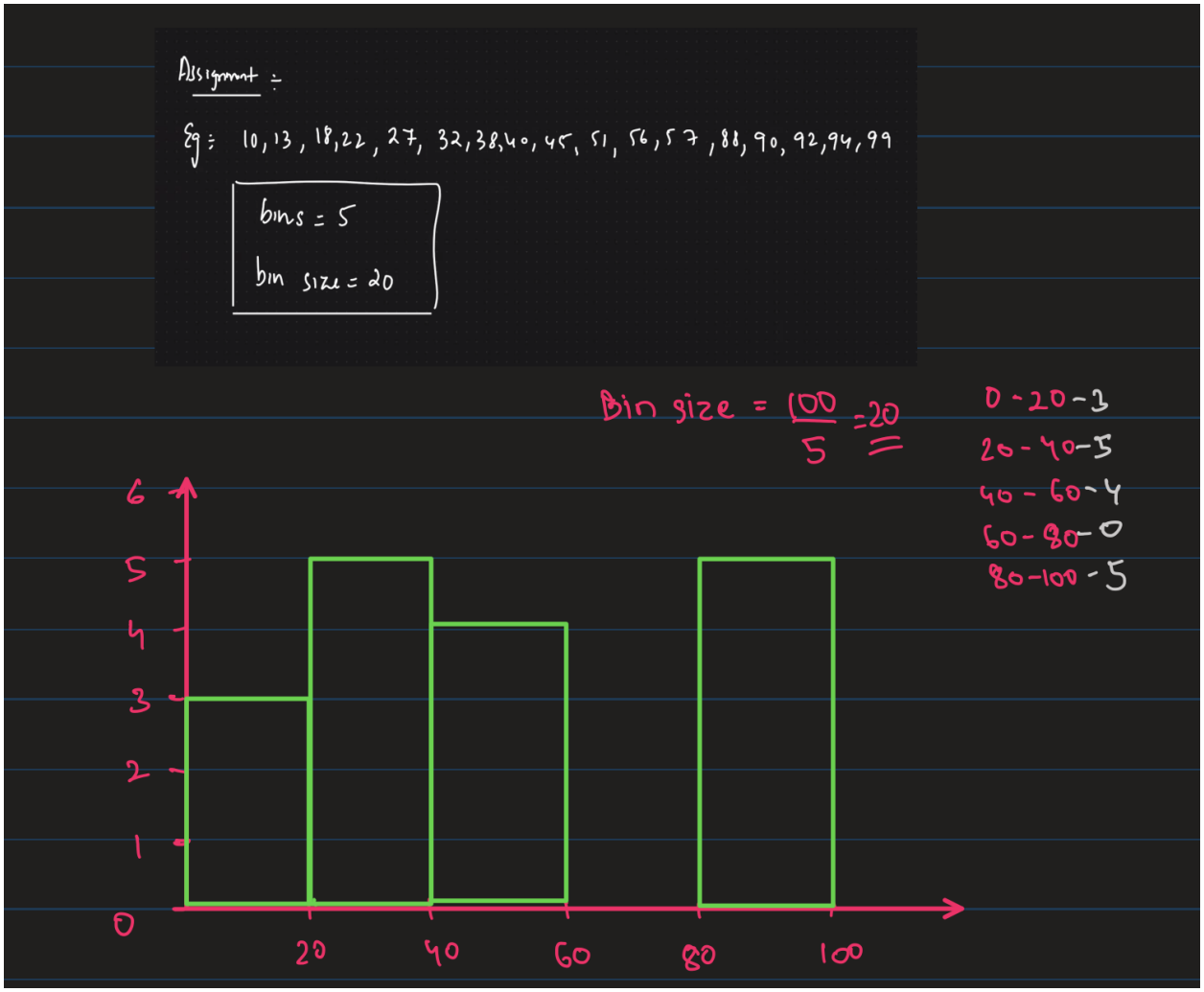
Que 1) Plot a histogram,

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.

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

$H_0 = \bar{x} = 520$ (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 btw 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.

A3) $\mu = 60\%$ $n = 250$ $\bar{x} = 170$ $\alpha = 10\%$

↳ 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 (Right tail test)

$\hat{p} = 0.68$ $n = 250$

$p_0 = 0.6$

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

$$\Rightarrow \frac{0.08 \times 50}{\sqrt{2.4}}$$

$$\Rightarrow 2.58$$

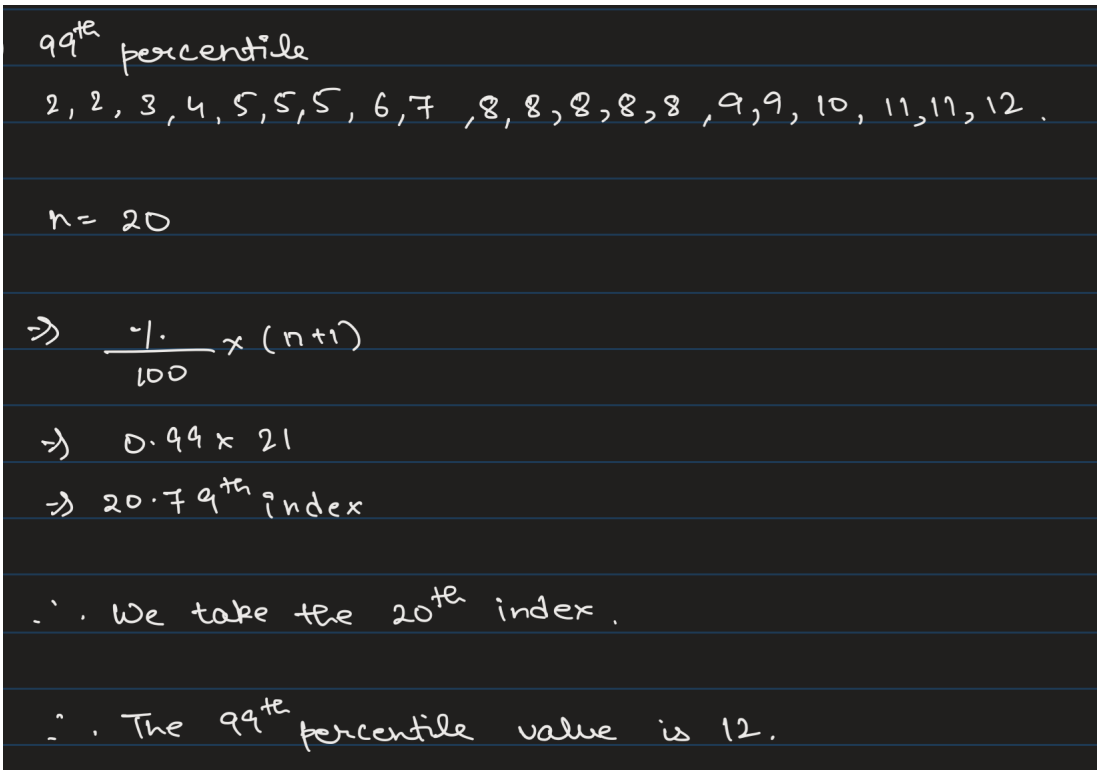
$\alpha = 10\%$ $1 - 0.1 = 0.9 \rightarrow 1.28$

As $2.58 > 1.28$ we reject the H_0 and accept the H_1.

∴ We can conclude that the idea that the vehicle owner in ABC city is 60% or less is false.

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



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

Draw the graph to represent the same.