

You have 30 minutes. Take your time!

Name: A. Student ☺

ONE: A general expression for a confidence interval for the mean is:

$$P(\bar{x} - t_{\alpha/2, n-1} \cdot S_x < \mu < \bar{x} + t_{\alpha/2, n-1} \cdot S_x) = 1 - \alpha.$$

Answer the following questions. An example of a perfect answer is given for the first question.

- a. What is \bar{x} ? the sample mean
- b. What is μ ? the population mean
- c. What is α ? type I error rate; "alpha level"; size of test
- d. What is S_x ? the standard error of the mean
- e. What is t ? the "quantile" from the t distribution

- f. Could we use something other than $t_{\alpha/2, n-1}$? If so, what, and when?

sure! use Z if $n > 30$ (really Z when $n < 100$)

TWO: What is the difference between a parameter and a statistic?

a parameter is a fixed, unknown, but real attribute of a population

a statistic is something calculated from data, like a sample

THREE: I flip two fair coins, and count the number of heads and tails. Order doesn't matter.

- a) What are the possible outcomes?

H, T or T, H, or T, T or H, H

- b) Draw a probability density histogram. Label it fully.

