Q1) Plot a histogram,
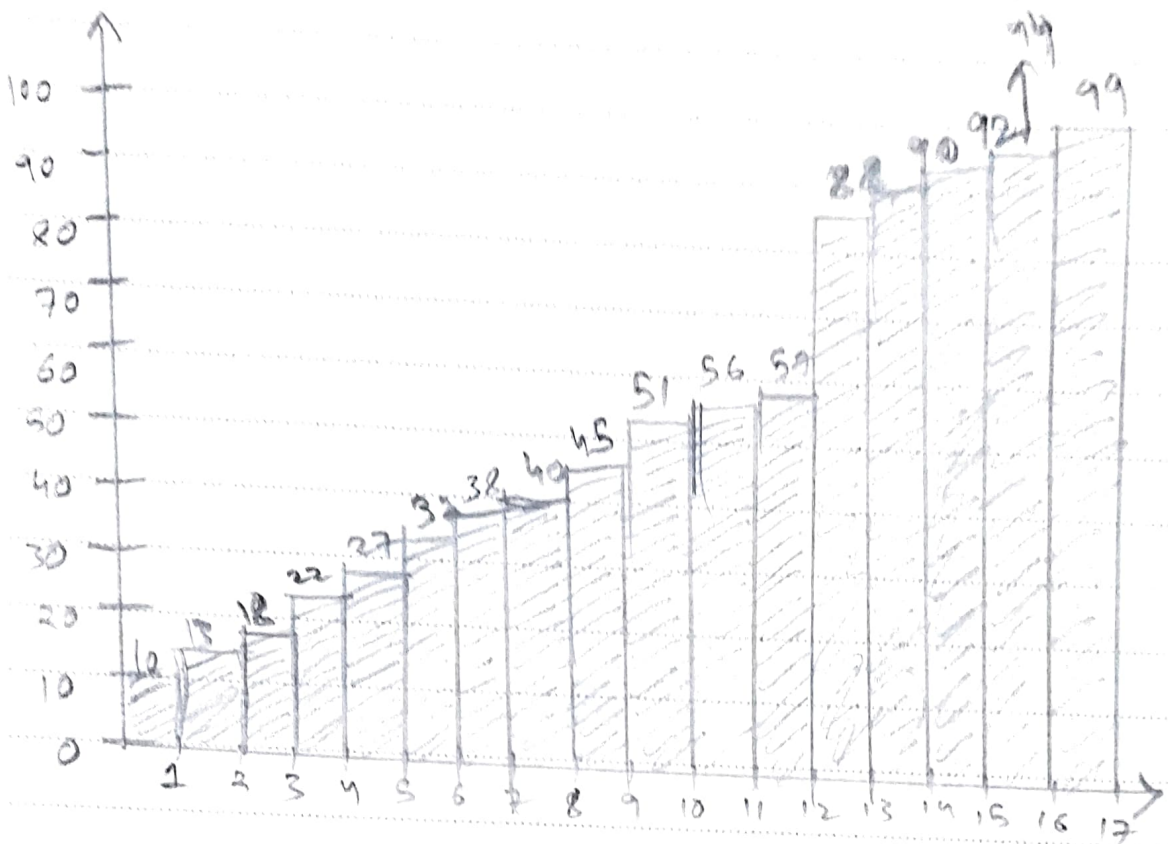
10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

Ans —

Q2) In a Quant test of the CAT exam, the populat Standard deviation is known to be 100. A Sample of 25 test taken has a mean of 520. Construct an 80% CI about the mean?

Ans- given:-

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

Since σ is given Z test. $CI = 80\%$.

i.e. $\alpha = 0.2$

$CI = \bar{x} \pm$ Margin of error $= 520 \pm Z_{\alpha/2} \dfrac{\sigma}{\sqrt{n}}$

$= 520 \pm 0.85 \times \dfrac{100}{\sqrt{25}}$

$= 520 \pm \dfrac{\overset{17}{\cancel{85}}}{\cancel{5}}$

$= 520 \pm 17$.

| CI:- | Lower fence $= 503$ | Ans |
| | Upper fence $= 537$ | |

Q3) A car believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager dis agrees with this. He conducted a hypothesis testing surveying 250 residents and 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.

Ans – Ho (null hypothesis) = The percentage of people owning a car $\leq 60\%$.

Ha (alternate hypothesis) = The percentage of people owning a car $> 60\%$.

$n = 250$, $x = 170$

proportion $(\hat{P_0}) = \dfrac{170}{250} = \boxed{0.68}$

$P_0 = \boxed{0.6}$

$q_0 = 1 - 0.6$

$= \boxed{0.4}$

$\hat{q_0} = 1 - 0.68 = \boxed{0.32}$

$\alpha = 0.01$ as $CI = 90\%$

$Z_{test} = \dfrac{\hat{p} - P_0}{\sqrt{\dfrac{P_0 q_0}{n}}} = \dfrac{0.68 - 0.60}{\sqrt{\dfrac{0.60 \times 0.40}{250}}}$

$= \dfrac{0.08}{0.031}$

$\boxed{2.58}$

At $\alpha = 0.01$, Z table we have from

Z value $= 1.29$

Since Z score $= \boxed{2.58 > 1.29}$, we reject the null hypothesis.

Conclusion :– The manager is right and the vehicle ownership is more than 60%.

Q4> what is the value of the 99 percentile

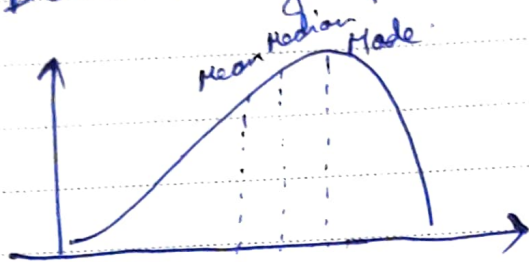1, 2, 3, 4, 5, 5, 5, 6, |7, 8|, 8, 8, 8, 8, 9, 9, 10, 11, 11,

Ans - Index = $\dfrac{Percentile}{100} \times n$

$= \dfrac{99}{100} \times 20 = 9.9$ (Average of 9th and 10th Index)

Value = $\dfrac{7+8}{2} = \dfrac{15}{2} = \boxed{7.5}$

Q5> In left and Right - skewed data, what is the relationship b/w mean, median & mode? Draw the graph to represent the same.
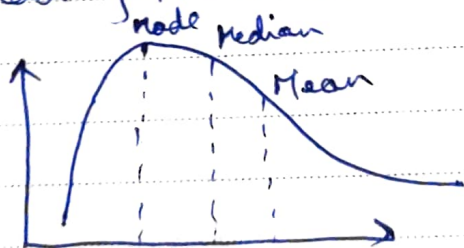

Mean Median Mode

For left skewed data -

Mean < Median < Mode

The reason being most of the values are towards the left side (tail) of the distribut⁴, thus the mean is towards the left i.e small ~~that of the values are located~~

Mode Median Mean

For right skewed data

The reason being most of the values are towards the right side (tail) of the distribut⁴, thus the mean is towards the right i.e large |Mean > Median > Mode|