Introduction to Statistics
Activity 8.2a **NAME:**

Critical Values for Means

a) Draw a rough sketch of the t-distribution with 9 degrees of freedom.
[Hint: It should look very much like a standard normal curve.]

b) The critical value t* for a 95% confidence interval is the value such that 95% of the area under the curve is between
t* and -t*. Shade this area on your sketch.

c) What is the area to the right of t* under the curve? [Hint: This area is not 0.05.]

d) Look at a t-dist calculator (Statdistributions.com/t/) (w/two tails and p-value being the shaded area under the curve) to find the value of t* with that area to its right under a t-distribution with 9 degrees of freedom. Report this value.

e) Is this critical value less than or greater than the critical value z* from the standard normal distribution for a 95% confidence interval? Explain why this is helpful, based on your motivation for needing the t-distr instead of the z-distr.

f) Find the critical value t* for a 95% confidence interval based on a sample size of n=20 (from the calculator). How does this value compare to the previous t* value? Explain why this is appropriate for the interval procedure as well.
[Hint: Think about whether a larger sample size would increase/decrease uncertainty in estimating σ by s.]

g) Find the critical value t* for a 90% and 99% confidence interval, based on a sample size of n=20. Which is greater? Explain why this is appropriate.

h) Find the critical value t* for a 95% confidence interval based on a sample size of n=130.

i) How has the t* value changed as you increased the degrees of freedom by increasing the sample size? How does t* with 129 degrees of freedom compare to z*?