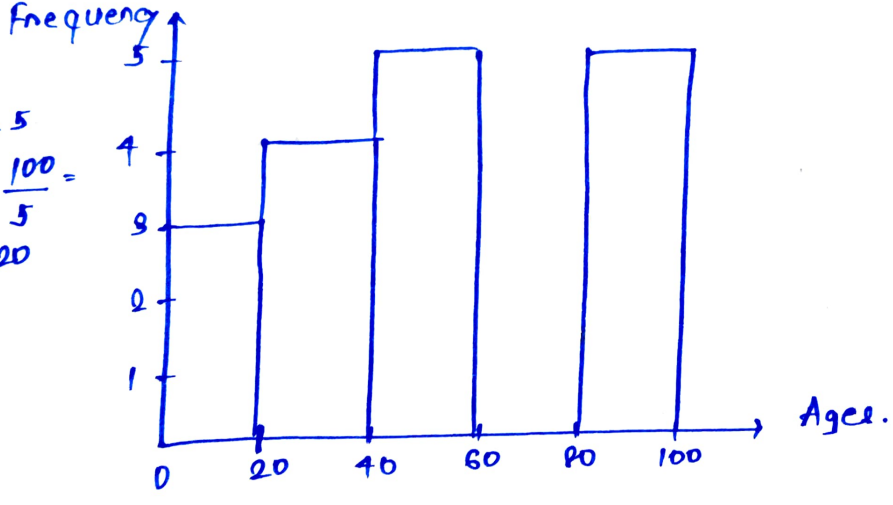
ASSIGNMENT - 1

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

Create a histogram

Given: Bins = 5

∴ Bin size = $\frac{100}{5}$ = 20



Bins	Frequency
0-19	3.
20-39	4
40-59	5.
60-79	0
80-99	5.

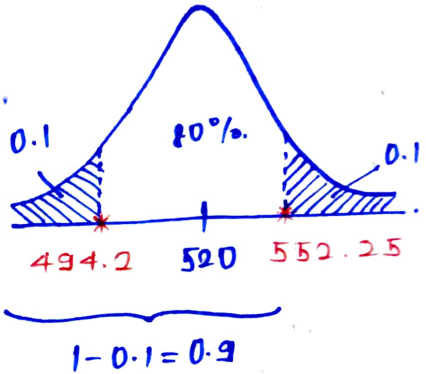
Ques2) In a quant test of the CAT Exam, the population std is 100. A sample of 25 test takers have a mean of 520. Construct an 80% CI about the mean.

Soln) Given :- $\sigma = 100$, $n = 25$, $\bar{x} = 520$

Significance value, $\alpha = 1 - CI$

$= 1 - 0.8$

$= 0.2$



$Z_{\alpha/2} = Z_{0.2/2} = Z_{0.1} = 1.29$

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

$= 520 - 1.29 \times \frac{100}{\sqrt{25}} = 20$

$= 494.2$

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

$= 520 + 1.29 \times 25$

$= 552.25$

Q6) A can company believes that the percentage of residents in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducts a hypothesis testing surveying 250 residents and found that 170 responded yes to owning a vehicle.

a) State the null and alternate hypothesis.

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

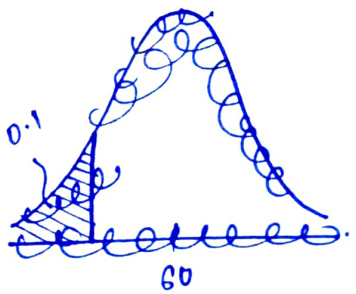
Soln) i) Null Hypothesis, $H0: P_0 \leq 60\%$

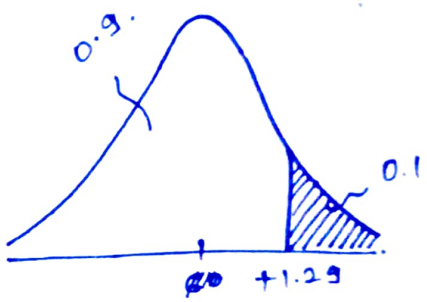
Alternate Hypothesis $H1: P_0 > 60\%$ {One-Tailed Test}

Given: $n = 250$, $x = 170$, $\hat{P} = \frac{x}{n} = \frac{170}{250} = 0.68$, $q_0 = 1 - P_0 = 1 - 60\% = 0.4$

ii) $\alpha = 10\%$,

iii) Decision ~~Rule~~ Boundary





iv) Z-test with proportion

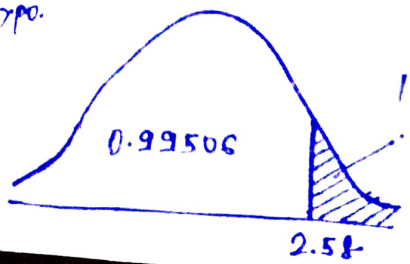
$$Z = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.58.$$

v) Conclusions:

$\because Z = 2.58 > 1.29 \therefore$ Reject the Null Hypothesis {Vehicle owners in ABC city is >60%}

Using p-value

P-value = 0.00494 < α (0.1) → Reject Null Hypo.



Que4) What is the value of 99 percentile ?.

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

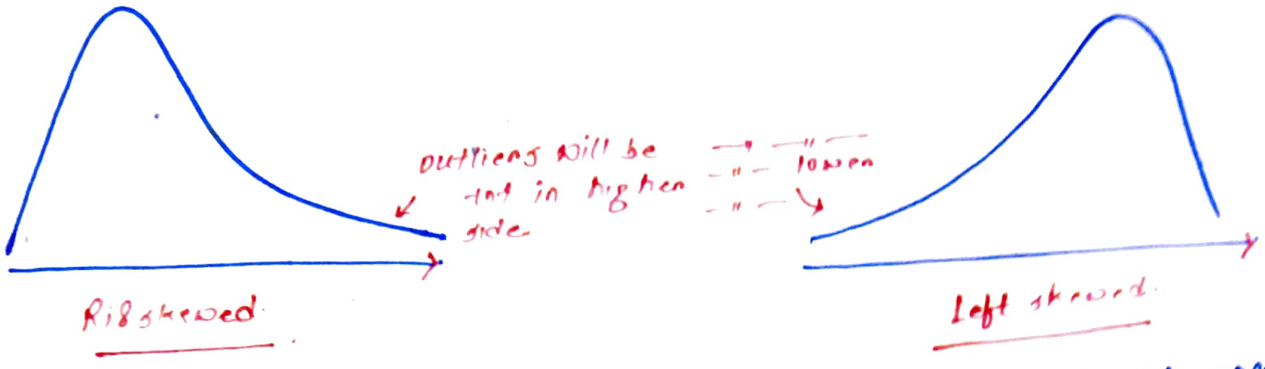
$$\text{Index - Value} = \frac{\text{Percentile}}{100} * (n+1)$$

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

$$= 20.79$$

∴ Value of 99 percentile is 12

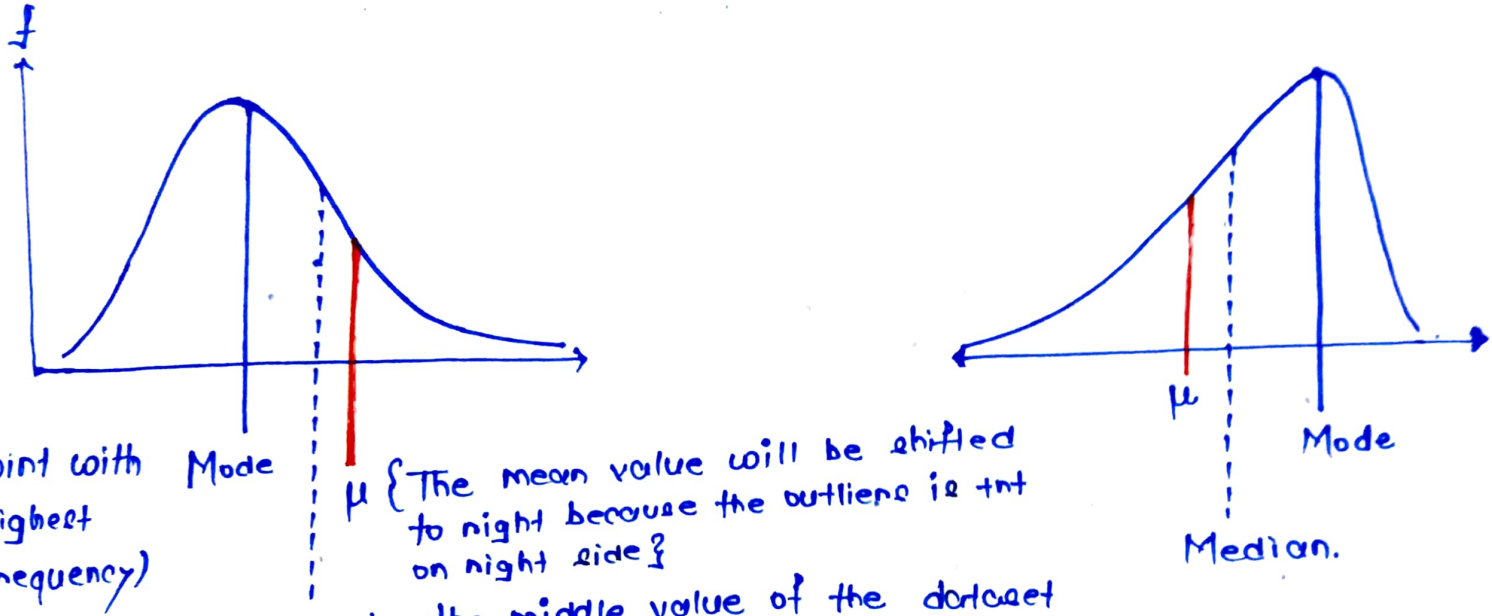
Q) Relationship between mean, median, mode in the two dist. ASSIGNMENT 8



Ex:- Life span

Mean > Median > Mode

Mode < Median < Mean.



(Point with highest frequency)

{The mean value will be shifted to right because the outliers is tnt on right side}

Median is the middle value of the dataset when sorted. ∴ We need to find a value for which half of the values are above that value and 1/2 of the values are below In other words, at what value do we have equal value area above and below that value.