20/6/22   ASSIGNMENT
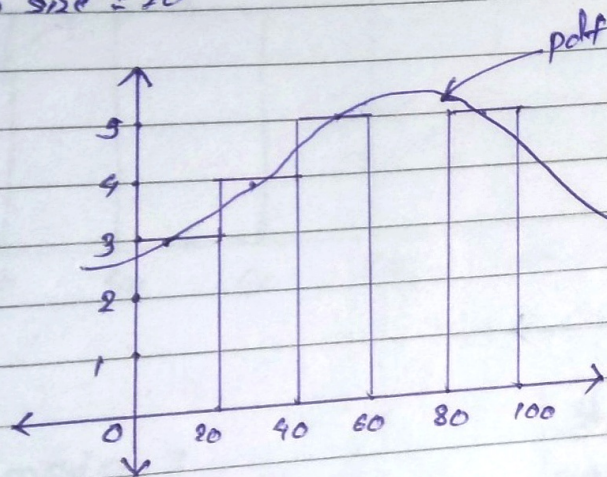
Q.1 Draw histogram and pdf

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

Bin = 5

Bin size = 20

Page No.

Date

7/7/22   ASSIGNMENT

Q2 In the Quant test of CAT exam, the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct 80% C7 about the mean?

→ Given : $\sigma = 100$, $n = 25$, $\bar{x} = 520$, $C.I = 80\% = 0.8$

$\alpha = 1 - 0.8 = 0.2$

$C.I = $ Point Estimate $\pm$ Margian Error

$= \bar{x} \pm Z_{\alpha/2} \dfrac{\sigma}{\sqrt{n}}$

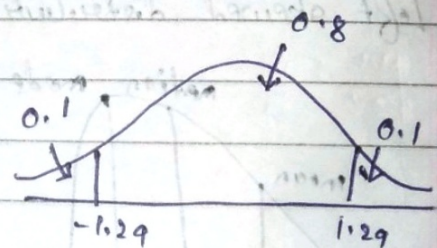$= 520 \pm Z_{\alpha/2} \dfrac{100}{\sqrt{25}}$

$= 520 \pm Z_{0.1} \dfrac{\overset{20}{\cancel{100}}}{\cancel{5}_{1}}$

$= 520 \pm Z_{0.1} (20)$

$= 520 \pm 1.29 (20)$

$= 520 \pm 25.8$

Lower Fench $= 520 - 25.8 = 494.2$

Higher Fench $= 520 + 25.8 = 545.8$

$1 - 0.1 = 0.9$

z table $0.9 = 1.29$
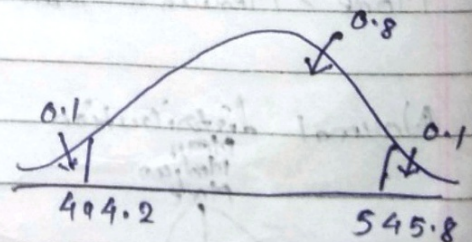
ASSIGNMENT

Q3 A car company believes that the percentage of residents in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with it. 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 ownership in city ABC is 60% or less?

→ Given : $p_0 = \frac{60}{100} = 0.6$, $n = 250$, $x = 170$, $\alpha = 0.1$, $\hat{p} = \frac{x}{n} = \frac{170}{250} = 0.68$
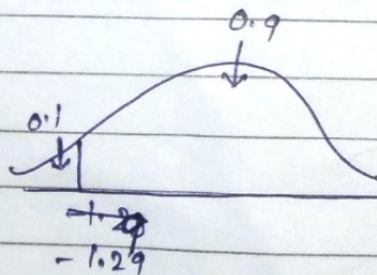
$q_0 = 1 - p_0 = 1 - 0.6 = 0.4$

Step 1 :

$H_0 : p_0 > 0.6$

$H : p_0 \le 0.6$

Step 2 :

$\alpha = 0.1$

Step 3 :

0.9

0.1

~~-1.28~~ −1.29

Step 4 :

$z = \dfrac{\hat{p} - p_0}{\sqrt{\dfrac{p_0 q_0}{n}}} = \dfrac{0.68 - 0.6}{\sqrt{\dfrac{0.6 \times 0.4}{250}}} = 2.58$

As $2.58 > $ ~~−1.28~~ −1.29

∴ Accept H0

∴ The percentage of residents that own a vehicle is more than 60%.

Q4. 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

→ n = 20

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

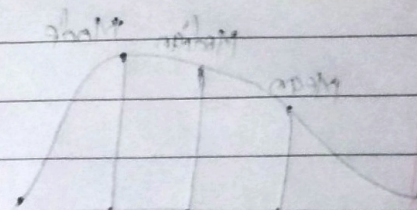$$= \frac{99}{100} \times 21$$

$$= 20.79$$

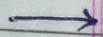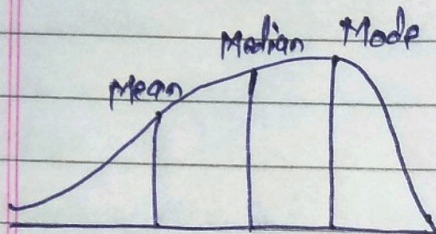As 21st element doesn't

∴ Value = 20th = 12

∴ The value of the 99 percentile is 12.

Q 5 In left and right skewed data, what is the relationship between mid mean, median and mode ?
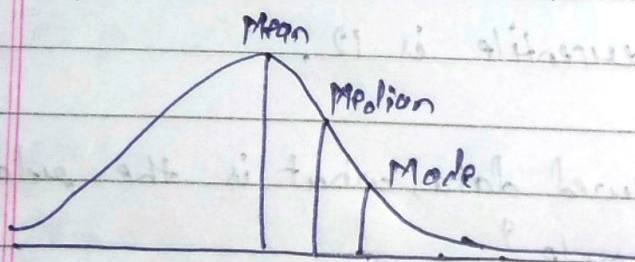Draw the graph to represent the same.

→

Left - skewed distribution

Median   Mode

Mean

In left - skewed distribution Mode > Median > Mean

Eg: Life span of human being

Right - skewed distribution

Mean

Median

Mode

In right - skewed distribution Mean > Median > Mode

Eg: Wealth distribution