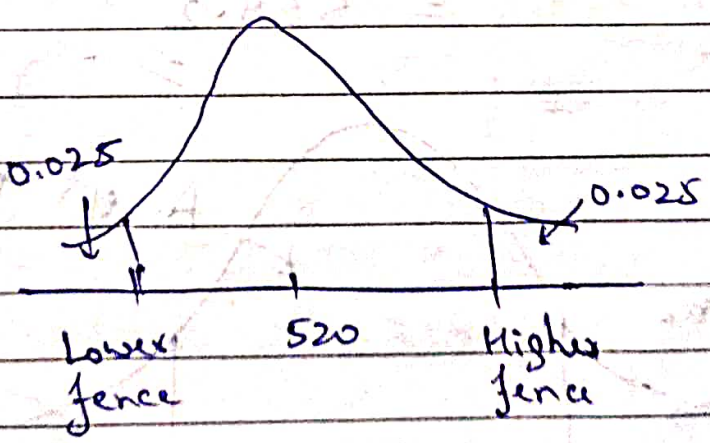
Q. In the Quant test of CAT exam, the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct a 95% CI about mean.

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

C.I. = 95%.

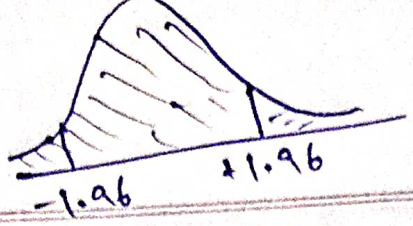
$\alpha = 1 - 0.95$

$\alpha = 0.05$



Point Estimate ± Margin of Error

$$\bar{x} \pm Z_{\alpha/2} \boxed{\frac{\sigma}{\sqrt{n}}} \Rightarrow \text{Standard Error}$$



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z-score table

z-test

$Z_{\alpha/2} = Z_{\frac{0.05}{2}} = Z_{0.025} = 1.96$

Lower fence $= \bar{x} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$

$= 520 - 1.96 \frac{100}{\sqrt{25}}$

$= 520 - 1.96 \times 20$

$= 480.8$

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

$= 520 + 1.96 \frac{100}{\sqrt{25}}$

$= 520 + 1.96 \times 20$

$= 559.2$