Your Name: _____

Names of people you worked with: _____

Task: Consider the two examples we've discussed this week. Below are the appropriate null and alternative hypotheses.

- What is your favorite dining hall at the 5Cs?

- Where are the solutions to the clicker questions, warm-ups, HW, and labs?

- 1. In what way are the alternative hypotheses different?
    2. **Why** are the alternative hypotheses different?
    3. In computing the p-value how does the alternative hypothesis play a role?

Botox & back pain:
$H_0 : p_{Bo} = p_{pl}$ Botox and back pain relief are independent
$H_A : p_{Bo} > p_{pl}$ Botox leads to more back pain relief

email & cheating:
$H_0 : p_e = p_{pp}$ type of note taking and cheating are independent
$H_A : p_e \neq p_{pp}$ the probability of cheating is not the same if using email versus if using pencil and paper

Solution:

1. For the Botox example, the alternative hypothesis is one-sided and for the cheating example, the alternative hypothesis is two-sided.

2. The hypotheses are different because the alternative hypothesis **always** contains the research idea. In the first, the research is trying to show that Botox has *higher* rates of pain relief. In the second, the research is trying to show only that the cheating rates are different.

3. The difference in analysis is that for a one-sided test, the p-value counts only null differences which are in one of the tails. For a two-sided test, the p-value counts the null differences that are in both tails (positive and negative differences).