

Q2.  $\sigma = 100$ ,  $n = 25$ ,  $\bar{x} = 520$

CI = 80%

$\alpha = 0.2$

$\alpha/2 = 0.1$

$Z(\alpha/2) = 1 - 0.1 = 0.9$

$Z(0.9) = 1.29$

from Z-table

point estimate  $\pm$  margin of error

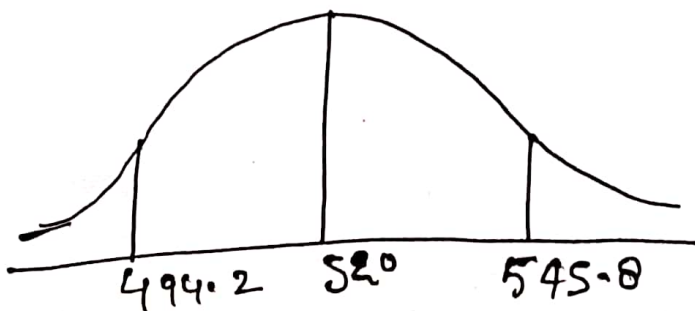
$\bar{x} \pm Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}}$

Higher fence -  $\bar{x} + Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}}$

$520 + 1.29 \times \frac{100}{\sqrt{25}}$

$= 545.8$

Lower fence -  $520 - 1.29 \times \frac{100}{\sqrt{25}} = 494.2$



Q.2 — ①  $H_0: \mu \leq 60$   
 $H_1: \mu > 60$

$n = 250$

$\bar{x} = 170$

$\hat{p} = \frac{\bar{x}}{n} = \frac{170}{250}$

②

③

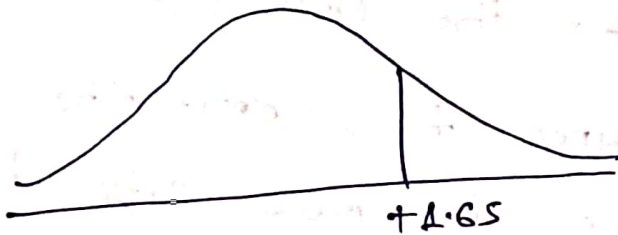
$p_0 = 1 - q_0$

$1 - 0.60 = 0.40$

$0.68$

④  $\alpha = 0.1$

⑤ Decision Boundary =  $z_{\alpha/2} = 0.05$   
 $1 - 0.05 = 0.95$   
 $z(0.95) = 1.65$



⑥ Z-test with Proportion →

$$\text{Z-test} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.40}{\sqrt{\frac{0.40 \times 0.60}{250}}}$$

$\frac{0.28}{0.0309} = 9.061$

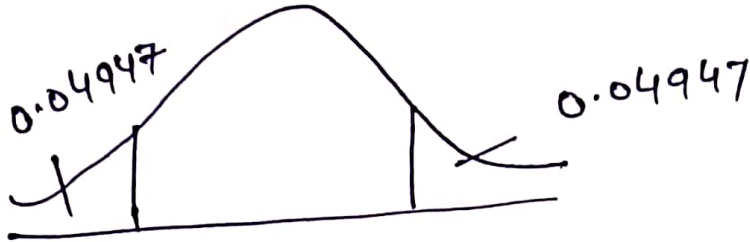
$9.061 > 1.65$  — Reject the Null Hypothesis,

(4)

p-value -

$$Z(1.65) = 0.95053$$

$$1 - 0.95053 = 0.04947$$



$$(0.04947 \times 2) = 0.09894$$

$$p = 0.09894 < 0.1 \quad \text{---} \quad \text{Reject Null Hypo.}$$

Conclusion - Reject the Null Hypo.  
 there is NO evidence to support the Idea  
 that vehicle owner in ABC city is 60%  
 or Less.

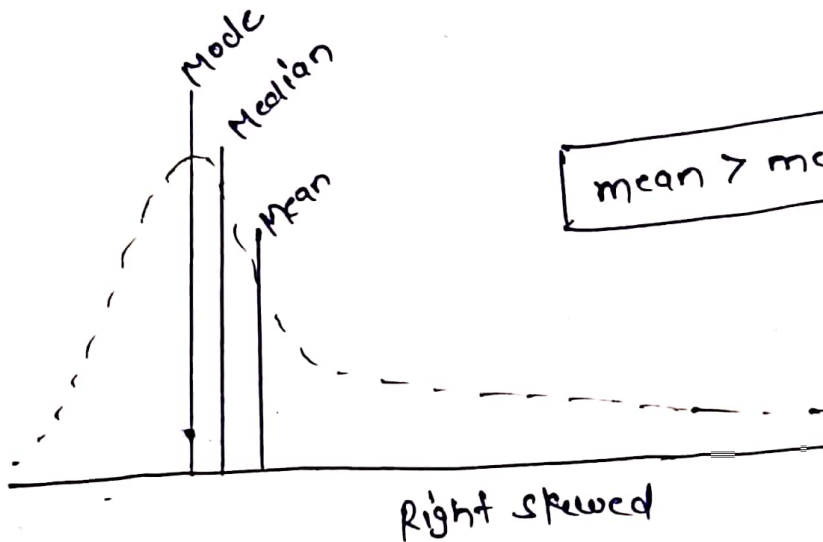
Q4 - 2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12

Soln 
$$Val = \frac{\text{percentile}}{100} \times (n+1)$$

$$Val = \frac{99}{100} \times 21 = 20.79 \text{ (Index)}$$

Val = 12 (Ans)

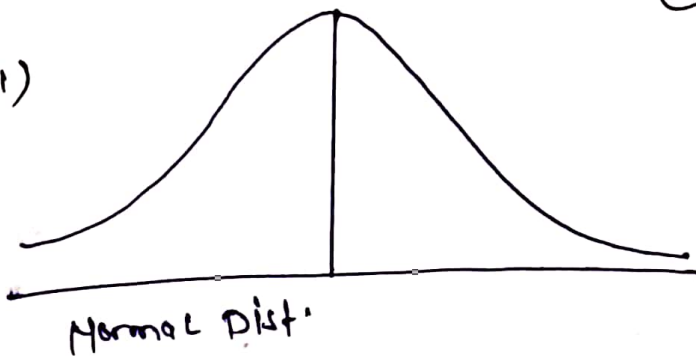
Q.5



mean > median > mode

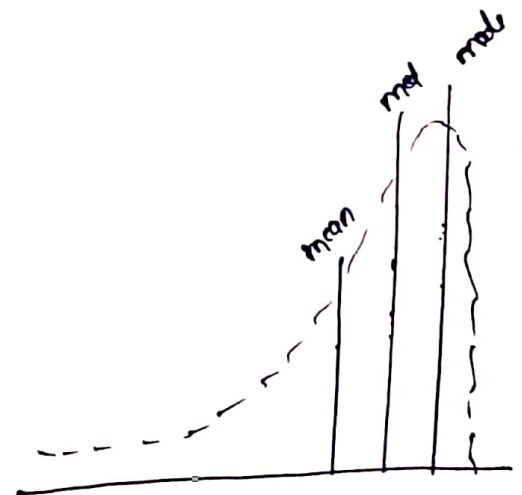
Ex - Wealth distribution.

(i)



mean  $\approx$  median  $\approx$  mode

Ex - Iris dataset  
Height Dist.



mode > med. > mean

Ex. Life span of Human Being.

# Assignment - 1

①

## Q. 1 Histogram

10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57,

88, 90, 92, 94, 99

Soln

