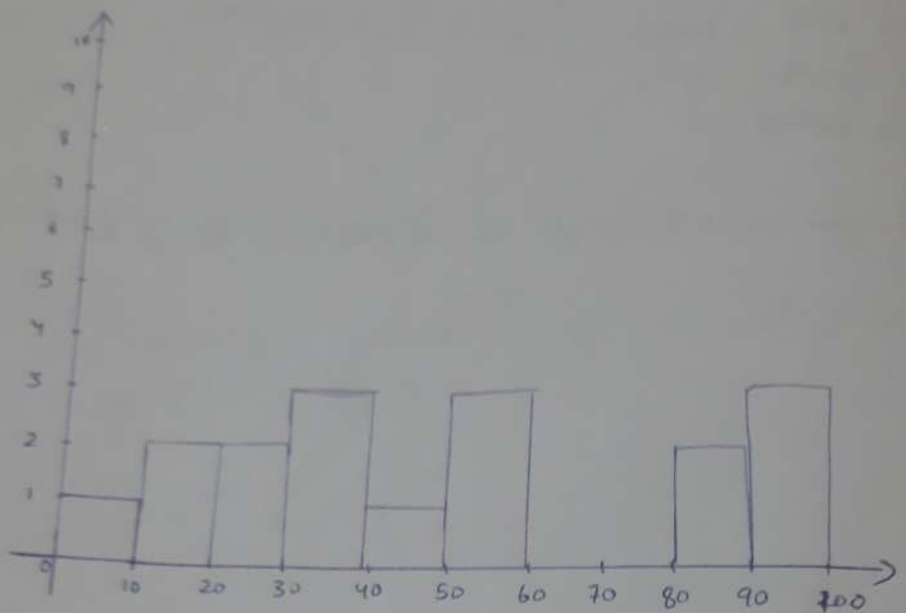
Q1) Plot a histogram

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

Ans



Q2) 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 80% CI about the mean.

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

$H_0 : \mu = 520 \quad H_1 : \mu \neq 520$

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

$$= 520 \pm Z_{\frac{0.2}{2}} \left(\frac{100}{\sqrt{25}} \right)$$

$$= 520 + (1.29)(20)$$

$$= 545.8$$

$= 520 - (1.29)(20)$

$= 494.2$

$494.2 \longleftrightarrow 545.8$ ∴ $\bar{x}(520)$ falls between lower limit and higher limit hence we accept H_0.

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

a) State null and 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.

$H_0 : P_0 \leq 60\%$ $\quad n = 250$ $\quad x = 170$ $\quad \alpha = 0.1$

$H_1 : P_0 > 60\%$, z score is $= 1.28$

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

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

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.6(1-0.6)}{250}}} = \frac{0.08}{\sqrt{\frac{0.24}{250}}} = 2.582$$

As 2.582 is greater than z score (1.28), we reject null hypothesis and accept Alternate hypothesis. The percentage of citizen owning a car is more than 60%.

Ques 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 $\text{Value} = \frac{\text{Percentile}}{100} \times (n+1)$

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

$= 20.79$

So, we will take 20th Index = 12

The value is 12.

Question 5) In left and right skewed data, what is the relation between mean, median & mode?

Ans In right skewed data the Mean is larger than median and mode is smaller than Median. Where as in left skewed data The Mode is larger than median and mean is smaller than median.