, 27, 32, 38, 40, 45, 57, 58
57, 88, 90, 92, 94, 99.

Ans



Bins = 10 bins

Bin size = 10

Q2 In a quant. Test of the last exam, the population standard deviation is known to be 100. A sample of 25 Tests has a mean of 520. Construct 80% CI about the mean.

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

$$\alpha = 1 - CI = 1 - 0.8 = 0.2$$

Two tail test

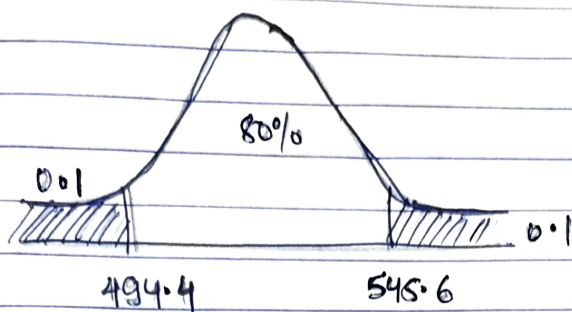
$$\text{lower fence} = \bar{x} - Z_{\frac{\alpha}{2}} \cdot \frac{\sigma}{\sqrt{n}}$$

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

$$= 520 - \frac{128}{5} = 494.4$$

upper fence $\Rightarrow \bar{x} + \frac{2s}{\sqrt{n}}$

$$\Rightarrow 520 + 1.28 \times \frac{100}{\sqrt{25}} \Rightarrow \boxed{545.6}$$



Questn A car believes that the percentage of citizens in city ABC that own a vehicle is 60% or less. A sales manager disagrees with this. He conducted a hypothesis testing surveying 250 residents and found that 170 residents responding own a vehicle.

(a) state the Null hypothesis.

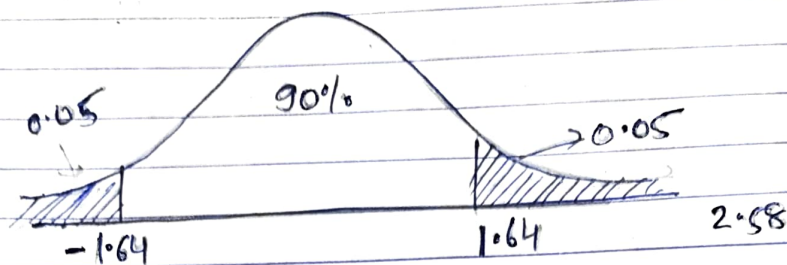
(b) At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

\Rightarrow Null hypothesis $\Rightarrow H_0 \leq 60\%$
 Alternate hypothesis $\Rightarrow H_1 > 60\%$ $\alpha \Rightarrow 0.10$

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

$p_0 \Rightarrow 0.6$ $q_0 \Rightarrow 0.4$

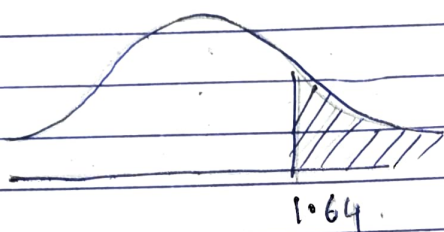
$Z_{stat} \Rightarrow \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} \Rightarrow \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} \Rightarrow \boxed{2.58}$



$$2.58 > 1.64$$

Reject the Null hypothesis

Pvalue



$$P\text{value} \Rightarrow 1 - 0.94950$$

$$\Rightarrow 0.0505$$

$$P\text{value} < \alpha$$

Reject the Null Hypothesis.

Q4

what is the value of the 99 percentile?

2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 8, 9, 9

10, 11, 11, 12.

$$99\text{th percent} \Rightarrow \frac{99}{100} (n+1) \Rightarrow 20.79 \text{ index}$$

\Rightarrow

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

⇒ Generally if the distribution is skewed to the left the mean is less than median which is often less than mode.

If the distribution of data is skewed to the right the mode is often less than median which is less than mean.

Ans
1 1 1 2 2 2 2 3 3 3 3 3 3 3 4 4 4 5 5
6 6 7 7 7 8 9 9 9

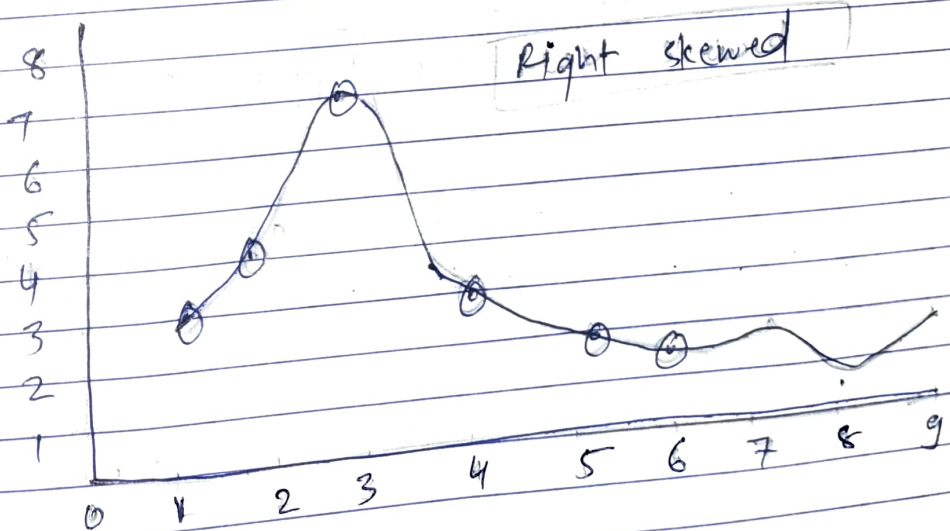
$$\bar{x} = \frac{57}{26}$$

$$\Rightarrow 2.85 \quad 3.86 \quad 4.35$$

$$\text{Median} = 3.5$$

$$\text{Mode} = 3$$

Mode > Median > Mean. Mean > Median > Mode



left skewed

2 3 4 4 5 5 5 6 7 7 7 7 8 9 9 9 9 9 9 10 10 10 10

Mean:

$$\bar{x} \Rightarrow \frac{158}{20} \Rightarrow 7.9 \quad \text{Median} \Rightarrow 8.5 \quad \text{Mode} \Rightarrow 9$$

Mode \times Median $>$ Mean

