General Strategy for Constructing Confidence Intervals

Remark: Complete the following steps to construct and interpret a confidence interval

I. Read the scenario (problem statement) very carefully

II. Re-read the scenario and decide what it is you are trying to estimate (a mean? a proportion? of what?)

III. Recall that the formula for a confidence interval is

$$(point\ estimate) \pm (critical\ value) * S_E$$

IV. Re-read the scenario to identify the *point estimate*, which comes from the sample collected

V. Use the *Standard Error Decision Tree* to identify how to compute the *standard error* (S_E)

VI. Identify the appropriate *critical value*

a. If the box containing your *standard error* formula **does not contain** information about *degrees of freedom* (df), then identify the *critical value* from the small table in the top-center of the *Standard Error Decision Tree*

b. If the box containing your *standard error* formula **does contain** information about *degrees of freedom* (df), then use Excel's $T.INV()$ function with the area to the left of the critical value and degrees of freedom as the arguments to find the appropriate critical value. Draw a picture to help you.

VII. Now that you have all three building-blocks for the confidence interval expression, fill them in and compute the lower- and upper-bounds for your confidence interval (be mindful of *order of operations* – you should multiply the *critical value* and *standard error* before doing any addition or subtraction).

VIII. Interpret your confidence interval in the appropriate context for your scenario:

"*We are **[XX%]** confident that the true **[clearly insert what it is you are estimating here]** is between **[insert lower bound]** and **[insert upper bound]***"