

3/7/2022

Q.) 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% C.I. above the mean.

Sol:-  $\bar{x} = 520$ ,  $n = 25$ ,  $\sigma = 100$ , C.I. = 80%.

$$\Rightarrow \bar{x} \pm z_{\alpha/2} \left[ \frac{\sigma}{\sqrt{n}} \right]$$

$$\Rightarrow 520 \pm z_{\frac{0.20}{2}} \left[ \frac{100}{\sqrt{25}} \right]$$

$$\Rightarrow 520 \pm z_{0.10} \left[ \frac{100}{\sqrt{25}} \right]$$

$$\alpha = 1 - 0.80$$
$$\alpha = 0.20$$

$$\frac{z_{\text{test}}}{1 - 0.10} = 0.90$$
$$z_{\text{table}(0.90)} = 1.29$$

$$\underline{\text{Lower fence}} = \bar{x} - z_{\alpha/2} \left[ \frac{\sigma}{\sqrt{n}} \right]$$

$$= 520 - 1.29 \left[ \frac{100}{\sqrt{25}} \right]$$

$$= 520 - 1.29 \times 20$$

$$\boxed{L.F = 494.2}$$

$$\underline{\text{Higher fence}} = \bar{x} + z_{\alpha/2} \left[ \frac{\sigma}{\sqrt{n}} \right]$$

$$= 520 + 1.29 \left[ \frac{100}{\sqrt{25}} \right]$$

$$= 520 + 1.29 \times 20$$

$$\boxed{H.F = 545.8}$$

