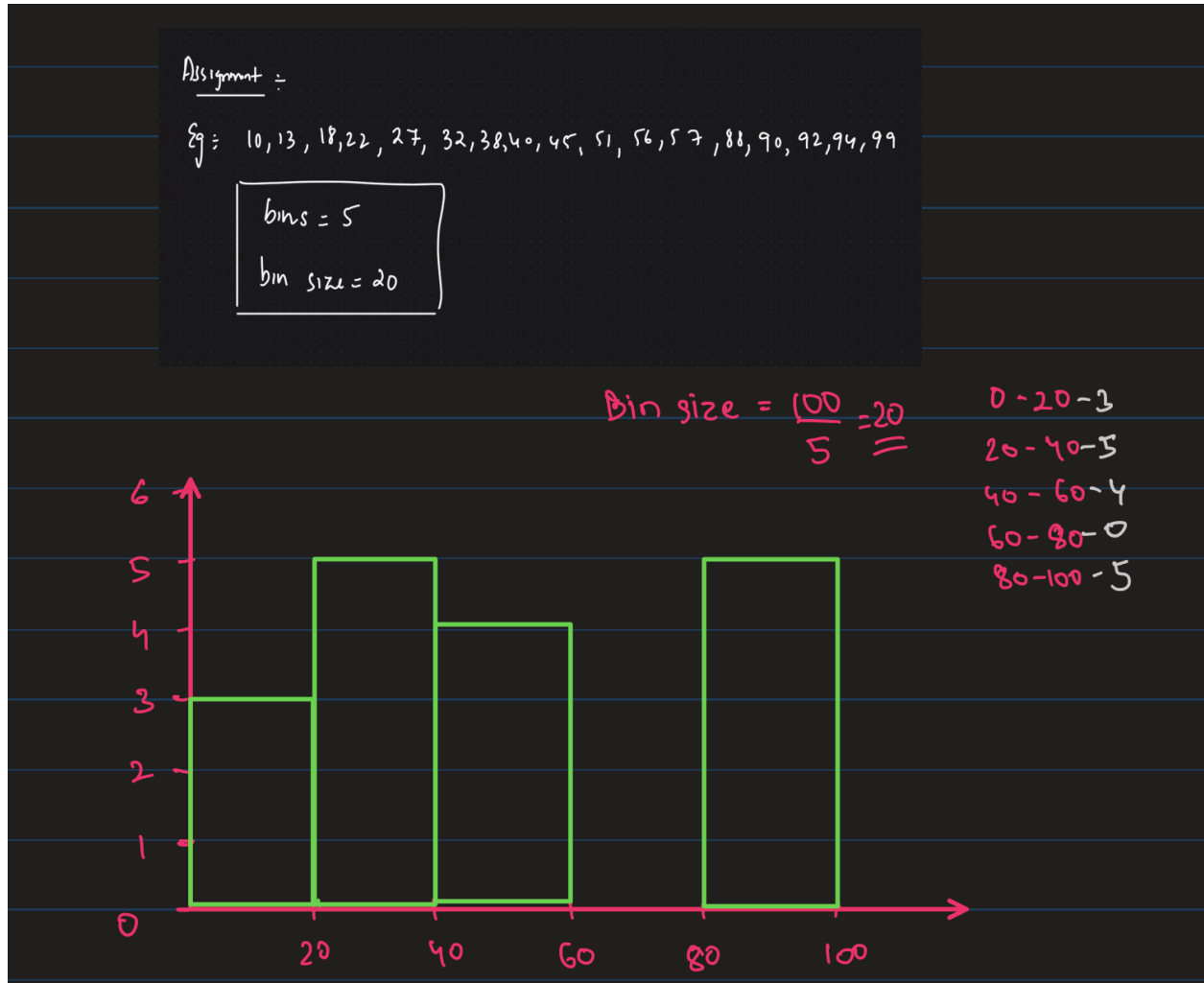


Que 1) Plot a histogram,

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



Que 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.

$$\sigma = 100 \quad n = 25 \quad \bar{x} = 520 \quad CI = 80\% \quad \alpha = 0.02$$

$$H_0 = \bar{x} = 520 \quad (\text{This is a 2-tailed test})$$

$$H_1 = \bar{x} \neq 520$$

$$\bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$\text{Upper fence} = \bar{x} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$\Rightarrow 520 + (1.28) \frac{(100)}{\sqrt{25}}$$

$$\Rightarrow 520 + (1.28)(4)$$

$$\Rightarrow 520 + 5.12$$

$$\Rightarrow 525.12$$

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

$$\Rightarrow 520 - (1.28) \frac{(100)}{\sqrt{25}}$$

$$\Rightarrow 520 - (1.28)(4)$$

$$\Rightarrow 520 - 5.12$$

$$\Rightarrow 514.88$$

$\therefore$  The point should lie b/w the range  $[514.88, 525.12]$   
 $\therefore$  We accept the null hypothesis.

Que 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 conducted a hypothesis testing surveying 250 residents & 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.

$$\mu = 60\% \quad n = 250 \quad \bar{x} = 170 \quad \alpha = 10\% \\ \hookrightarrow \text{yes}$$

$H_0: \mu \leq 60\%$  (Don't own a vehicle)

$H_1: \mu > 60\%$  (Own a vehicle)

Now we are going to use z-test with proportion

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

This is a one-tailed test

$$\hat{p} = 0.68 \quad n = 250 \\ p_0 = 0.6$$

$$\Rightarrow \frac{0.68 - 0.6}{\sqrt{\frac{0.6(1-0.6)}{250}}} = \frac{0.08}{\sqrt{\frac{(0.4)(0.6)}{250}}} > \frac{0.08}{\sqrt{\frac{24}{2500}}}$$

$$\Rightarrow \frac{0.08 \times 50}{\sqrt{24}}$$

$$\Rightarrow 0.81$$

$$\alpha = 10\% \quad 1 - 0.1 = 0.9 \rightarrow 1.28 \\ \underline{\quad \quad \quad}$$

As  $0.81 < 1.28$  we accept the  $H_0$  and reject the  $H_1$ .  
 $\therefore$  We can conclude that there is enough evidence to support the idea that the vehicle owners in ABC city is 60% or less

Que 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

99<sup>th</sup> percentile

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

$n = 20$

$\Rightarrow \frac{99}{100} \times (n+1)$

$\Rightarrow 0.99 \times 21$

$\Rightarrow 20.79^{\text{th}}$  index

$\therefore$  We take the 20<sup>th</sup> index.

$\therefore$  The 99<sup>th</sup> percentile value is 12.

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

Draw the graph to represent the same.

