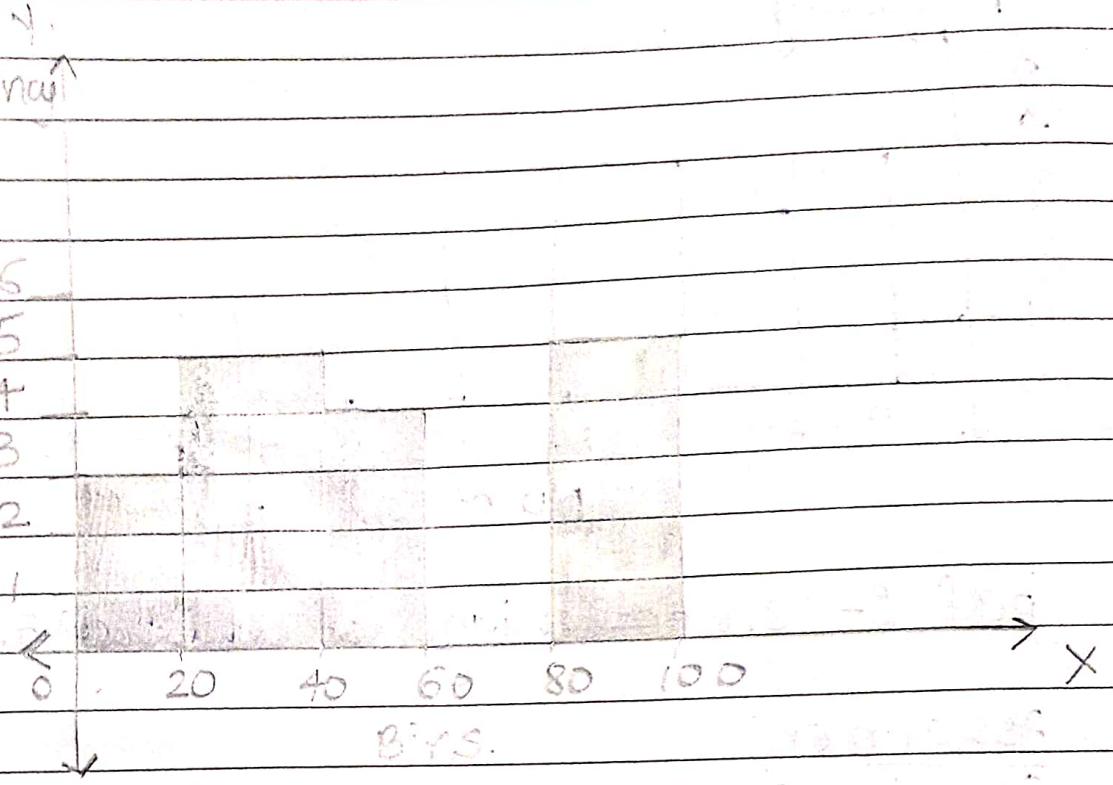
Date
Page

25/0

Q.①



Q.② What is the value of the 99 percentile?

1, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12

Ans 99 percentile = $\frac{\text{Percentile}}{100} \times (n+1)$

$= \frac{99}{100} \times (79+1)$

$= \frac{99}{100} \times 20$

$= 19.8$ ← index

12 is the 99 percentile.

Q.③ Why sample variance is divided by n-1?

Ans ① When you have an entire population and calculate any parameter (population variance or population standard deviation) your results will be accurate. This is because we have the entire data.

② When we work with the sample we have only a part of the population. Our answers won't be that accurate.

③ So here we will have sample statistic $\bar{x}$ instead of μ, so any x-value in our sample will be closer to $\bar{x}$ then μ.

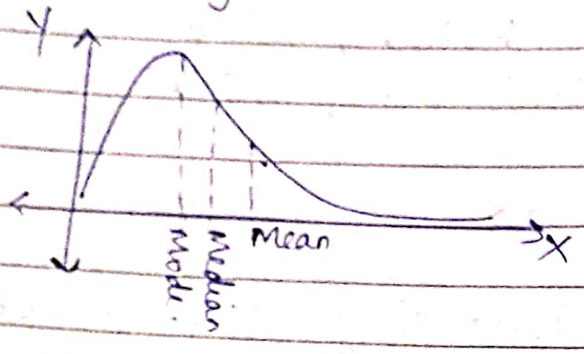
④ So therefore $\sum_{i=1}^{N} (x_i - \mu)^2 > \sum_{i=1}^{n} (x_i - \bar{x})^2$

⑤ If we are interested in finding sample mean and want to extrapolate our findings to the population, Bessel's correction (n-1 in the denominator) is needed.

Q. ③. Skewness.

Ans) Skewness refers to asymmetry.
There are three types of skewness.

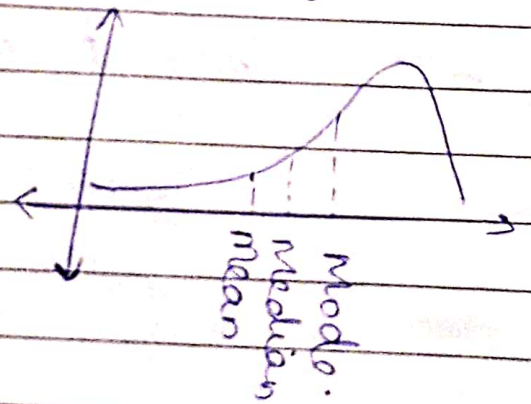
① Positively skewed.



mean > median > mode.

Eg. ① Wealth Distribution.
most people have money (income) ranging from 20k - 50k. Very few people have income starting from 100k.

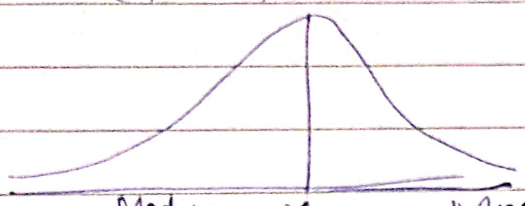
② Negatively skewed.



Mode > Median > Mean.

Eg. Covid - 19
At the beginning the cases very few in number but eventually got risen.

③ Symmetrical



Mean = Median = Mode

Eg. Blood pressure, weight, height, etc.

Most people will have the normal blood pressure 120/80 and some may have extreme low or extreme high due to adversities in their B.P.

Q.5 (*) Null hypothesis :- $H_0: P_0 \leq 0.6$

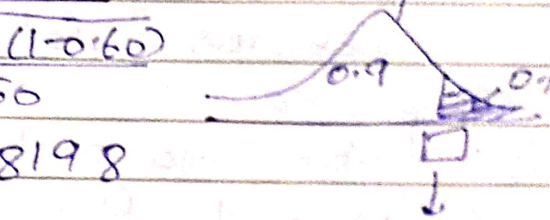
Alternative hypothesis :- $H_1: P_0 > 0.6$

$n = 250$ $\quad \hat{p} = \frac{170}{250} = 0.68$ $\quad$ 68% claimed they have vehicle in sample survey

$\alpha = 10\%$

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times (1-0.60)}{250}}}$$

$$= 2.58198$$



Check 0.9 in the Z-table

$Z_{cal} > Z_{tabulated}$

Reject H_0.

$Z_{tab} = (1.29)$

The sale's manager's claim is accepted that more than 60% people own a vehicle.