7.3

C.I. for Mean (σ unknown & $n<30$)
Using Calculator

7.3

Confidence Intervals for the Mean (σ unknown & $n<$

When σ is unknown and $n<30$ we can't use normal to find C.I., we must use t distribution

Characteristics of t-dist.

1. bell-shaped
2. Symmetric about mean
3. mean = median = mode = 0
4. Never touches x-axis

1. Variance >1
2. t-dist. is a group of curves based on "degrees of free
3. as $n \to \infty$, t-dist $\to$ normal

degrees of freedom, d.f. - the number of values that are free to vary after a sample statistic has been computed.

Ex I have 8 numbers, mean = 5, the sum of the #s must be 40 (since $\frac{40}{8} = 5$) So the first 7 numbers can be anything but the 8th number must make the sum 40. So 7 d.f.

So for right now d.f. $= n-1$ (for C.I.)

Formula for C.I. for mean when σ is unknown & $n<30$

$$\bar{X} - t_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right) < \mu < \bar{X} + t_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right)$$

The d.f. $= n-1$

(ex) 1 sample 10 students about age. $\bar{X} = 20$ $s = 1$. Find 90% C.I. for the mean age.

$\bar{X} = 20$, $\alpha = .10$, $\alpha/2 = .05$ $s = 1$ $n = 10$ d.f. $= 9$

$$20 - 1.833\left(\tfrac{1}{\sqrt{10}}\right) < \mu < 20 + 1.833\left(\tfrac{1}{\sqrt{10}}\right)$$

$$19.42 < \mu < 20.58$$

t-dist on pg. 731

Using Your Calculator

Data

1. Enter L_1
2. STAT → TESTS → 8-tInterval
3. DATA
4. Enter stuff
5. Calculate

Stats

1. STAT → TESTS → 8-tInterval
2. Stats
3. Enter stuff
4. Calculate