MA 381 HW 15 Solutions

#2 i. 90% CI for μ = avg. capacity:

$\bar{x} = 178$

$s = 14 \Rightarrow \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \cong \frac{s}{\sqrt{n}} = \frac{14}{\sqrt{120}} = 1.278$

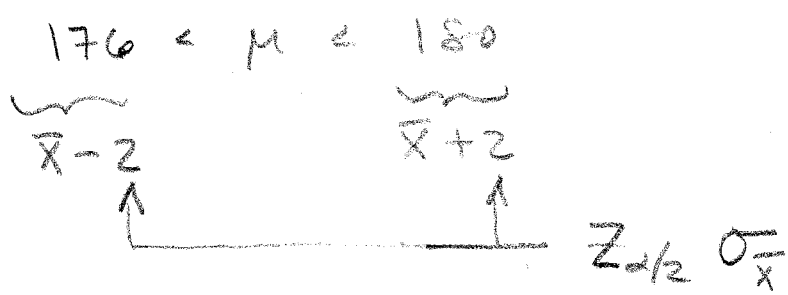
$z_{\alpha/2} = 1.645$

$\therefore$ 95% CI: $(\bar{x} - 1.645\sigma_{\bar{x}},\ \bar{x} + 1.645\sigma_{\bar{x}})$

$= (178 - 1.645(1.278),\ 178 + 1.645(1.278))$

$= (175.90,\ 180.10)$

ii.



$2 = z_{\alpha/2}\sigma_{\bar{x}} \cong z_{\alpha/2}\,1.278$

$\therefore z_{\alpha/2} = \frac{2}{1.278} = 1.565$

Since $\Phi(-z_{\alpha/2}) = \alpha/2$

$\Phi(-1.565) \cong \Phi(-1.56) = .0594$

$\therefore 100(1-\alpha)\% = 100(1-2(.0594))\% \cong \underline{88\%}$