

Ass. Ques.

In a Quant test of the CAT exam, the population std. deviation is known to be 100. A sample of 25 tests taken has a mean of 520.

Construct an 80% confident interval about the mean.

Ans :- Given -

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

$$\& \text{ Confidence Interval} = 80\%. \quad \boxed{\therefore \alpha = 0.02}$$

(C.I.) (1 - C.I.)

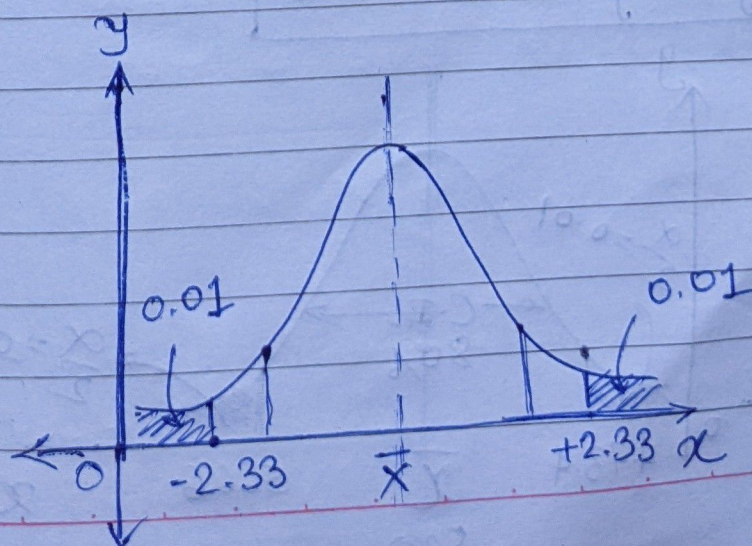
Step ① As population std. deviation is given, We shall use Z-test.

② And we need to find, Margin of Error.

$$\text{Margin of Error} = Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$Z_{\alpha/2} = Z_{\frac{0.02}{2}} = Z_{0.01}$$

From Z-table :- $Z_{0.01} = 2.33$ (std. dev. value)



$$\begin{aligned}\therefore \text{Error} &= Z_{0.01} \times \frac{\sigma}{\sqrt{n}} \\ &= 2.33 \times \frac{100}{\sqrt{25}} \\ &= 2.33 \times \frac{100}{5} \times 20\end{aligned}$$

$$\therefore \text{Error} = 46.6$$

Step ③ Lower Fence = Point estimate - Margin Error

$$\begin{aligned}&= \bar{x} - Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}} \\ &= 520 - 46.6\end{aligned}$$

$$\therefore \text{Lower Fence} = 473.4$$

Higher Fence = Point Est. + Margin of Error

$$\begin{aligned}&= \bar{x} + Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}} \\ &= 520 + 46.6\end{aligned}$$

$$\therefore \text{Higher Fence} = 566.6$$

Step ④

