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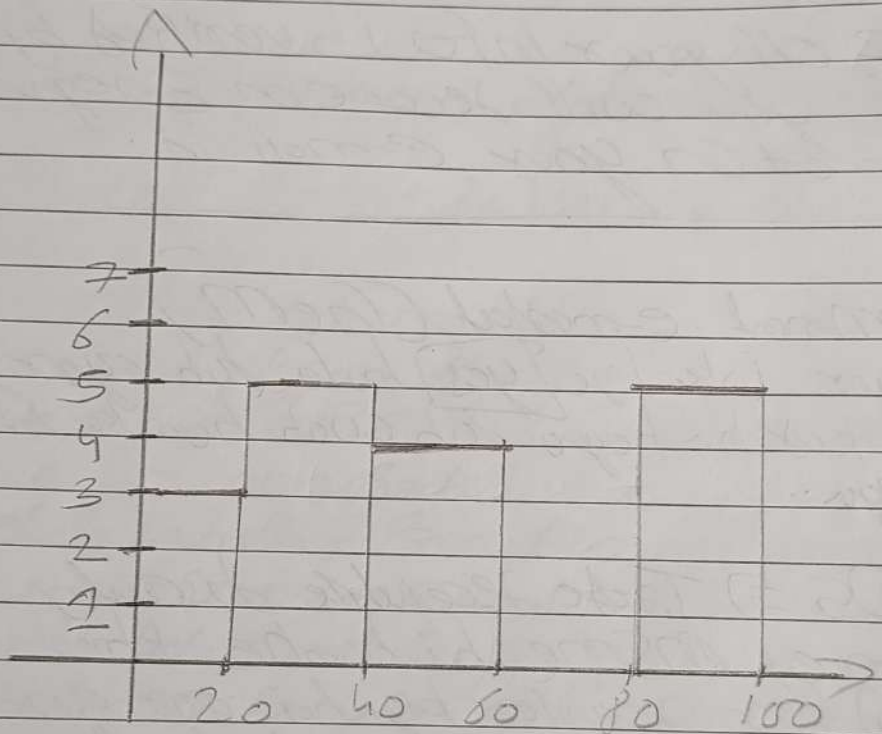
Statistics assignment

1] Histogram

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

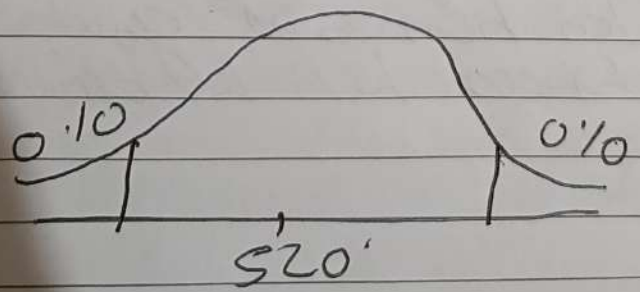
Bin size = 20

Bins = 5



2] $\sigma = 100$, $n = 25$, $\bar{x} = 520$ CI = 80%

$\alpha = 1 - 0.80 = 0.20$



Point Estimate $\pm$ Margin of Error

$\bar{x} \pm z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}}$

$$Z_{\frac{0.20}{2}} \quad Z_{0.1} = 2.33$$

2 tail -

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

$$= 520 - 2.33 \frac{100}{\sqrt{25}}$$

$$= 520 - 2.33 \times 20$$

$$= 473.4.$$

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

$$= 520 + 2.33 \times 20$$

$$= 566.6.$$

3] Null Hypothesis = $H_0 = 60\%$

Alternate Hypothesis = $H_1 \neq 60\%$.

$n = 250$; $x = 170$

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

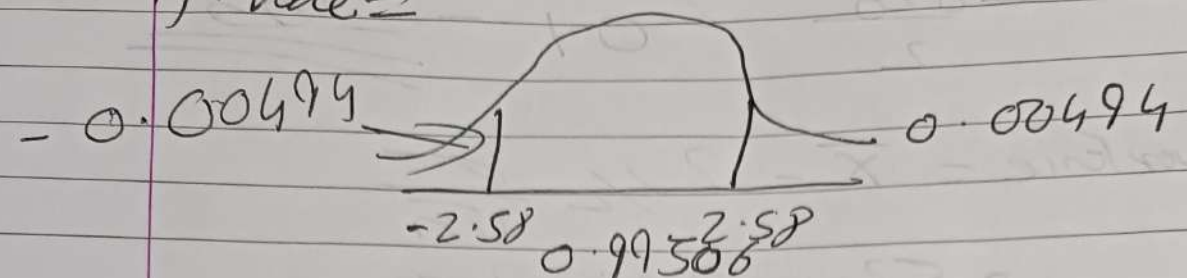
$$q_0 = 1 - P_0 = 1 - 0.60 = 0.4.$$

$$\alpha = 0.10 \quad Z\text{-test} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 \cdot q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}}$$

$$= 2.5823$$

$-2.33 < -2.58$ [Accept the alternate Hypothesis]

P-value =



P-value = 0.00494 + 0.00494

= 0.00988.

P-value < Significance value ⇒ Accept the Alternate Hypothesis.

4] Dataset

{2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12}

n = 20, K = 99

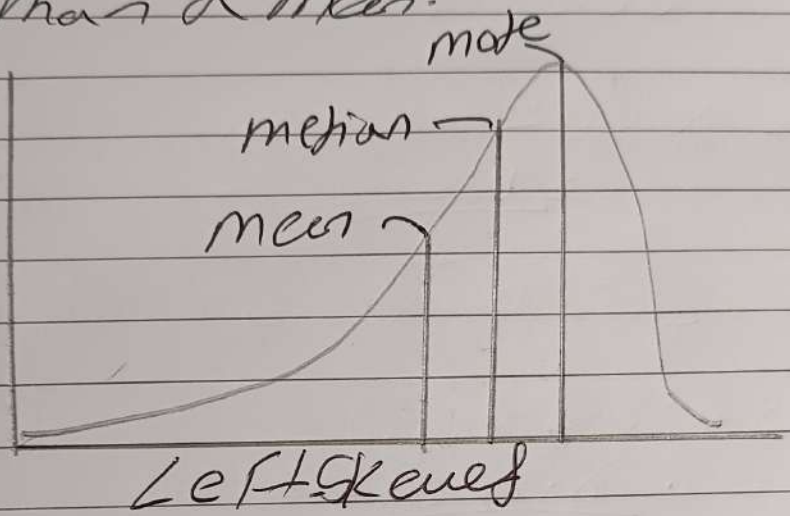
$i = \frac{K}{100}(n+1)$

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

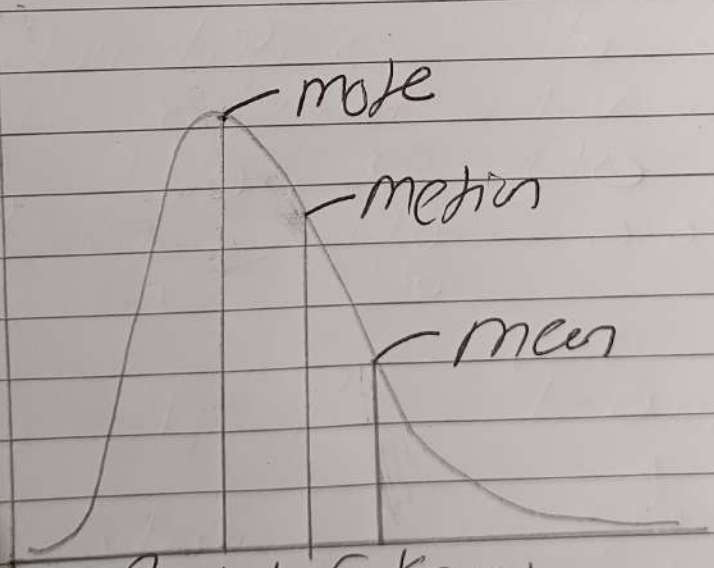
$= 0.99(21) = 20.79$

99th Percentile is 12

5) generally, if the distribution of data is skewed to the left, the mean is less than the median, which is often less than the mode. If the distribution of data is skewed to the right, the mode is often less than the median, which is less than a mean.



Left-Skewed



Right-Skewed.