Q-1
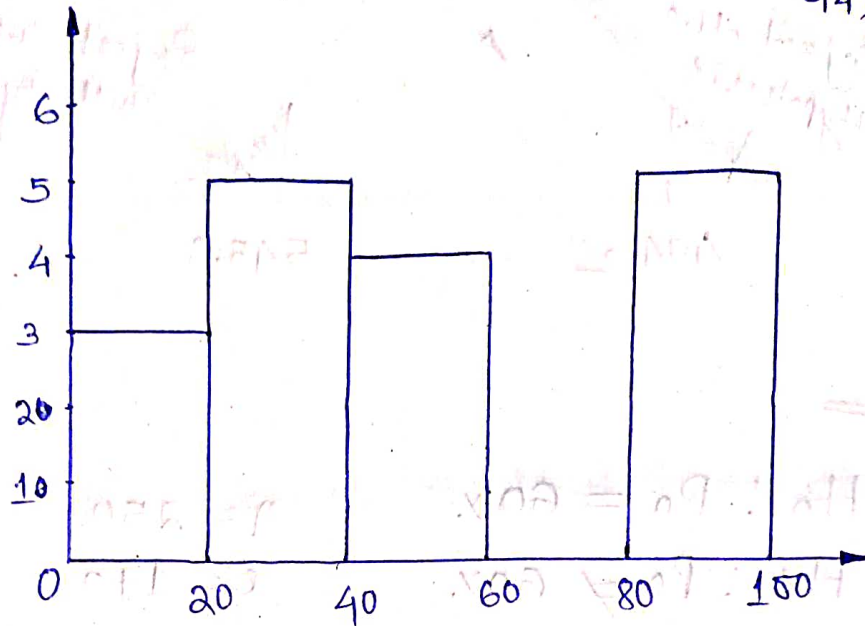
10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99
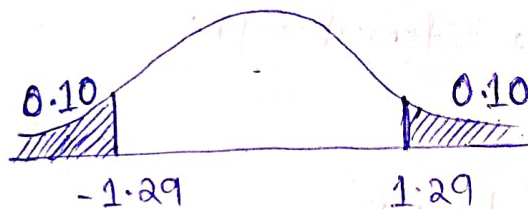

Q-2

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

$\alpha = 1 - CI$

$1 - 0.10 = 90$

$\Rightarrow 1 - 0.80 = 0.20$

$\dfrac{z_{0.20}}{2} = z_{0.10} = 1.29$

Lower fence

$\Rightarrow \bar{x} - z_{\delta/2} \dfrac{\sigma}{\sqrt{n}}$

$\Rightarrow 520 - 1.29 \times \dfrac{100}{\sqrt{25}}$

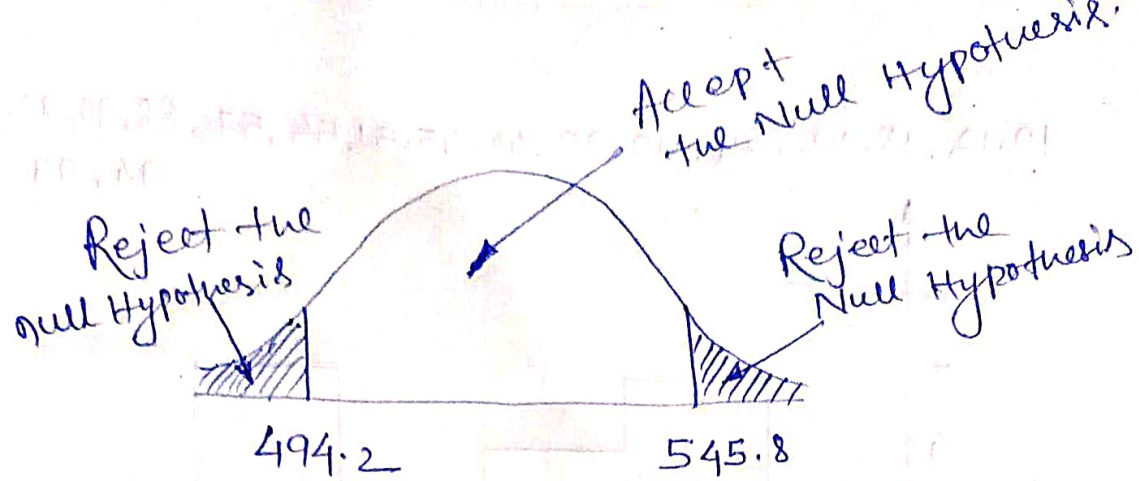$\Rightarrow 520 - 1.29 \times 20$

$\Rightarrow 494.2$

Higher fence

$\Rightarrow \bar{x} + z_{\delta/2} \dfrac{\sigma}{\sqrt{n}}$

$\Rightarrow 520 + 1.29 \times 20$

$\Rightarrow 545.8$

Reject the null Hypothesis

Accept the Null Hypothesis.

Reject the Null Hypothesis

494.2   545.8

Q-3

$H_0 : P_0 = 60\%$. $n = 250$

$H_1 : P_0 \neq 60\%$. $x = 170$

$$\hat{P} = \frac{x}{n} = \frac{170}{250} = 0.68$$
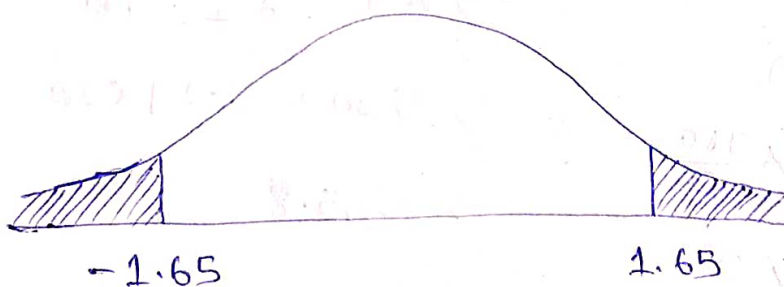
$q_0 = 1 - P_0 = 1 - 0.6 = 0.4$

$\alpha = 0.10$

Significance level = 10%.

Confidence interval = 90%.

$1 - 0.05 = 0.95$

z table $= 0.95 \leftrightarrow 1.65$
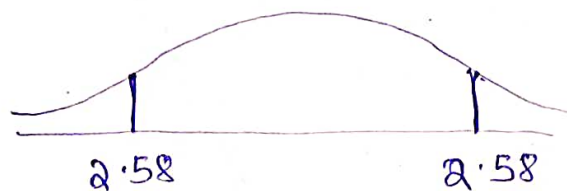

-1.65 1.65

$$z = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$$

$$\Rightarrow \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.58$$

a) $2.58 > 1.65$. Reject the Null Hypothesis.

b)

$$1 - 0.0049 = 0.9951$$

P value $= 0.9951 + 0.9951$

$$\Rightarrow 1.9902$$

P value $>$ Significance level $\rightarrow$ Reject
(1.9902) (0.10) Null Hypothesis

Q-4

99 Percentile

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

$n = 20$

$\Rightarrow \dfrac{Percentile}{100} (n+1)$

$\Rightarrow \dfrac{99}{100} (20+1)$

$\Rightarrow 20.79 \approx "12"$

Q-5

In left & Right-skewed data, what is Relationship between mean, median and mode?

Ans

Distribution of statistical data shows how often the values on the dat set occur. A distribution is said to be symetrical when the values of mean, median, and mode are same. That is, There is equal number of values on both sides of the mean which means the values occures at regular frequencies.

In a histogram that is constructed for a data that is normally distributed, the columns would form a symmetrical bell shape.
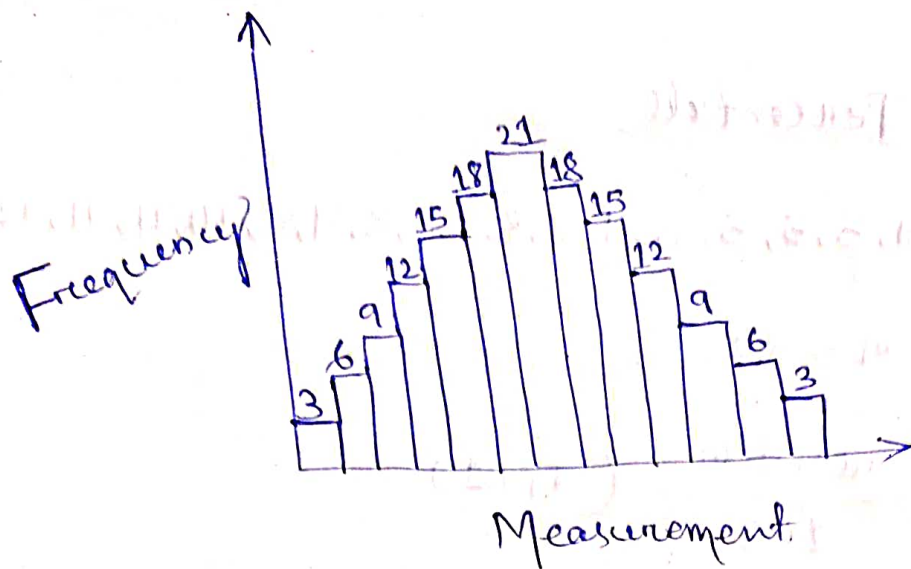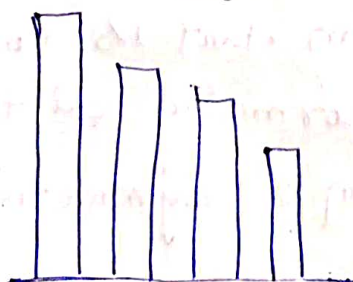
The graph drawn on such a data is known as a 'normal curve' or a 'bell curve'

Mean
Median
Mode

Symetrical
Distribution
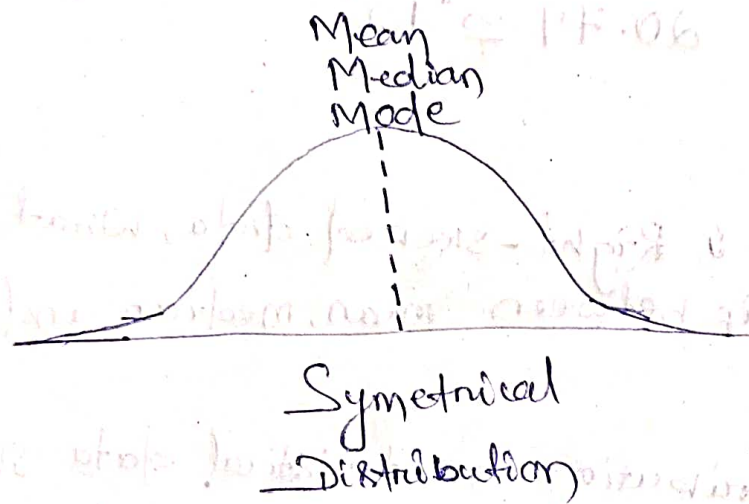
When the values of mean, median & mode are not equal, then the distribution is said to be asymmetrical or skewed. A skewed distribution can either be positively skewed or negatively skewed.

Positive Skew

Negative Skew

In a positively skewed distribution, the median and mode would be to the left of the mean. That means that the mean is greater than median and the median is greater than the mode (Mean > Median > Mode). Where as the negatively skewed distribution the median and mode would be to the Right of the mean. That means that the median and the median is less than the mode (Mean < Median < Mode)

Median
Mode | Mean

Positive
Skew

Median
Mean | Mode

Negative
skew
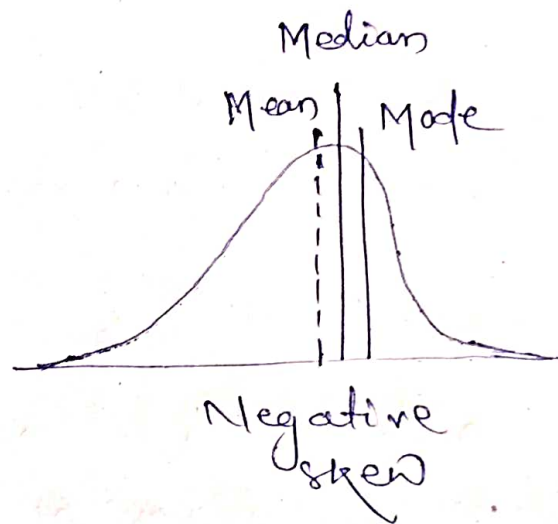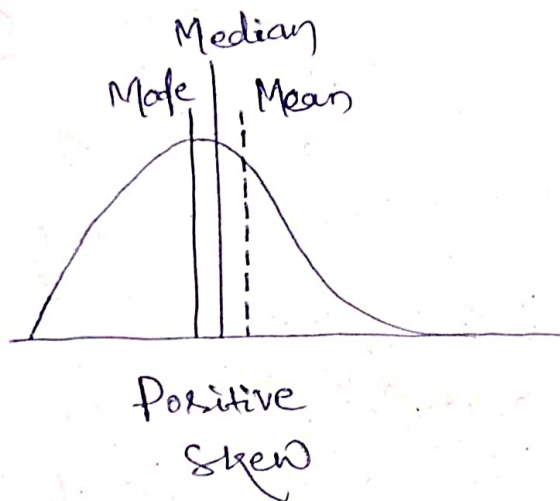
Empirical studes have proved that in a distribution that is moderately skewed, a very important relationships exists between mean, median, & mode. The distance between the mean and the median is about one-third the distance between the mean and the mode.