Statistics

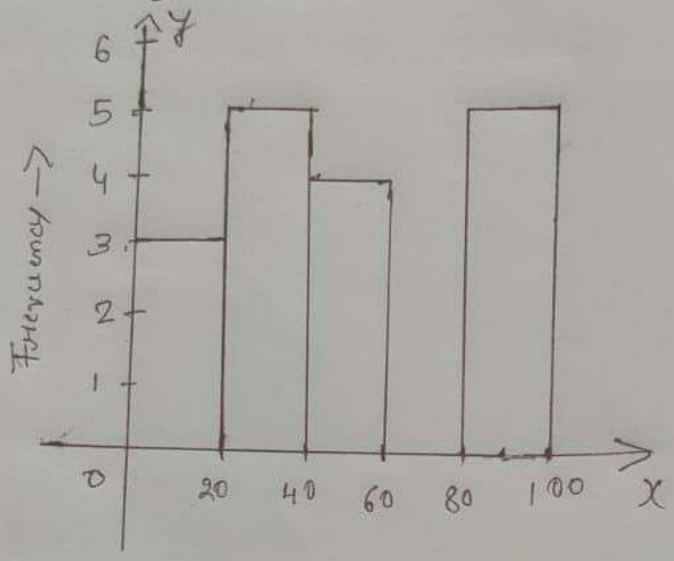
Assignment

1) Plot an Histogram of given data

Eg:- 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

Bins = 5

Bins size = 20



2) 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 an 80% CI about the mean

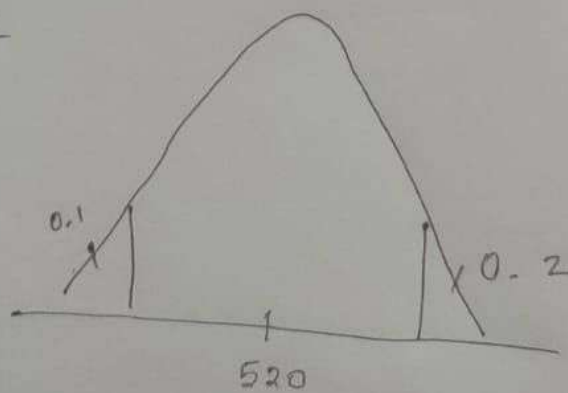
$\sigma = 100$, $n = 25$, $\bar{x} = 520$

α = significance value

1 - CI

1 - 80% (0.80)

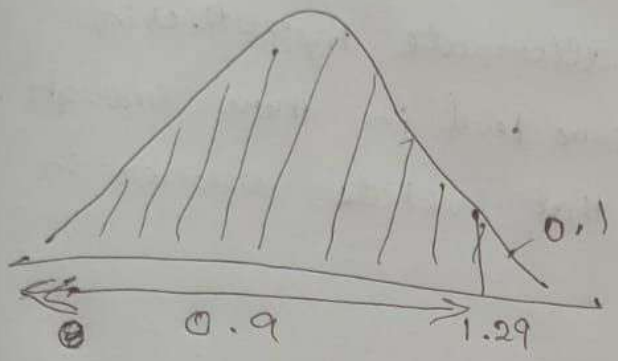
= 0.2



Point Estimate ± margin of error

$$\bar{x} \pm z\frac{\alpha}{2}\left(\frac{\sigma}{\sqrt{n}}\right)$$

$$\Rightarrow z\frac{\alpha}{2} = z\frac{0.2}{2} = z_{0.1}$$



Lower fence : $\bar{x} - z\frac{\alpha}{2}\left(\frac{\sigma}{\sqrt{n}}\right)$

$$520 - 1.29\left(\frac{100}{\sqrt{25}}\right)$$

$$520 - 1.29 \times 20$$

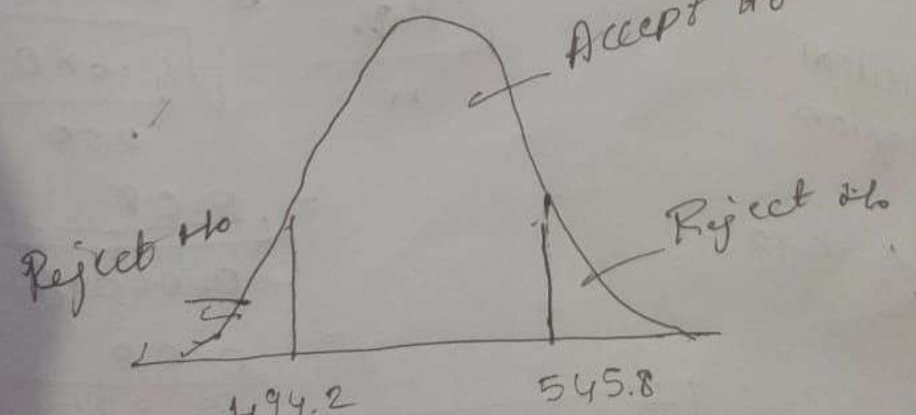
Lower fence : 494.2

Higu fence $\bar{x} + z\frac{\alpha}{2}\left(\frac{\sigma}{\sqrt{n}}\right)$

$$520 + 1.29 \times 20$$

$$520 + 25.8$$

$$= 545.8$$



3) A car believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He constructed a hypothesis testing surveying 250 residents & found that 170 resident responded Yes to owning a vehicle

a) State the null & alternate 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.

$H_0 = P_0 \leq 60$

$H_1 = P_0 > 60$

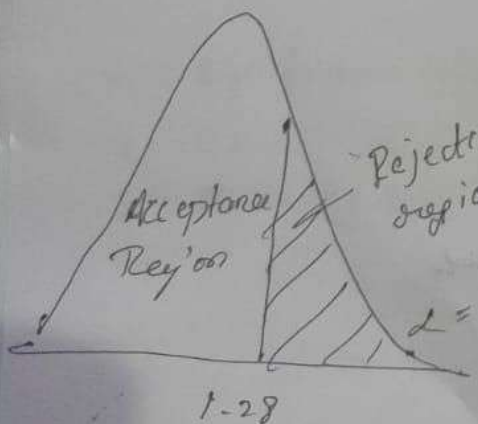
$n = 250, \quad \bar{x} = 170$

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

$q_0 = 1 - P_0 = 1 - 0.6 = 0.4$

$\Rightarrow q_0 = 0.4$

$\alpha = 0.10$ (10% Significance Level)



Z test: $\frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}}$

$= \frac{0.08}{\sqrt{0.00096}}$

$= \frac{0.08}{0.0309}$

$Z = 2.588$

Rejection the Null Hypothesis.

4) what is the value of the 99 percentile

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

Solution : value = $\frac{\text{Percentile}}{100} \times (n+1)$

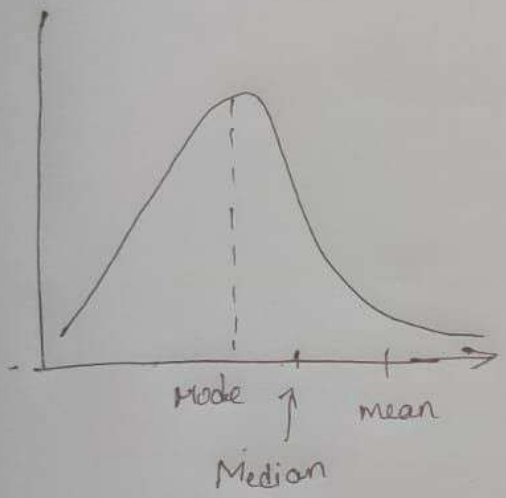
$= \frac{99}{100} \times 21 = 20.79$

So, 12 is the value of the 99 percentile

5) In left & right skewed data, what is the relationship mean, median & mode?

Draw the graph to represent the same

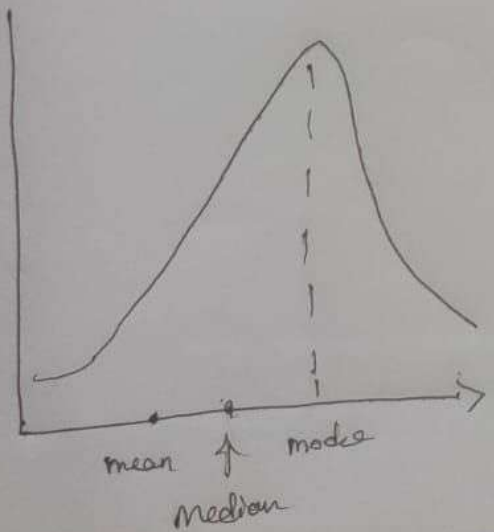
Positively Skewed



Example :- wealth Distribution

mean > median > mode

Negatively Skewed



mode > median > mean

Example :- Life Span of Human Beings