CONFIDENCE INTERVALS FOR MEANS WITH THE t- DISTRIBUTION

$n \geq 30$ $\quad \bar{x} \pm z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$ $\quad \sigma$ IS KNOWN

$n < 30$ $\quad \left[\bar{x} \pm t_{\alpha/2} \cdot \frac{s}{\sqrt{n}} \right]$ $\quad \sigma$ IS UNKNOWN

- $\bar{x}$: Point estimate
- $t_{\alpha/2}$: Critical value
- $\frac{s}{\sqrt{n}}$: Standard Error

Example: $n = 20$, $\bar{x} = 15$, $s = 1.5$

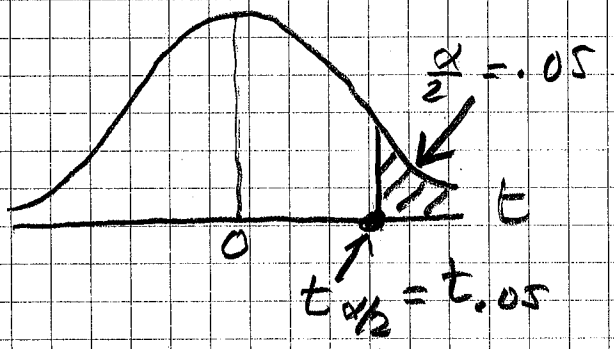
90% C.I for μ

$\alpha = 1 - .90 = .10$

$\alpha/2 = .10/2 = .05$

$df = n - 1 = 19$

$t_{\alpha/2} = 1.729$



90% CI for μ

$15 \pm 1.729 * \frac{1.5}{\sqrt{20}} = (14.42, 15.60)$

We are 90% confident that the population mean, μ, is between 14.42 and 15.60