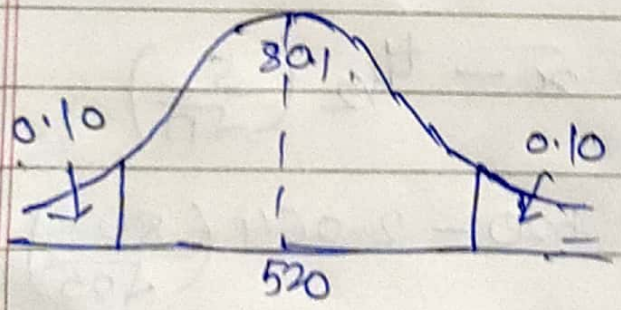
Ans 17) Q) In the Quant test of CAT Exam, the population std. deviation is known to be 100. A sample of 25 test takes has a mean of 520. construct a 80% confidence interval about mean?

→ $\sigma = 100$, $n = 25$, $\bar{x} = 520$, C.I. = 80%, $\alpha = 0.2$.

Population std. deviation is given

use Z-test (Z-table)



$\alpha = 1 - 0.80$

$\alpha = 0.20$

$\therefore C.I. = \bar{x} \pm Z_{\alpha/2}\left(\frac{\sigma}{\sqrt{n}}\right)$

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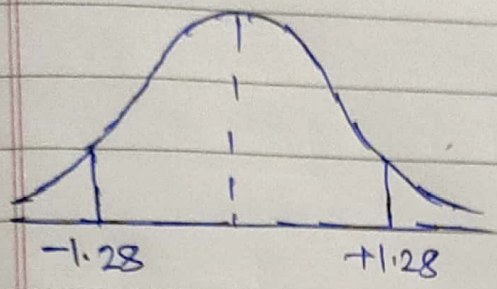
$\therefore Z_{\alpha/2} = Z_{\frac{0.20}{2}} = Z_{0.10}$

From Z-table

$\therefore Z_{0.10} = -1.28$ (closest value to $0.10 = 0.10027$)

$Z_{0.90} = +1.28$ (closet value to $0.90 = 0.89973$)



$\therefore$ Lower Fence $= \bar{x} - Z_{\alpha/2}\left(\frac{\sigma}{\sqrt{n}}\right)$

$= 520 - 1.28\left(\frac{100}{\sqrt{25}}\right)$

$= 520 - 1.28\left(\frac{100}{5}\right)$

$= 520 - 1.28(20)$

$= 494.4$

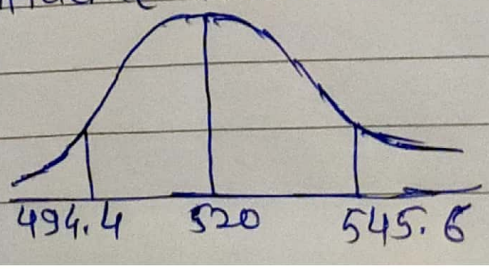
Higher Fence $= \bar{x} + Z_{\alpha/2}\left(\frac{\sigma}{\sqrt{n}}\right)$

$= 520 + 1.28\left(\frac{100}{\sqrt{25}}\right)$

$= 520 + 1.28(20)$

$= 545.6$

$\therefore$ confidence Interval is



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