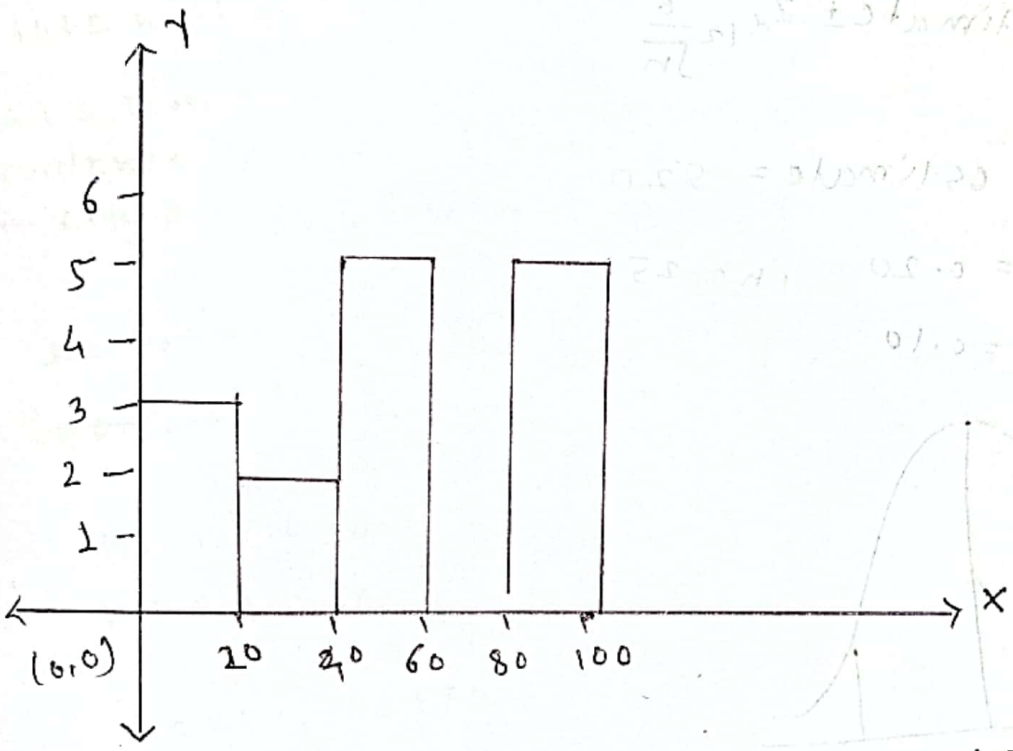
Assignment - 1

Que-1] plot histogram

10, 13, 18, 22, 32, 40, 45, 51, 56, 57, 88, 90, 92, 95
99

Bin size = 20 , no. of bins = $\frac{100}{20} = 5$



Q.2] In Quant test of the CAT Exam, the population Standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct an ~~CI~~ 80% CI about mean.

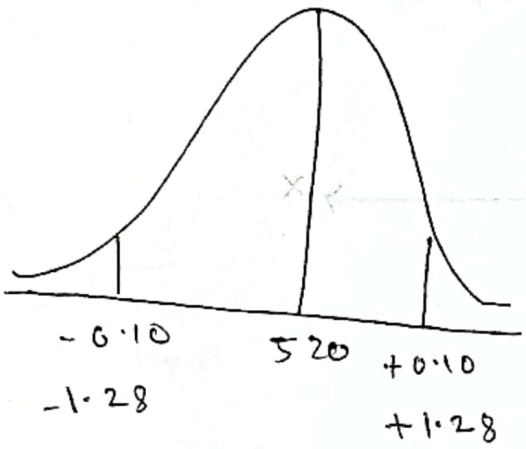
point estimate ± margin of error

point estimate $\pm Z_{\alpha/2} \frac{6}{\sqrt{n}}$

$\bar{x}$ = point estimate = 520

$6 = 10$, $\alpha = 0.20$, $n = 25$

$\frac{\alpha}{2} = 0.10$



$\bar{x} + 1.28 \times \frac{10}{\sqrt{25}}$

$520 + 1.28 \times \frac{10}{5}$

$520 + 1.28 \times 2$

$520 + 2.56$

522.56

$\bar{x} - 1.28 \times \frac{10}{\sqrt{25}}$

$\bar{x} - 1.28 \times 2$

$520 - 2.56$

517.44

confidence interval ~~of~~ is (517.44, 522.5

80% C.I = (517.44, 522.56)

2] A car company believes that percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagree with this. He conducted a hypothesis testing surveying 250 residents and found that 170 residents responded to owning a vehicle

a] State null and alternative hypothesis.

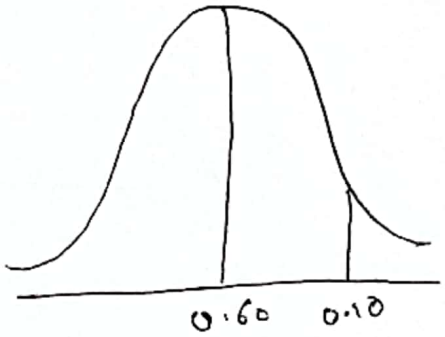
b] At a 10% significance level, is there enough evidence to support the idea that vehicle owner in city ABC is 60% or less.

~~[1] Ho: μ = 60~~

~~Ho: $P_o \leq 0.60$ v/s H1: $P_o \geq 0.60$~~

a] $H_0: P_o \leq 0.60$

$H_1: P_o > 0.60$



$n = 250, \quad x = 170$

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

$P_o = 0.60, \quad q_o = 1 - 0.60 = 0.40$

$$Z_{cal} = \frac{\hat{P}_o - \hat{P}_o}{\sqrt{P_o q_o / n}} = \frac{0.68 - 0.60}{\sqrt{0.60 \times 0.40 / 250}} = \frac{+0.08}{\sqrt{0.60 \times 0.40 / 250}}$$

$$\approx +2.58$$

$Z_{tab} = 1.28$

Since $Z_{tab} < Z_{cal}$

∴ we reject null hypothesis

∴ There is no enough evidence to support the idea that vehicle owner in city ABC is 60% or less

Q-4] 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

Sol

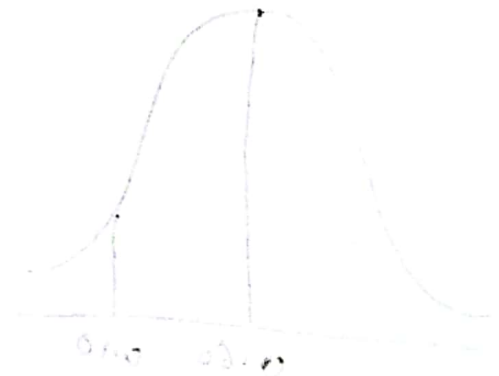
99 percentile $= \left[\frac{99}{100} \times (n+1)\right]^{th}$ index

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

$= 20.79$

$= [20.79]^{th}$ index

$= 12$

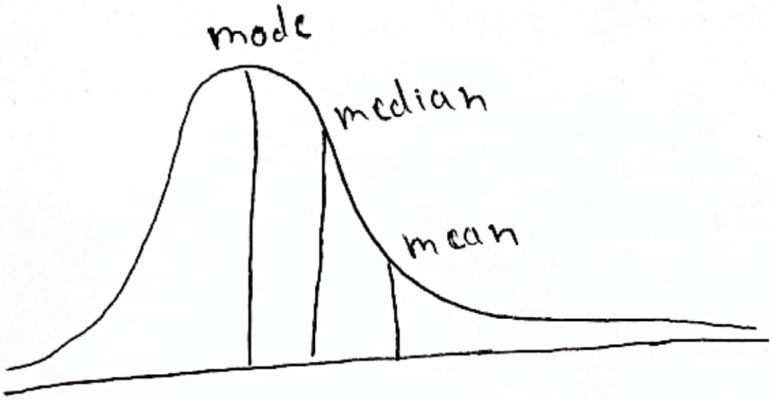


5] In left and right skewed data, what is the relationship between mean, median and mode.

In right skewed distribution

~~Mean > median~~

Mean > median > mode



In left skewed distribution

mean < median < mode