(1) In a Quant test of CAT exam, population S.D. is 100. A sample of 25 test takers has ~~sample~~ mean 520. Construct an 80% C.I. about mean.

Given: $\sigma = 100$; $\bar{x} = 520$; $n = 25$.

Significance Value (α) = 1 − Confidence Interval

$= 1 - 80\%$

$\alpha = 0.20$

Parameter = Point Estimate ± Margin of Error

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

Higher Fence $= 520 + Z_{0.10} \frac{100}{\sqrt{25}}$

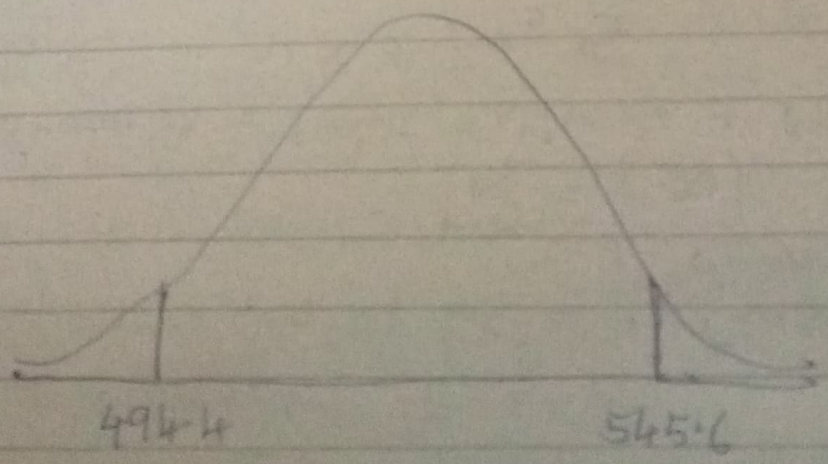
$= 520 + (1.28 \times 20)$

Higher Fence = 545.6

Lower Fence $= 520 - Z_{0.10} \times 20$

$= 520 - (1.28 \times 20)$

Lower Fence = 494.4



② In a company there are 100k employees. We need to order L & XL T shirts for them. For sample 500, there are 300 XL and 200 L T shirts. How many XL & L T shirts need to be ordered.

XL T-shirt: $n_1 = 300$, $\bar{x} = 500$, s (Sample S.D) $= 150$

Degrees of freedom $= n_1 - 1 = 299$.

Lower Fence $= 500 - t_{299/2} \, s/\sqrt{n}$

$= 500 - 1.6551 \times \frac{150}{\sqrt{300}} = \boxed{485.67}$

$\boxed{\text{Higher Fence} = 500 + 14.334 = 514.334}$

2nd L T-shirt:

$n_2 = 200$, $\bar{x} = 500$, $s = 150$

Lower Fence $= 500 - t_{99.5}\left(\frac{150}{\sqrt{200}}\right) = 500 - 17.614$

$\boxed{\text{Lower Fence} = 482.39.}$

Higher Fence $= 500 + 17.614 =$

$\boxed{\text{Higher Fence} = 517.614}$