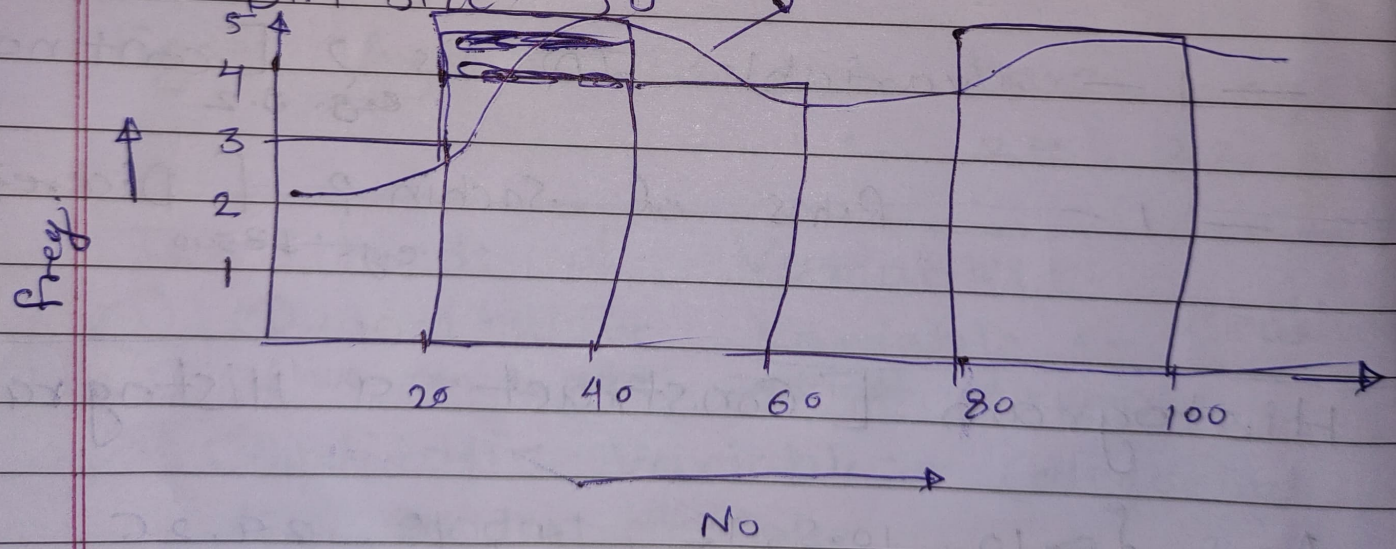
e.g. (2) Eg. = {10, 13, 18, 22, 27, 32, 38, 46, 45, 51, 56, 57, 88, 90, 92, 94, 99}

Bins = 5

Bin size = 20

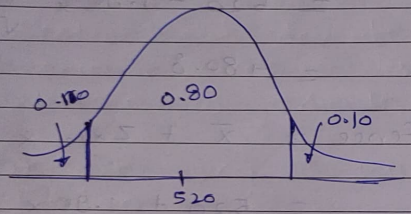


HISTOGRAM

Q2. In the Quant test of CAT exam, the population std deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct a C.I. 80% CI about the mean?

→ $\sigma = 100$ $\quad n = 25$ $\quad \bar{x} = 520$

C.I. = 80% $\quad \alpha = 1 - 0.80 = 0.20$

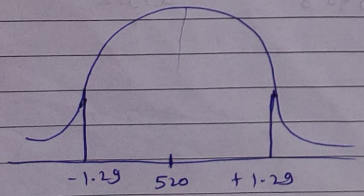


For $Z_{\alpha/2} = Z_{0.20/2} = Z_{0.10}$

For $Z_{0.10}$ value is

$1 - 0.10 = 0.90$

For $Z_{0.90}$ value is 1.29



∴ Lower Fence $= \bar{x} - Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}}$

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

$= 520 - 1.029 \times 20$

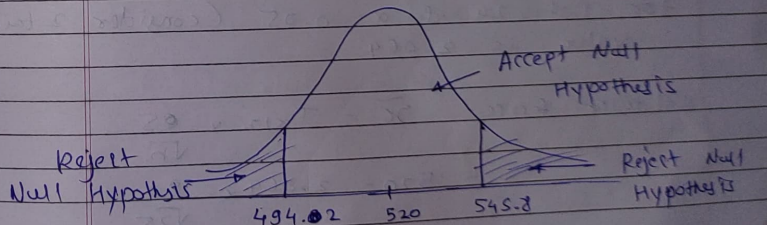
Lower Fence $= 494.2$

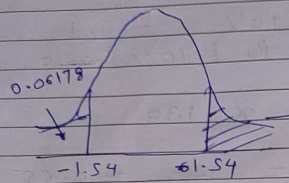
Higher fence :-

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

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

$= 545.8$





for 1.54 → 0.93822

∴ 1 - 0.93822

= 0.06178

∴ P-value = 0.06178 + 0.06178

= 0.12356

P-value > significance value

0.12356 > 0.05

∴ Accept the Null Hypothesis.

Q.8 A car company believes that the percentage of residents in a city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducts a hypothesis testing surveying 250 residents & found that 170 responded yes to owning a vehicle.

[a] State the Null & Alternate hypothesis

[b] At 10% significance level, is there enough evidence to support the idea that vehicle ownership in city ABC is 60% or less?

→ ① H_0 = $P_0 \leq 60\%$

H_1 = $P_0 > 60\%$

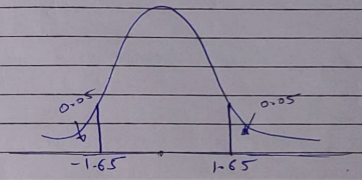
$n = 250$ $x = 170$

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

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

② $\alpha = 0.1$

③



1 - 0.05 = 0.95

* Z test with proportion

$Z\ test = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.4}{250}}}$

= 2.588

2.588 > 1.65

∴ Reject the Null Hypothesis

For 2.58 value is 0.9950

P-Value = 0.99505

P-value < significance value

∴ Reject the Null Hypothesis

Q. What is 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

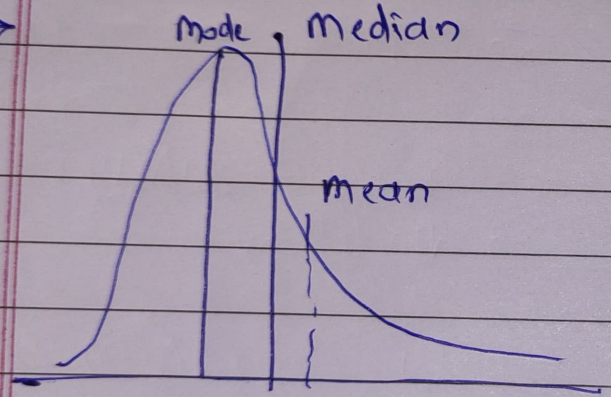
→ value = $\frac{\text{Percentile} \times n}{100}$

$= \frac{99}{5+99} \times 20 = 19.8$ Index

$\therefore \frac{11+12}{2} = \boxed{11.5}$ ← Answer

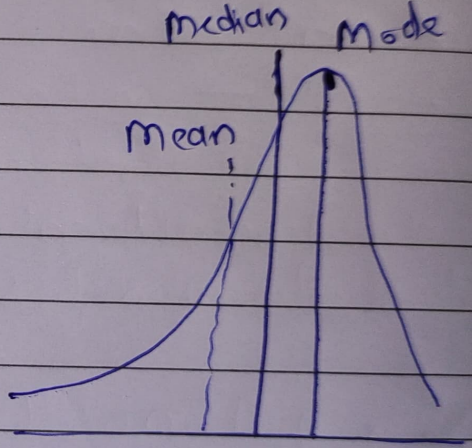
Q5. Left & Right skewed data, what is relationship between mean, median & mode? Draw graph to represent the same.

→



Right skewed

Mode < Median < Mean



Left skewed

Mean < median < mode