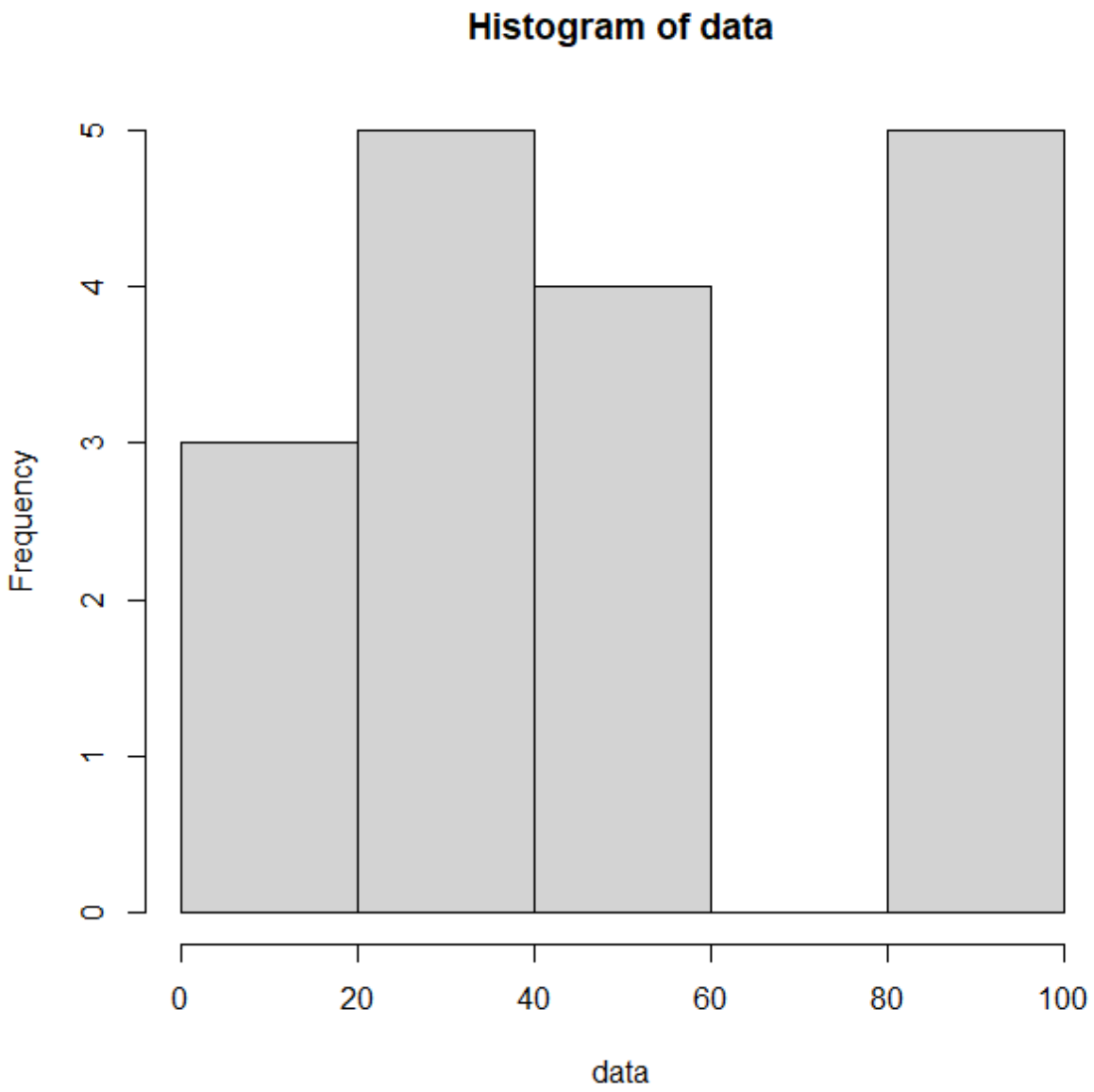
I Neuron.Ai Assignment

Q no. 1) Plot a histogram

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

Ans :- data=c(10,13,18,22,27,32,38,40,45,51,56,57,88,90,92,94,99);

> hist(data)



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.

$\Rightarrow \quad \sigma = 100, \; n = 25, \; \bar{x} = 520$

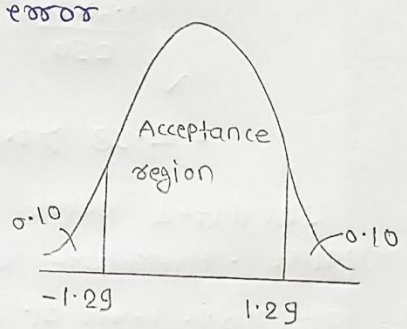
$\alpha = 0.20$ = level of significance

C.I = point estimate $\pm$ margin of error

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

$Z_{\frac{\alpha}{2}} = Z_{\frac{0.20}{2}} = Z_{0.10}$

$Z_{\frac{\alpha}{2}} = 1.29$



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

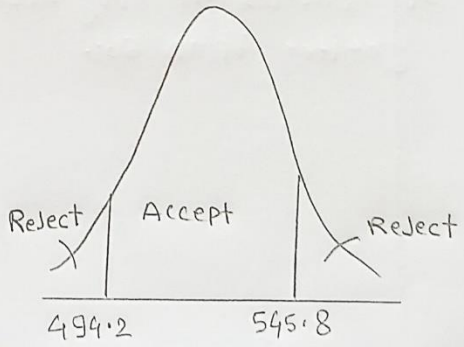
$= 520 - 1.29 \frac{100}{\sqrt{25}}$

$= 494.2$

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

$= 520 + 1.29 \frac{100}{\sqrt{25}}$

$= 545.8$



Confidence interval = [494.2, 545.8]

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.

$\Rightarrow$ $p_0 = 0.60$

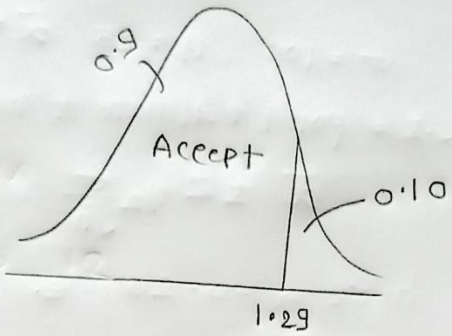
$H_0 : p_0 \leq 60\%$

$H_1 : p_0 > 60\%$

$n = 250 \quad x = 170$

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

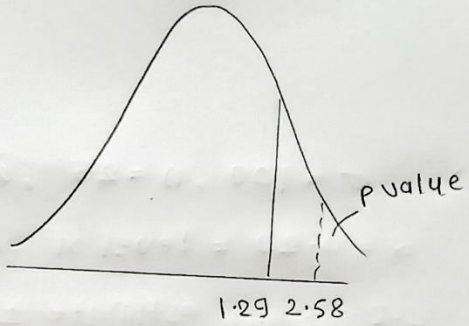
$\alpha = 10\% \quad C.I = 90\%$



$$Z \text{ statistic} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}}$$

$= 2.58 > 1.29$



p value $= 1 - 0.99506$

$= 0.004$

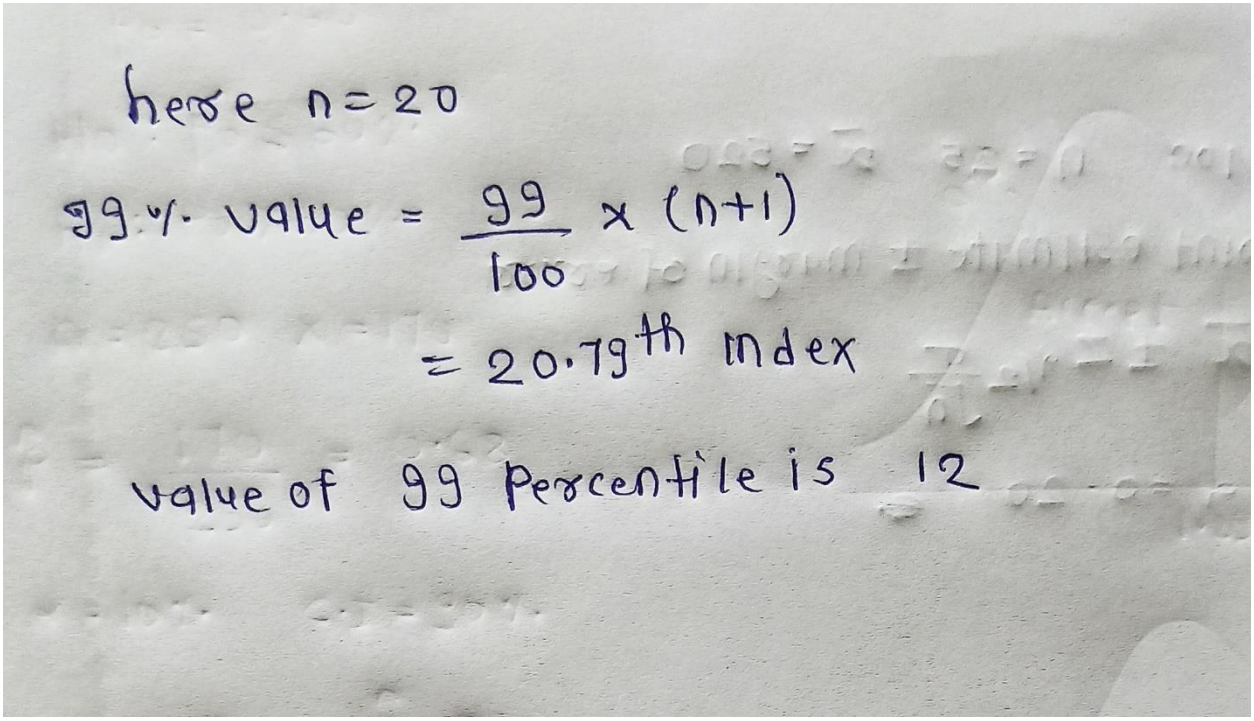
calculated value of z is greater than tabulated value. therefore we reject the null hypothesis at 10% level of significance

here p value $= 0.004 < 0.10$

Reject H_0, and conclude that the percentage of citizens in city ABC that owns a vehical is greater than 60%.

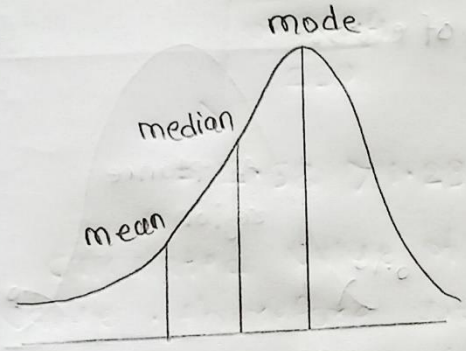
Que 4) What is the value of the 99 percentile?

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



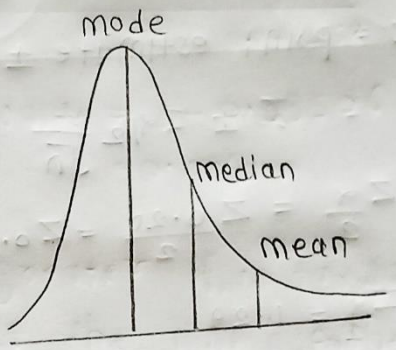
Que 5) In left & right-skewed data, what is the relationship between mean, median & mode?

Draw the graph to represent the same.



left skewed
(negatively skewed)

mean < median < mode



right skewed
(positively skewed)

mean > median > mode