Question 1 = 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92
94, 99

class Interval	No
10-20	3
20-30	2
30-40	2
40-50	2
50-60	3
60-70	
70-80	
80-90	1
90-100	4

Bin Size = 10

y

3

2

1

10-20 20-30 30-40 40-50 50-60 60-70 70-80 80-90 90-100 x
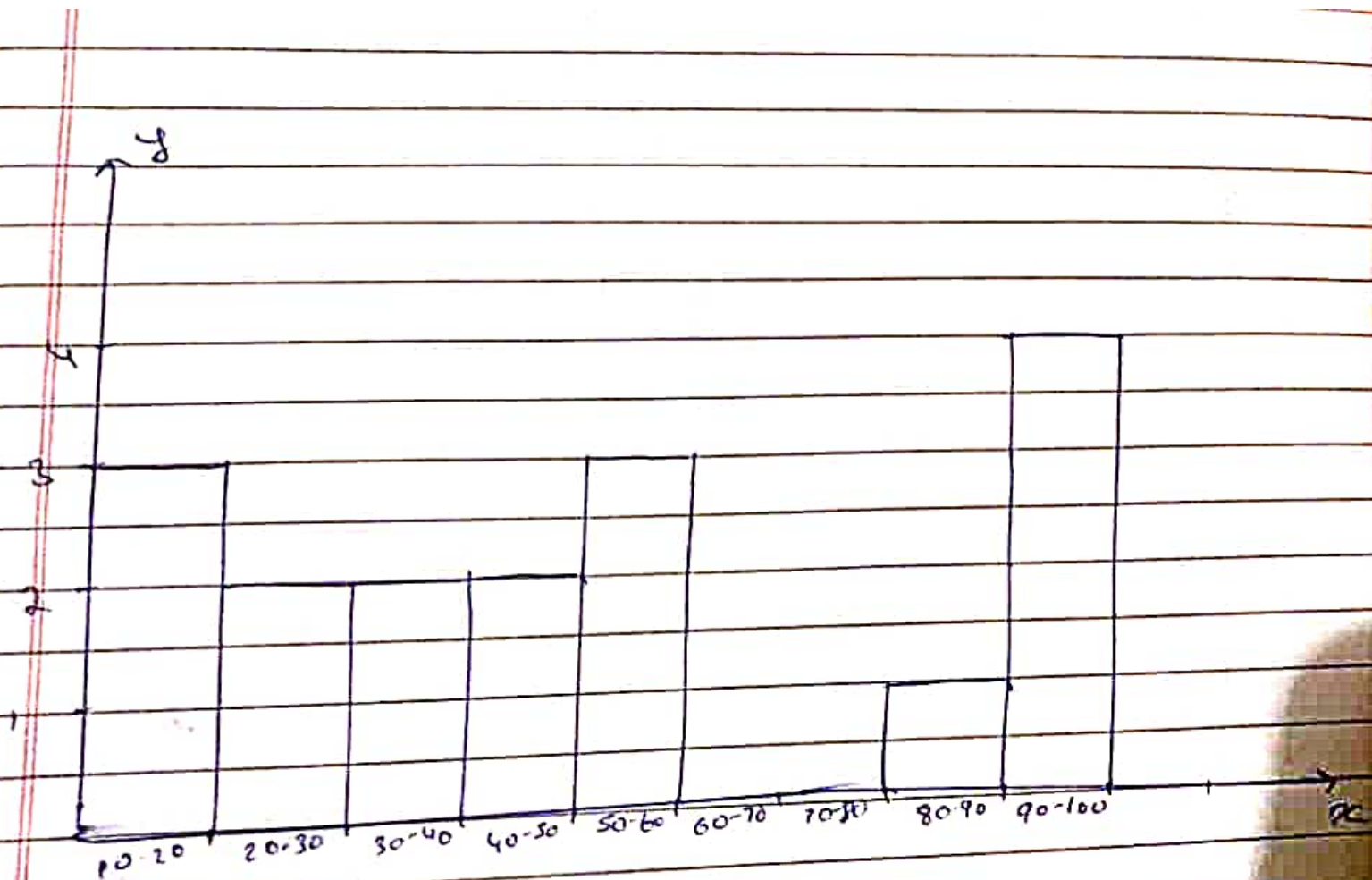
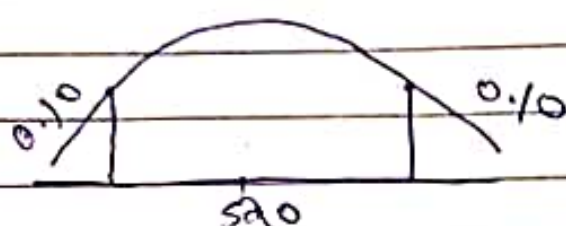**Question 2 :** In the Quant test of CAT exam, the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct a 80% CI about mean.

Sol:

$\sigma = 100$, $n = 25$, $\bar{x} = 520$, $CI = 80\%$.

$L = 1 - CI = 1 - 0.80 = 0.2$

Point estimate $\pm$ margin of error

$$\bar{x} \pm z_{L/2} \frac{\sigma}{\sqrt{n}}$$
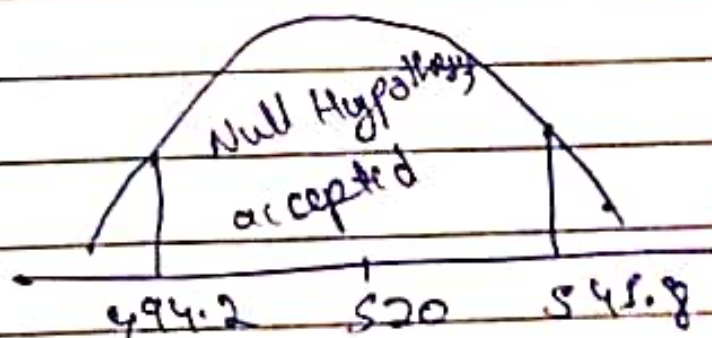
$z_{L/2} = \dfrac{0.2}{2} = 0.1$

$= 1 - 0.1 = 0.9 = \boxed{1.29}$

Lower fence $= \bar{x} - z_{L/2}\left(\dfrac{\sigma}{\sqrt{n}}\right)$

$= 520 \cdot 494.2$

Higher fence : $\bar{x} + z_{L/2}\left(\dfrac{\sigma}{\sqrt{n}}\right)$

$= 545.8$

Null Hypothesis accepted

494.2   520   545.8

Question.

A Car Company believes that the Percentage of residents in City A.B.C that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducts a Hypothesis testing surveying 250 residents and found that 170 respondes yes to owing a vehicle

(A) State the null and 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?

Solution

Null Hypothesis $H_0 = P_0 = 60\%$
Alternate Hypothesis $H_1 = P_0 \neq 60\%$

$q_0 = 40\%$ i.e
0.40

$m = 250$
$x = 170$
$\hat{P} = \dfrac{x}{m} = \dfrac{170}{250} = 0.68$

Significance level = 10%
Confidence interval = 90%

0.10

One tail test

$$z\text{-test} = \dfrac{\hat{P} - P_0}{\sqrt{\dfrac{P_0 q_0}{m}}}$$

$$= \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}} = 2.653$$

$\Rightarrow$ $2.6537 - 2.32$ (Accept the null Hypothesis)

$\Rightarrow$ P value $= 0.99598 > 0.10$ (Accept the null Hypothesis)

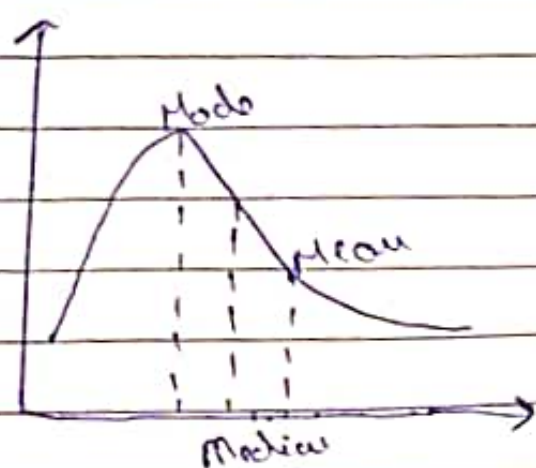**Ques 4:** 2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 99, 10, 11, 11, 12
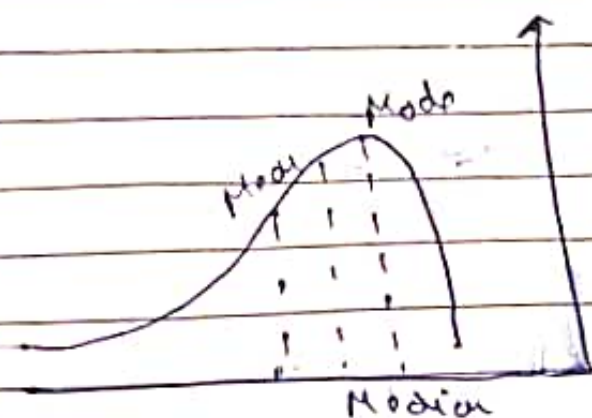
$$\frac{Percentile}{100} \times n + 1$$

$$= \frac{99}{100} \times (20 + 1)$$

$$= 20.79$$

$$\boxed{12}$$

Relationship b/w mean/median and mode

Mean > Median > Mode
eg: Wealth distribution

Mode > Median > Mean
eg: life span