6.2 Notes – Confidence Intervals for the Mean

(Small Samples)

I. The t – Distribution

In many real-life situations, the ________________________________ is unknown. If the random variable is normally distributed (or approximately normal) the sampling distribution for $\bar{x}$ is a ______________________.

Formula for t – distribution: →

Critical values of t are denoted by ______.

Properties of the t-distribution:

1.

2. degrees of freedom (df) –

3.

4.

5.

Example 1 – use the table:

a. Find the critical value t_c, for a 90% confidence when the sample size is 22.

b. Find the critical value, t_c, for a 95% confidence when the sample size is 15.

c. Find the critical value, t_c, for an 99% confidence when the sample size is 28.

II. Confidence Intervals and t-Distributions

Example 2:

You randomly select 16 restaurants and measure the temperature of the coffee sold at each. The sample mean temperature is 162°F with a sample standard deviation of 10°F. Find the 90% confidence interval for the mean temperature.

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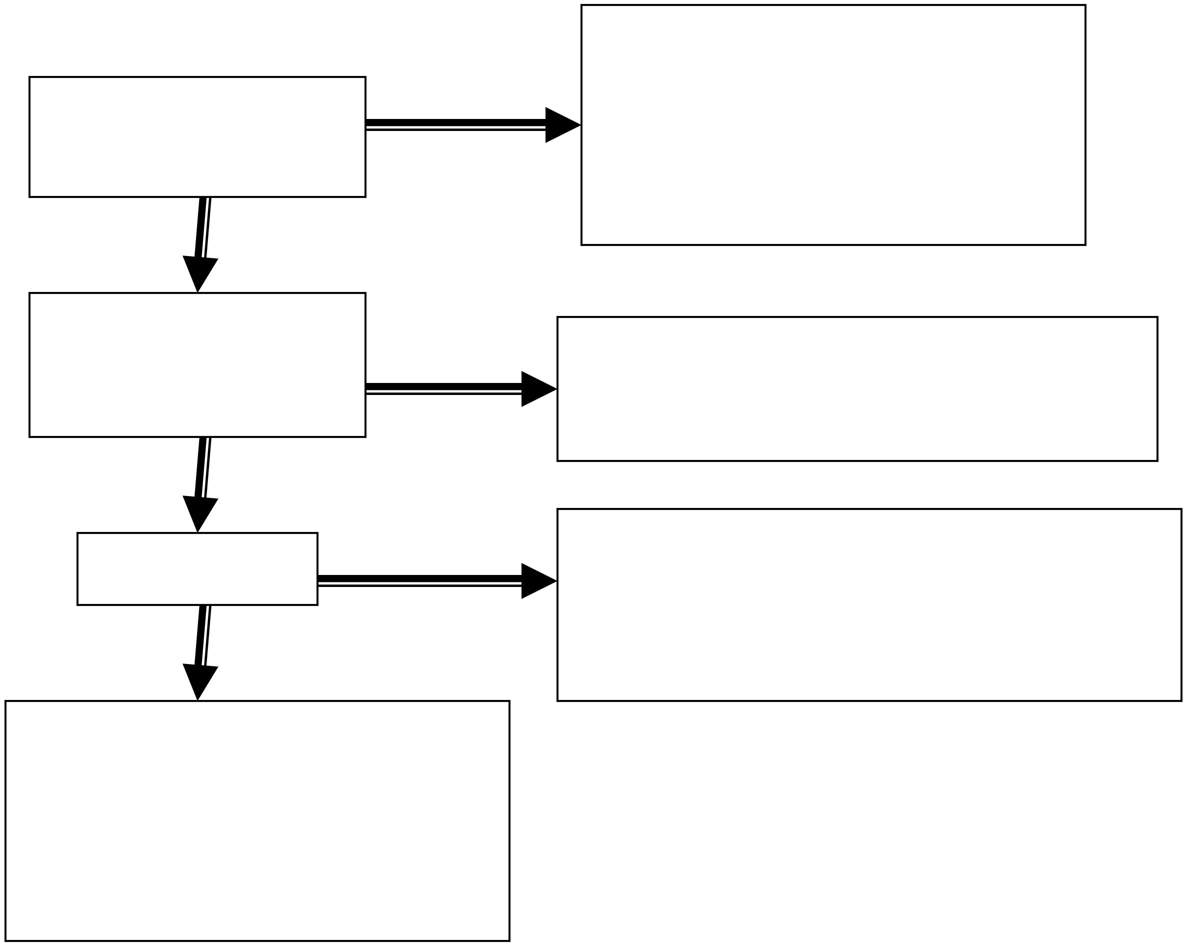
How do you know when to use a normal distribution or a $t-$ distribution to construct a confidence interval?



<u>Example 3:</u>

You randomly select 18 adult male athletes and measure the resting heart rate of each. The sample mean heart rate is 64 beats per minutes with a sample standard deviation of 2.5 beats per minute. Assuming heart rates are normally distributed, should you use the normal distribution or the $t-$ distribution, or neither to construct a 90% confidence interval for the mean heart rate? Find the interval, if possible.