I. $n = 52 \rightarrow$ sufficiently Large!

$\bar{X} = 90.9$

$s = 3.8$

(A) $99\% \Rightarrow \alpha = .01$

$\Rightarrow \alpha/2 = .005$

$d.f. = n-1 = 52-1 = 51$

$\Rightarrow t_{\alpha/2} = 2.676$

so $\bar{x} \pm t_{\alpha/2}\, s/\sqrt{n}$ $d.f. = n-1$

$\Rightarrow 90.9 \pm (2.676)\left(3.8/\sqrt{52}\right)$

$\Rightarrow 90.9 \pm (2.676)(.527)$

$\Rightarrow \boxed{90.9 \pm 1.410}$ $\Rightarrow$ Remember, there is never a penalty for rounding difference as long as you SHOW YOUR WORK!

(B) $90\% \Rightarrow \alpha = .10$

$\Rightarrow \alpha/2 = .05$

$d.f = 51$

$\Rightarrow t_{\alpha/2} = 2.008$

so we have: $\bar{x} \pm t_{\alpha/2}\left(s/\sqrt{n}\right)$ $d.f. = n-1$

$\Rightarrow 90.9 \pm (2.0008)\left(3.8/\sqrt{52}\right)$

$\Rightarrow 90.9 \pm (2.008)(.527)$

$\Rightarrow \boxed{90.9 \pm 1.058}$

II $n = 49 \rightarrow$ sufficiently large!

$\bar{X} = 54.6$

$s = 8.2$

$$\left.\begin{array}{l}\alpha = .05 \\ \alpha/2 = .025 \\ d.f. = n-1 \\ \quad = 49-1 \\ \quad = 48\end{array}\right\} \Rightarrow t_{\alpha/2} = 2.011$$

so $\Rightarrow \bar{X} \pm t_{\alpha/2}\, s/\sqrt{n}$ $\quad d.f. = n-1$

$\Rightarrow 54.6 \pm (2.011)\left(8.2/\sqrt{49}\right)$

$\Rightarrow 54.6 \pm (2.011)(1.171)$

$\Rightarrow \boxed{54.6 \pm 2.356}$

III. $n = 8 \Rightarrow$ NOTE: "Normally Distributed" is given, so any sample size is sufficiently large.

$\bar{X} = 2958.75$

$s = 39.26$

$$\left.\begin{array}{l}\alpha = .05 \\ \alpha/2 = .025 \\ d.f. = n-1 \\ \quad = 8-1 \\ \quad = 7\end{array}\right\} \Rightarrow t_{\alpha/2} = 2.365$$

so $\bar{X} \pm t_{\alpha/2}\, s/\sqrt{n}$ $\quad d.f. = n-1$

$\Rightarrow 2958.75 \pm (2.365)\left(39.26/\sqrt{8}\right)$

$\Rightarrow 2958.75 \pm (2.365)(13.881)$

$\Rightarrow \boxed{2958.75 \pm 13.881}$

IIII. $n = 15 \Rightarrow$ "Normally Distributed" is given, so ANY sample size is sufficiently large

$\bar{X} = 186$

$s = 4.3$

$$\left.\begin{array}{l}\alpha = .05 \\ \alpha/2 = .025 \\ d.f. = n-1 \\ \quad = 15-1 \\ \quad = 14\end{array}\right\} \Rightarrow t_{\alpha/2} = 2.145$$

so

$\Rightarrow \bar{X} \pm t_{\alpha/2}\, s/\sqrt{n}$ $\quad d.f. = n-1$

$\Rightarrow 186 \pm (2.145)\left(4.3/\sqrt{15}\right)$

$\Rightarrow 186 \pm (2.145)(1.110)$

$\Rightarrow \boxed{186 \pm 2.381}$