Math 58B, Spring 2022
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WU # 6
Thursday 2/3/2022

Your Name: _____

Names of people you worked with: _____

Instructions: Work on this problem in class with your group. Do your best. This piece of paper will be collected during class.

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

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?

Gender Discrimination:
$H_0 : p_m = p_f$ gender and promotion are independent
$H_A : p_m > p_f$ men are more likely to be promoted

Email vs 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 discrimination 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 women are less likely to be promoted. 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).