Analyze A/B Test Results

Meets Specifications

**CONGRATULATIONS !!!!**

**Code Quality**

All code cells can be run without error.

Docstrings, comments, and variable names enable readability of the code.

**A faster way to simulate the 10000 trials**

* When possible, it is always more computationally efficient to use numpy built-in operations over explicit for loops. The short reason is that numpy-based operations attack a computational problem based on vectors by computing large chunks simultaneously.
* Additionally, using loops to simulate 10000 can take a considerable amount of time vs using numpy  
  <https://softwareengineering.stackexchange.com/questions/254475/how-do-i-move-away-from-the-for-loop-school-of-thought>

new\_converted\_simulation = np.random.binomial(n\_new, p\_new, 10000)/n\_new old\_converted\_simulation = np.random.binomial(n\_old, p\_old, 10000)/n\_old p\_diffs = new\_converted\_simulation - old\_converted\_simulation

* Essentially, we are applying the null proportion to the total size of each page using the binomial distribution. Each element, for example, innp.random.binomial(n\_new, p\_new, 10000) results in an array with values like [17262, 17250, 17277...]. This array is 10000 elements large
* When we divide it by n\_new, Python broadcasts n\_new for each element and we return a proportion for each element.
* This is essentially is simulating, 10000, the new page conversion rate.
* We do this again for the old page.
* The difference of the two will result in a simulated difference array of length 10000 between the new page and old page conversions.
* **Note** that this method does not require you to calculate the null values to get the p-value.

**Statistical Analyses**

All results from different analyses are correctly interpreted.

For all numeric values, you should provide the correct results of the analysis.

**AWESOME**  
Getting the stats calculations for both the simulation and z-test correct is difficult at this stage. Great work.

Conclusions should include not only statistical reasoning, but also practical reasoning for the situation.

* **Spot On!!!** Great intuition with the relationship between the different hypotheses statements.
* **Extra Credit** Knowing that Part iii is a two-tailed test and Part ii is a one-tail test, can you convert the p-values between each other?