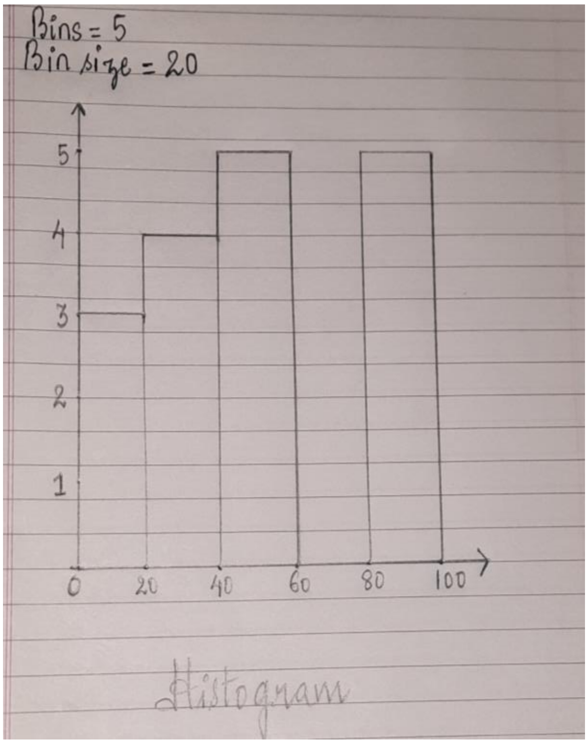
Que 1) Plot a histogram,
10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

Bins = 5
Bin size = 20



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.

Answer: -

$\sigma = 100$, $\bar{x} = 520$, n = 25, Confidence Interval = 80%

Calculate Significance level

Significance Value(α) = 1 - Confidence Interval

$\alpha = 1 - 0.80 = 0.20$

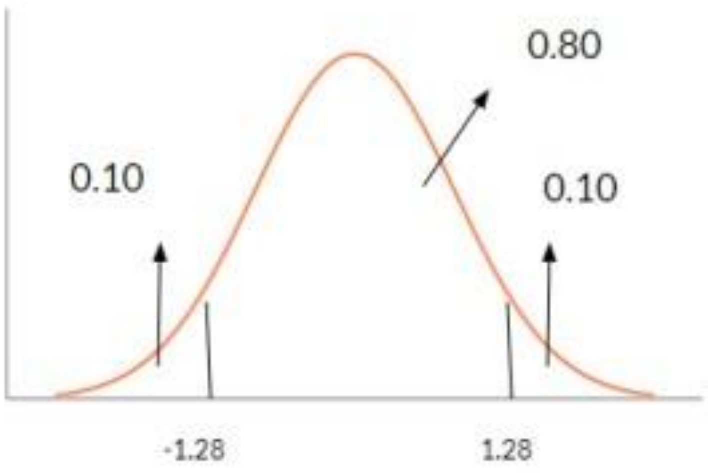
$\alpha = 0.20$

$z\ \alpha/2 = z\ 0.20/2 = z\ 0.10$

$1 - 0.10 = 0.90$

Therefore, from the z table (if population standard deviation is given) value is 1.28

$z\ \alpha/2 = 1.28$



Lower Fence $= \bar{x} - z\ \alpha/2\ (\sigma / \sqrt{n})$

Lower Fence = $520 - 1.28\ (100/ \sqrt{25})$

$= 520 - 1.28 \times 20$

$= 520 - 25.6$

$= 494.4$

Higher Fence $= \bar{x} + z\ \alpha/2\ (\sigma / \sqrt{n})$

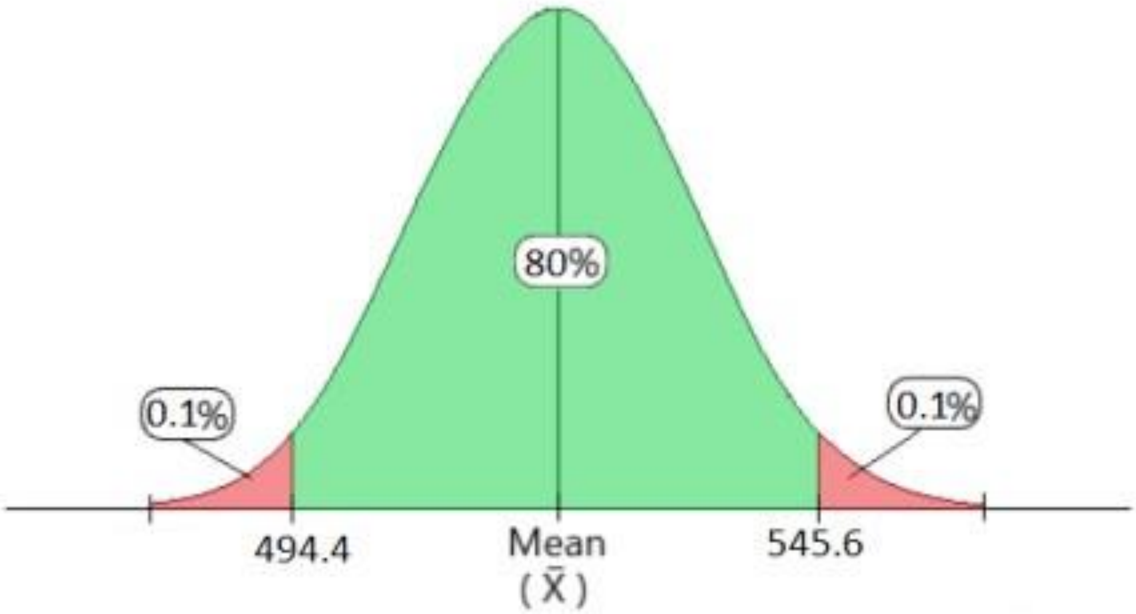
Higher Fence = $520 + 1.28\ (100/ \sqrt{25})$

$= 520 + 1.28 \times 20$

$= 520 + 25.6$

$= 545.6$

The Lower and Higher Fence in Distribution



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.

Answer –

Step 1 : - Null and Alternate Hypothesis

HO = PO <= 60
H1 = PO $\neq$60

Step 2 : - Proportion

$\hat{P}$ = x/n

$\hat{P}$ = 170/250

$\hat{P}$ = 0.68

Step 3 : - Significance level and Confidence interval

a = 0.10 i.e. a = 1 - 0.90 = 0.10,
So the confidence interval is 0.90 or 90%

za/1 as it’s a one tail test,
0.10/1 = 0.10

From the Z table for 0.10 we get Standard Deviation as -1.28
Step 4 : -

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

Z = 0.68 – 0.60/(0.60)(0.40)/250

Z = 0.08/0.0309838668 = 2.58

As 2.58 > - 1.28, We accept the Null Hypothesis

Step 5 : -

There is enough evidence to support the idea that vehicle owner 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

<u>Answer: -</u>

Value = Percentile/100*(n+1)

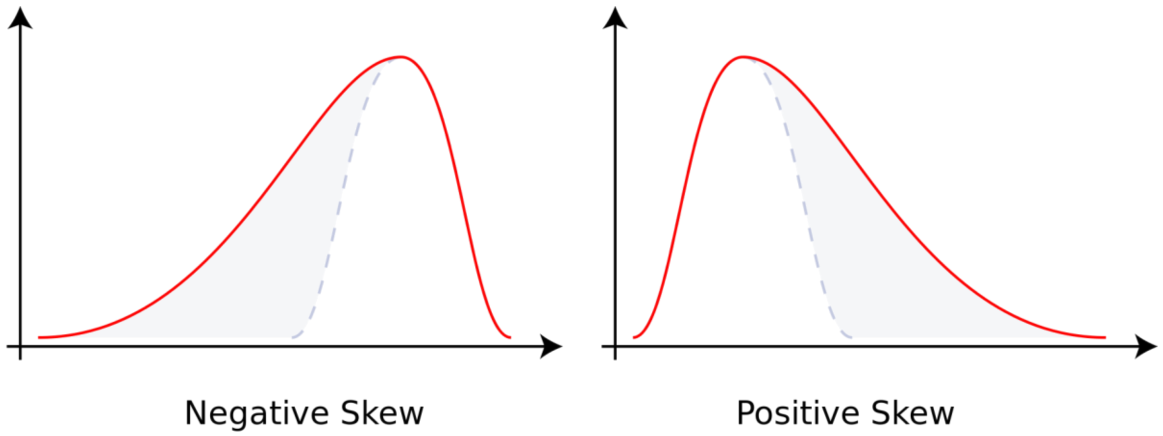
= 99/100*(20+1)

= 99/100*21

= 20.79 Index
As there is 20 numbers in distribution and we got 20.79 as Index so the value that exist at 20.79 Index is 12.

Value that exist at 20.79 Index is 12

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



For a negatively skewed frequency distribution, the relation between mean median and mode is:
Mean < Median < Mode

Example: - Life Span of Human being

The human life cycle is a classic example of negatively skewed frequency distribution. This is because most people tend to die after reaching an average age, while only a few people die too soon or too late. Hence, the representation is clearly left or negatively skewed in nature.

For a positively skewed frequency distribution, the relation between mean median and mode is:
Mean > Median > Mode

Example: - Wealth Distribution

Income distribution is a prominent example of positively skewed distribution. This is because a large percentage of the total people residing in a particular state tends to fall under the category of a lowincome earning group, while only a few people fall under the high-income earning group. The mean of such data is generally greater than the other measures of central tendency of data such as median or mode.