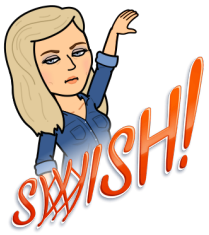
Name: _____ Hour: _____ Date: _____



Will Mrs. Gallas Prove Herself??

Recall that Mrs. Gallas claims she is an 80% free throw shooter. Mr. Wilcox is skeptical and believes that she is a less than 80% free throw shooter. Mrs. Gallas has decided to take another SRS of 50 free throws to prove herself.

1. Write the appropriate hypotheses for the significance test. Be sure to define the parameter of interest.

2. Describe a Type II error in this setting.

3. Suppose that Mrs. Gallas' true free throw percentage is actually 66% (H_a is true!). Enter all information into the applet at https://istats.shinyapps.io/power/. Click to Display Type II error. It will show as a blue shaded region.

(a) If Ha is true, what is the probability of a Type II error (bad decision)? _____

(b) If Ha is true, what would be the probability of a good decision here? _____

(c) Interpret the probability of this good decision in the context of the problem.

4. Click Display Power. We want to **increase** the power of our test. How could we adjust each of the following factors to increase our power? Use the applet to explore each.

a. Sample size:

b. Alpha level:

c. Alternative p:

Name: _____ Hour: _____ Date: _____

Power of a Test

Important ideas:

Check Your Understanding

A statistics major and a finance major decide to get married. In order to investigate their per person expenses they select a random sample guests they have invited to the wedding and records whether or not each person plans to attend the wedding. They decide to test H_0: $p = 0.75$ versus H_a: $p \neq 0.75$ where p = the true proportion of all guests that will attend the wedding.

a. The power of the test to reject H_0: $p = 0.75$ when $p = 0.70$ using $\alpha = 0.05$ and $n = 25$ subjects is 0.10. Interpret this value.

b. Find the probability of a Type I error and the probability of a Type II error for the test in part (a).

c. Determine whether each of the following changes would increase or decrease the power of the test. Explain your answers.

- Use $\alpha = 0.01$ instead of $\alpha = 0.05$.

- Use $n = 100$ instead of $n = 25$.