

#### IV. Statistical Inference

You must be able to decide which statistical inference procedure is appropriate in a given setting. Working lots of review problems will help you.

You need to know the difference between a population parameter, a sample statistic, and the sampling distribution of a statistic.

##### On any hypothesis testing problem:

1. State hypotheses **in words and symbols.**
  2. Identify the correct inference procedure and verify conditions for using it. **(A/Cs, name test)**
  3. Calculate the test statistic and the  $P$ -value (or rejection region).
  4. Draw a conclusion in context that is directly linked to your  $P$ -value or rejection region.
- State your hypotheses in terms of population parameters, not sample statistics.
  - Use standard notation in your hypotheses:  $\mu$  for population mean and  $p, \pi, \text{ or } \theta$  for population proportion.
  - Don't reverse the null and alternate hypotheses. Remember, the null hypothesis is basically a statement of no effect or no difference. If you hope to show that there is a difference between two population means, then the null hypothesis should be that the population means are equal.
  - It is not enough to state the conditions for the chosen inference procedure. You must show that the conditions are satisfied.

##### On any confidence interval problem:

1. Identify the population of interest and the parameter you want to draw conclusions about.
2. Choose the appropriate inference procedure and verify conditions for its use.
3. Carry out the inference procedure.
4. Interpret your results in the context of the problem.

You need to know the specific conditions required for the validity of each statistical inference procedure -- confidence intervals and significance tests.