STATISTICS ASSIGNMENT

Q1 Plotting Histogram

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

Bins = 10
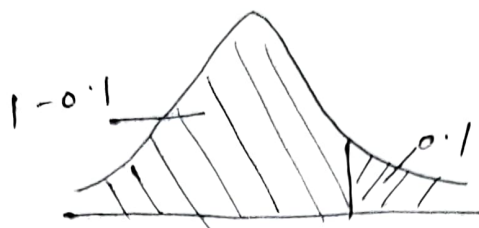

Frequency vs. values histogram with bins of 10, x-axis from 10 to 100, y-axis frequency from 1 to 5.
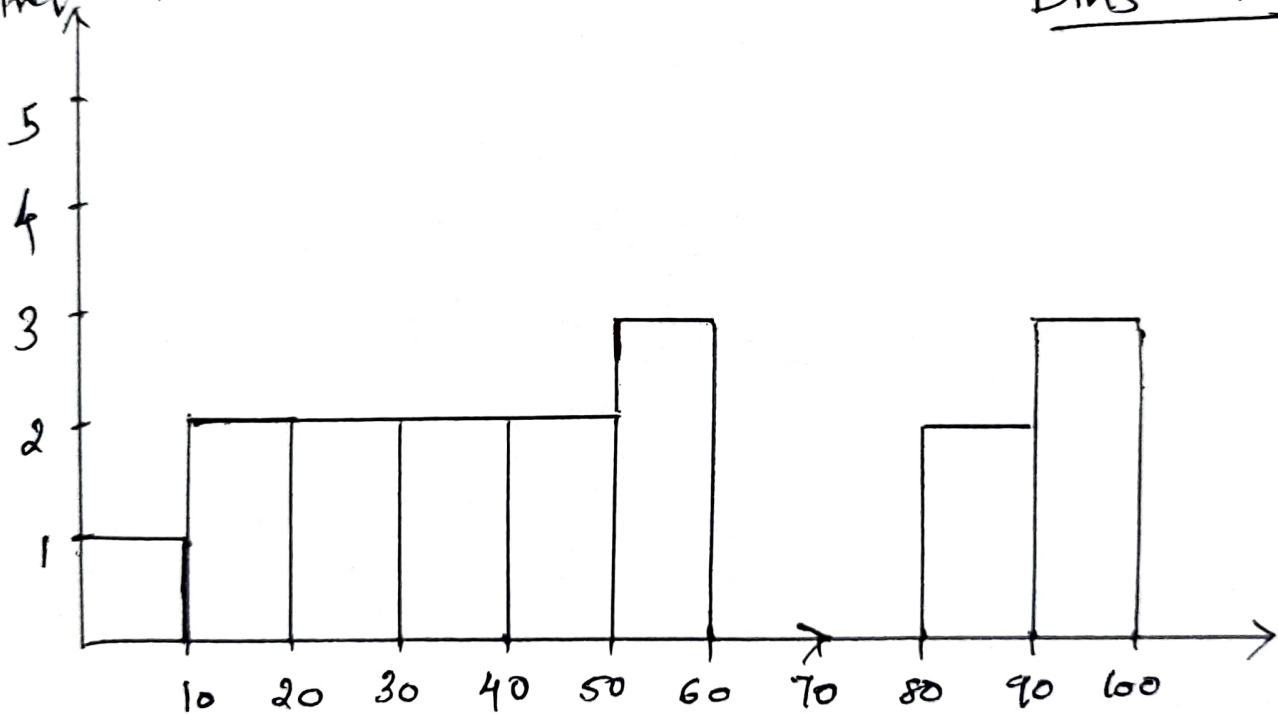
2.

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

$\alpha = 1 - \text{C.I} = 1 - 0.8 = 0.2$

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

$1 - 0.1 = 0.9$

From Z table, we find value for 0.9

$\therefore Z_{0.1} = 1.29$

Lower fence $= \bar{x} - Z_{\alpha/2}\left(\dfrac{\sigma}{\sqrt{n}}\right) = 520 - 1.29\left(\dfrac{100}{\sqrt{25}}\right)$

$= 494.2$

Higher fence $= 520 + 1.29\left(\dfrac{100}{\sqrt{25}}\right)$

$= 545.8$

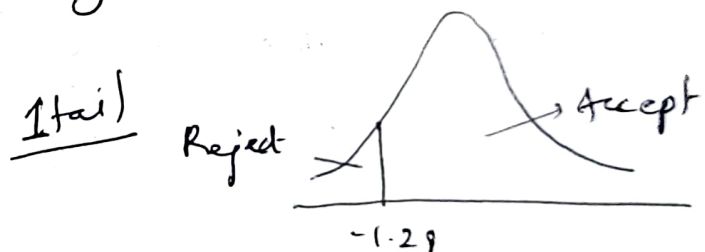494.2   545.8

3.
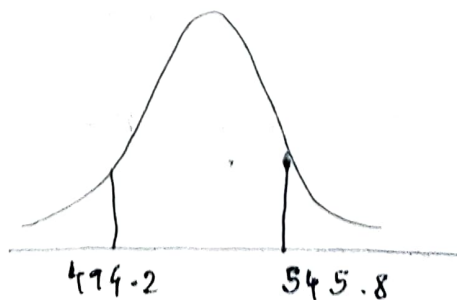
① Ho : $P_0 \geq 60\%$

H₁ : $P_0 < 60\%$.

$n = 250$, $x = 170$

$\hat{p} = \dfrac{x}{n} = \dfrac{170}{250} = \underline{0.68}$

$q_0 = 1 - P_0 = 1 - 0.6 = \underline{0.4}$

② $\alpha = 0.1$

from Z table we get value as -1.28

1 tail   Reject   Accept

-1.28

$Z_{test} = \dfrac{\hat{p} - P_0}{\sqrt{\dfrac{P_0 q_0}{n}}}$

$= \dfrac{0.68 - 0.6}{\sqrt{\dfrac{0.6 \times 0.4}{250}}} = \underline{0.266}$

$0.266 > -1.28$

∴ we accept the null hypothesis

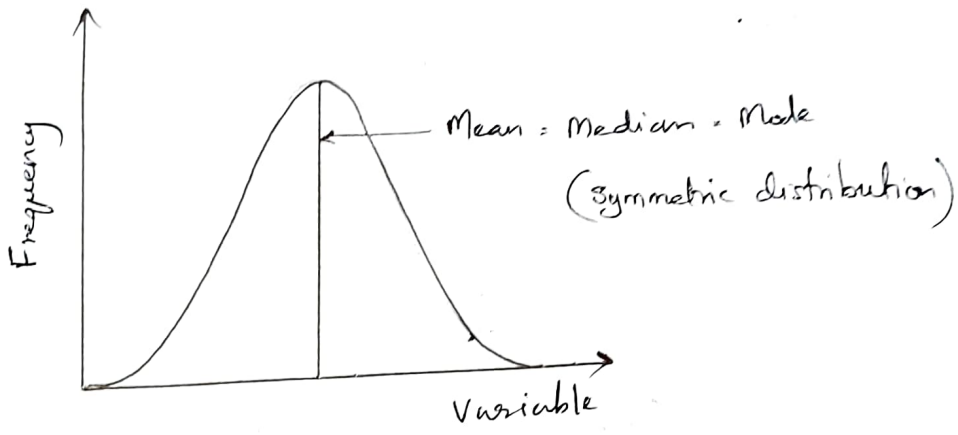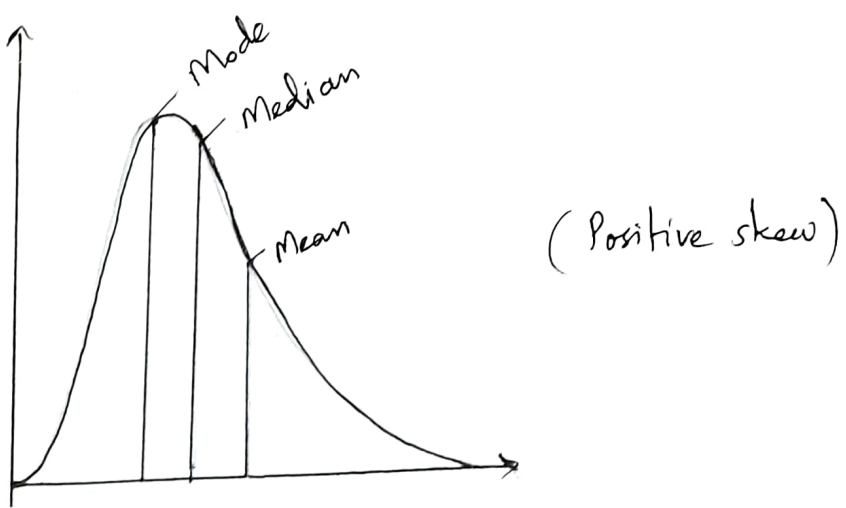Q4. Value of 99 percentile $\{2,2,3,4,5,5,5,6,7,8,8,8,8,8,$
$99,10,11,11,12\}$

$$\frac{\text{Percentile}}{100} \times n = \frac{99}{100} \times 20 = 19.8^{th}\text{ index}$$

$\therefore 11.5$

Q5. Relationship between mean, median and mode in left and right skewed data.

Mean = Median = Mode

(Symmetric distribution)

Right skewed

Mode
Median
Mean

(Positive skew)

Left Skewed

Mode
Median
Mean

(Negative skew)