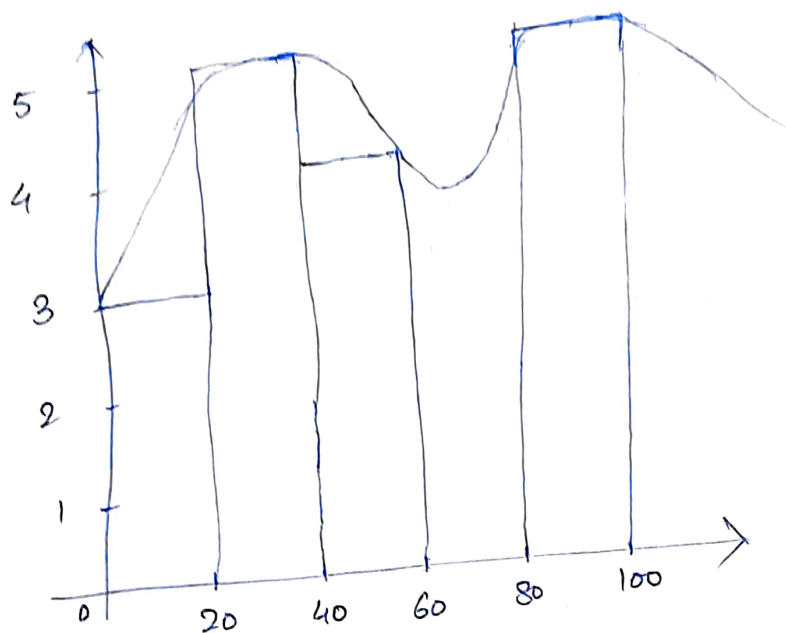


Ques 1)

Plot histogram

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

Bin = 5, Bin size = 20



Ques 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.

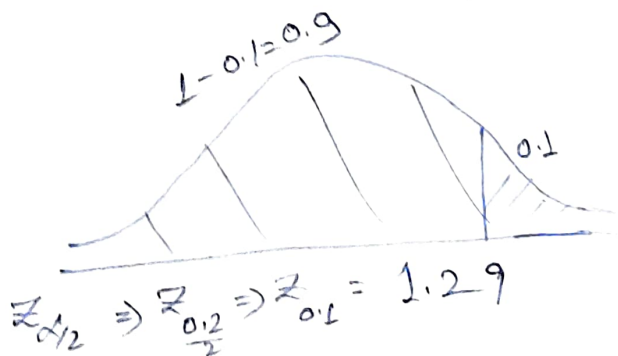
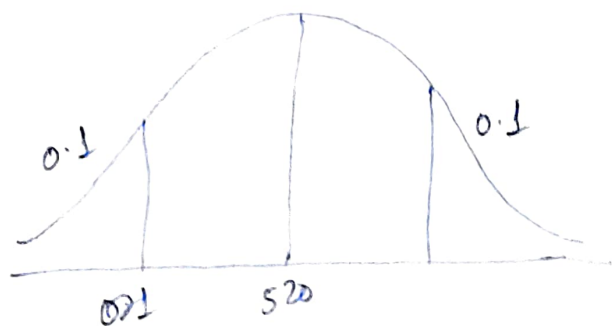
$$\sigma = 100$$

$$n = 25$$

$$\bar{x} = 520$$

$$\alpha = 1 - C.I = 0.2$$

$$C.I = \bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$



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

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

$$= 520 - 1.29 \times 20$$

$$= 494.2$$

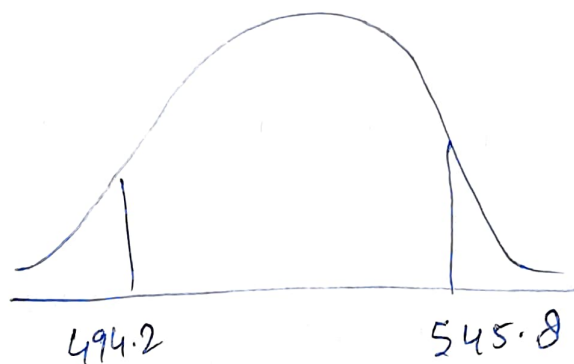
$$\text{Higher fence} = \bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

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

$$= 520 + 1.29 \times 20$$

$$= 545.8$$

80% C.I. \Rightarrow



Ques 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.

① $H_0 : P_0 = 60\%$

$H_1 : P_0 < 60\%$

$n = 250$

$x = 170$

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

② $\alpha = 0.1$ C.I. = 90%

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

③ Z-test with proportion

$$Z_{\text{test}} = \frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.58$$



$2.58 > 1.65$
(Reject null hypothesis)

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

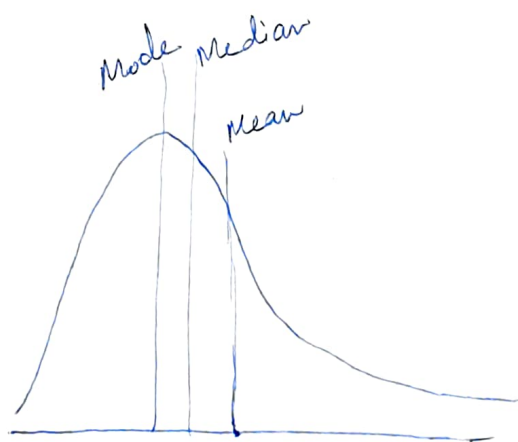
$$\text{Value} = \frac{\text{Percentile}}{100} \times (n+1)$$

$$= \frac{99}{100} \times (21) \approx 20.79 \text{ index}$$

Will consider 20th index ~~set~~

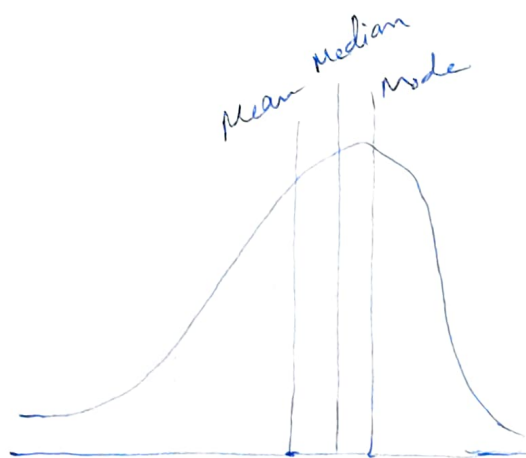
Value of the 99 percentile is 12

Ques 5) In left & right-skewed data, what is the relationship between mean, median & mode? Draw the graph to represent the same.



Right-Skewed

Mean > Median > Mode



Left-Skewed

Mode > Median > Mean