Que 1) Plot a histogram,

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

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.

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.

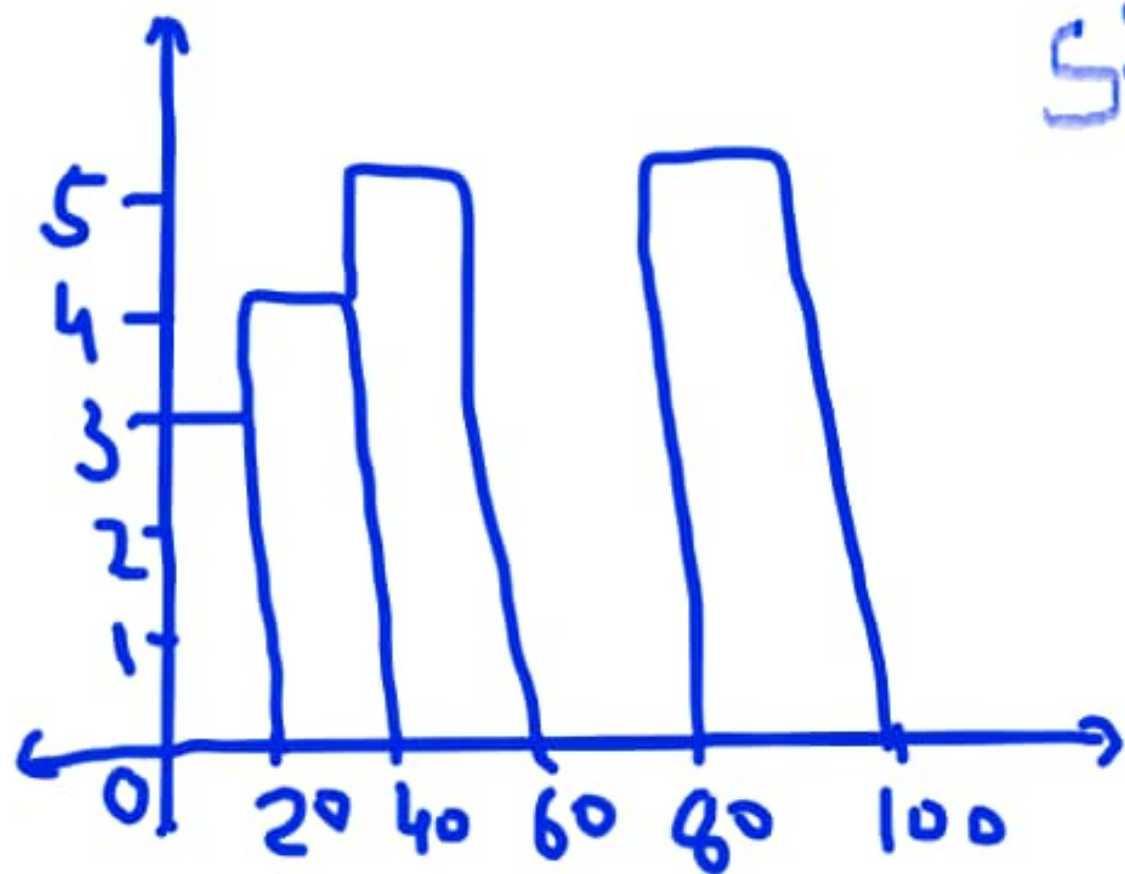Que 4) What is the value of the 99 percentile?

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.

bin = 5
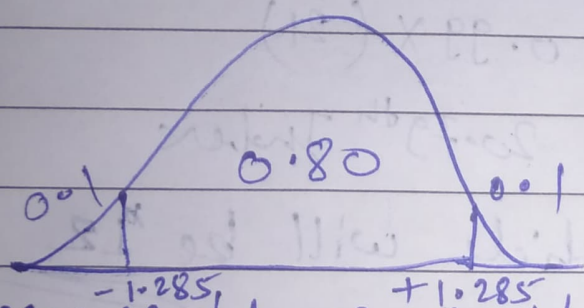
Size = 20

②

Solution for 2nd problem.

Given data :— | To do :
   $\sigma = 100$ | Construct 80% CI
   $n = 25$ | about the mean
   $\bar{X} = 520$

Sol :→ here σ is given so we will
         use Z table

CI = 0.80

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

$= 1 - 0.80$

$\boxed{\alpha = 0.2}$

because we are considering
that data is
normally Distributed. (because
                              of
we know.   symetric
                              Data)

$\boxed{Z_{0.1} = Z_{0.9}}$

Point estimate $= \bar{X} \pm Z_{\alpha/2} \dfrac{\sigma}{\sqrt{n}}$

$= 520 \pm Z_{0.1} \left(\dfrac{100}{5}\right)$

$= 520 \pm 1.285 (20)$

here we get,
lower fence $= 494.3$
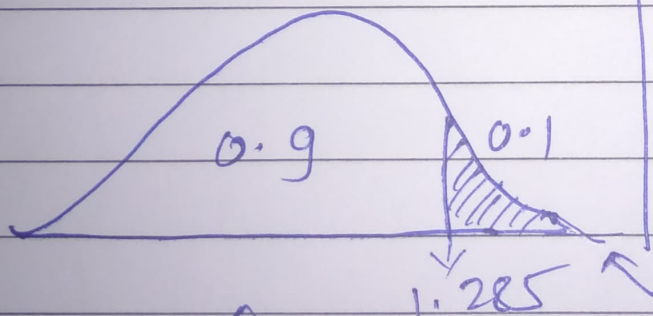higher fence $= 545.7$

Q.3. Sol^n :→

@

$H_0 \Rightarrow P_0 \leq 0.60$

$H_a \Rightarrow P_0 > 0.60$

$n = 250 \quad \Rightarrow \hat{P} = \dfrac{170}{250} = 0.68$

$X = 170$

∴ $P_0 = 0.60$ then $q_0 = 1 - P_0$

$\qquad = 1 - 0.60$

This will be 1 tail test $\quad = \underline{0.40}$

$\alpha = \underline{0.10}$

by looking in the Z table we get

$Z = 1.285$

$Z = \dfrac{\hat{P} - P_0}{\sqrt{\dfrac{P_0 q_0}{n}}} = \dfrac{0.68 - 0.60}{\sqrt{\dfrac{0.60 \times 0.40}{250}}}$

$Z = \dfrac{0.08}{0.03098} = \underline{2.58}$

Hence we will Rejected the null hypotheses.

Q.④. Value of 99th percentile.

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

n = 20

99th percentile = $\left[\dfrac{99}{100} \times (n+1)\right]^{th}$ Index

$= 0.99 \times (21)$

$= 20.79^{th}$ Index

hence 99th percentile will be 12
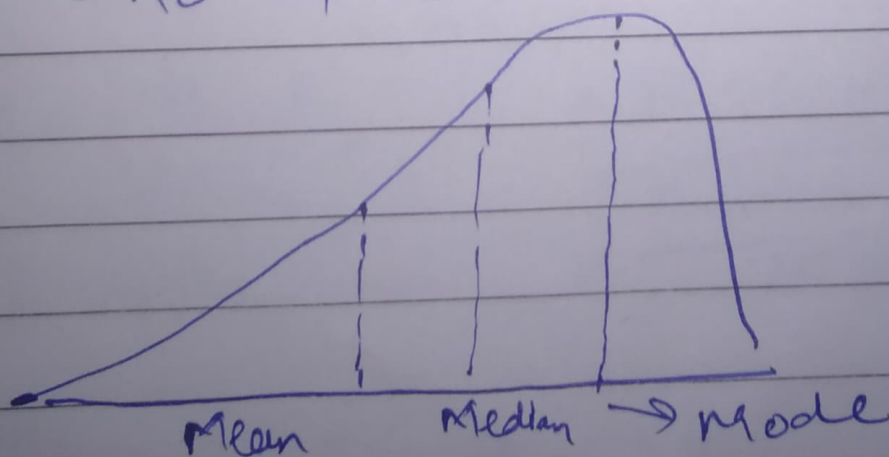
But from python code it is showing 11.80

Q.5:

Relationship between left & Right Skewed
Mean, Median, Mode.

Right Skewed Data.

Mode   Median   Mean

$\therefore$ Mode < Median < Mean.

Left Skewed Data

Mean   Median   → Mode

$\therefore$ Mean < Median < Mode.