

Question 1.2. State the null hypothesis. It should reflect the position of either Dr. DeNero or Dr. Sahai.
(4 points)

Note: Check out [11.3](#) for a refresher on hypotheses.

H₀: Each person has a 60% chance of getting Vaccine 1.

Question 1.3. State the alternative hypothesis. It should reflect the position of the doctor you did not choose to represent in Question 1.2. (4 points)

Note: Check out [11.3](#) for a refresher on hypotheses.

HA: Each person does not have a 60% chance of getting Vaccine 1, and DeNero's model is not good.

Question 1.7. Simulate 20,000 values of the test statistic under the assumption you picked in Question 1.6. (4 points)

As usual, start by defining a function that simulates one value of the statistic. Your function should use `sample_proportions`. (You may find a variable defined in Question 1.1 useful here!) Then, write a `for` loop to simulate multiple values and collect them in the array `simulated_statistics`.

Use as many lines of code as you need. We have included the code that visualizes the distribution of the simulated values. The red dot represents the observed statistic you found in Question 1.5.

```
In [11]: def one_simulated_statistic():
          sim_proportion = sample_proportions(sample_size,make_array(0.6,0.4)).item(0)
          return 100*abs(sim_proportion-0.6)

          num_simulations = 20000

          simulated_statistics = make_array()
          for i in np.arange(num_simulations):
              simulated_statistics = np.append(simulated_statistics, one_simulated_statistic())

          # Run the this cell a few times to see how the simulated statistic changes
          one_simulated_statistic()
```

```
Out[11]: 0.2515723270440251
```


Question 2.1. Suppose we want to test whether or not each factor contributes the same amount to the overall Happiness Score. Define the null hypothesis, alternative hypothesis, and test statistic in the cell below. Feel free to check your work with another student or course staff. **(4 points)**

Note: Please format your answer as follows: - Null Hypothesis: ...

- Alternative Hypothesis: ...

- Test Statistic: ...

HO:Each factor contributes the same amount to the overall Happiness Score. HA:Each factor does not contribute the same amount to the overall Happiness Score. Test Statistic: TVD

Question 2.5. What can you conclude about how each factor contributes to the overall happiness score in the US? Explain your answer using the results of your hypothesis test. Assume a p-value cutoff of 5%. (4 points)

Since the p-value is less than 5%, we reject our null hypothesis. This means that not all factors contribute the same to the overall happiness score in the US. Some factors are more important than others.

