Assignment - 1 (Statistics)
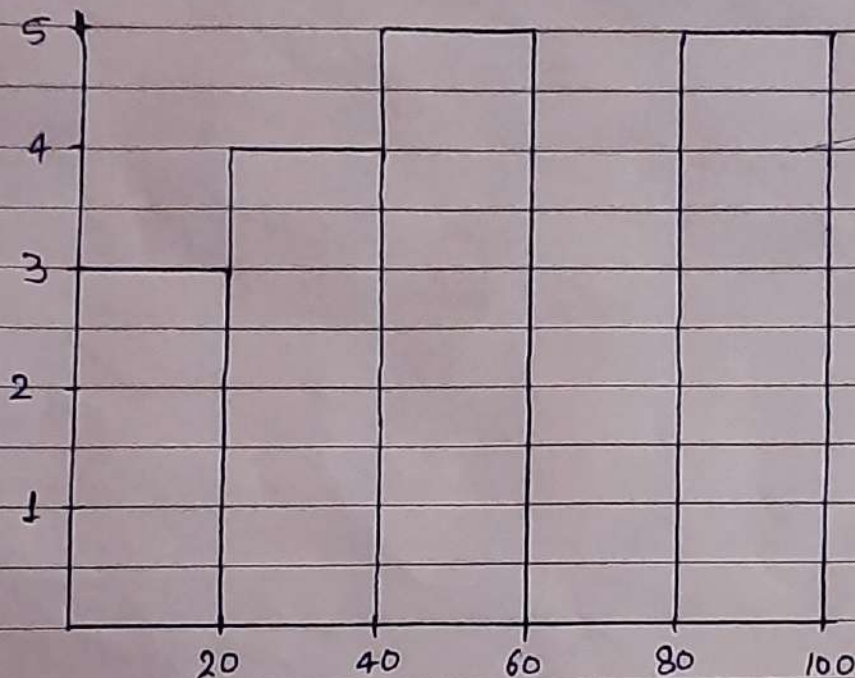
Q. 1. Plot a histogram.

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

Ans. Bin Size = 20   Bins = 5

Q. 2. In a quant test of the CAT Exam, the population standard deviation is known to be 100. A sample of 25 tests taken has a mean of 520. Construct an 80% CI about the mean.

Ans.

$$\sigma = 100$$
$$\bar{x} = 520$$
$$CI = 80\%$$
$$\alpha = 1 - .80$$
$$= 0.20$$

Instructor's Sign

Lower fence $= \bar{x} - Z_{\alpha/2} \dfrac{\sigma}{\sqrt{n}}$

$$= 520 - Z_{.2\%/2} \dfrac{100}{\sqrt{25}}$$

$$= 520 - Z_{0.10} \dfrac{100}{5}$$
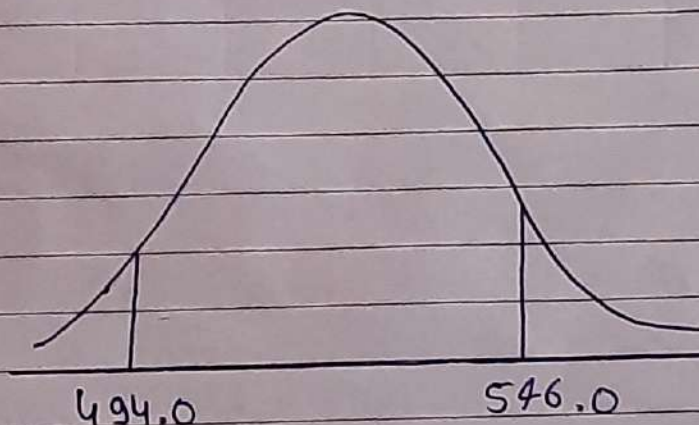
$$= 520 - 1.3 \times 20$$
$$= 520 - 26.0$$
$$= 494.0$$

Higher fence $= \bar{x} + Z_{\alpha/2} \dfrac{\sigma}{\sqrt{n}}$

$$= 520 + 1.3 \times 20$$
$$= 520 + 26.0$$
$$= 546.0$$

494.0   546.0

Q.3 A car believes that the percentage of citizen in city ABC that owns a vehicle is 60% or less. A sales manager disagree with this. He

conducted a hypothesis testing surveying 250 resident & found that 170 residents 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.

Ans.   Null hypothesis :

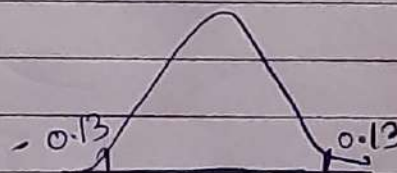$$H_0 : P_0 = 60\%.$$
$$H_1 : P_0 \neq 60\%.$$

$$n = 250$$
$$x = 170$$

$$\text{Proportion} (\hat{P}) = \frac{x}{n} = \frac{170}{250} \Rightarrow 0.68$$

$$q_0 = 1 - 60\% = 1 - \frac{60}{100} = .40$$

$$\alpha = .90$$

$$\alpha \overline{} .90$$

$$- 0.13 \qquad 0.13$$

$$Z \text{ Test} \Rightarrow \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} \Rightarrow \frac{0.68 - .60}{\sqrt{\frac{.60 \times .40}{250}}} \Rightarrow \frac{.08}{\sqrt{\frac{.2400}{250}}} \Rightarrow \frac{.08}{.0019}$$

$$\Rightarrow 40.82$$

40.82 > 0.13
        that why accept the null hypothesis

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

Ans.

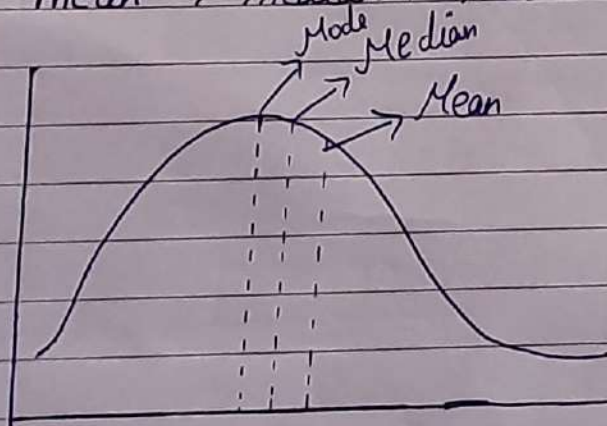$$Value = \frac{99}{100} \times (20+1)$$

$$= .99 \times 21$$

$$= 20.79 \implies Index$$

so the value is 12

Q.5 In left & right-skewed data, what is the relationship b/w mean, median & mode?
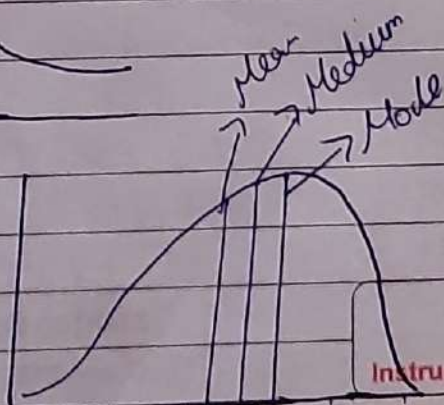Draw the graph to represent the same.

Ans. In left skewed data:

mean > median > mode

In right skewed data:

Mode > Medieum > Mean