Question 1.1. Let's run a hypothesis test using confidence intervals to see if there is a linear relationship between egg weight and bird weight. Define the null and alternative hypotheses that will allow you to conduct this test. **(8 points)**

Note: Please write your answer **in the cell below** in the following format: - **Null Hypothesis:** - **Alternative Hypothesis:**

    Hint: Reminder your null hypothesis should be about the relationship in the population.

- **Null Hypothesis**: The regression line of egg weight and bird weight has slope of 0
- **Alternative Hypothesis**: The regression line of egg weight and bird weight has slope different from 0

Question 1.4. Create an array called `resampled_slopes` that contains the slope of the best fit line for 1000 bootstrap resamples of `birds`. Plot the distribution of these slopes. **(8 points)**

```
In [12]: resampled_slopes = make_array()

         for i in np.arange(1000):
             birds_bootstrap = birds.sample()
             bootstrap_line = fit_line(birds_bootstrap, "Egg Weight", "Bird Weight")
             bootstrap_slope = bootstrap_line.item(0)
             resampled_slopes = np.append(resampled_slopes, bootstrap_slope)

         # DO NOT CHANGE THIS LINE
         Table().with_column("Slope estimate", resampled_slopes).hist()
```
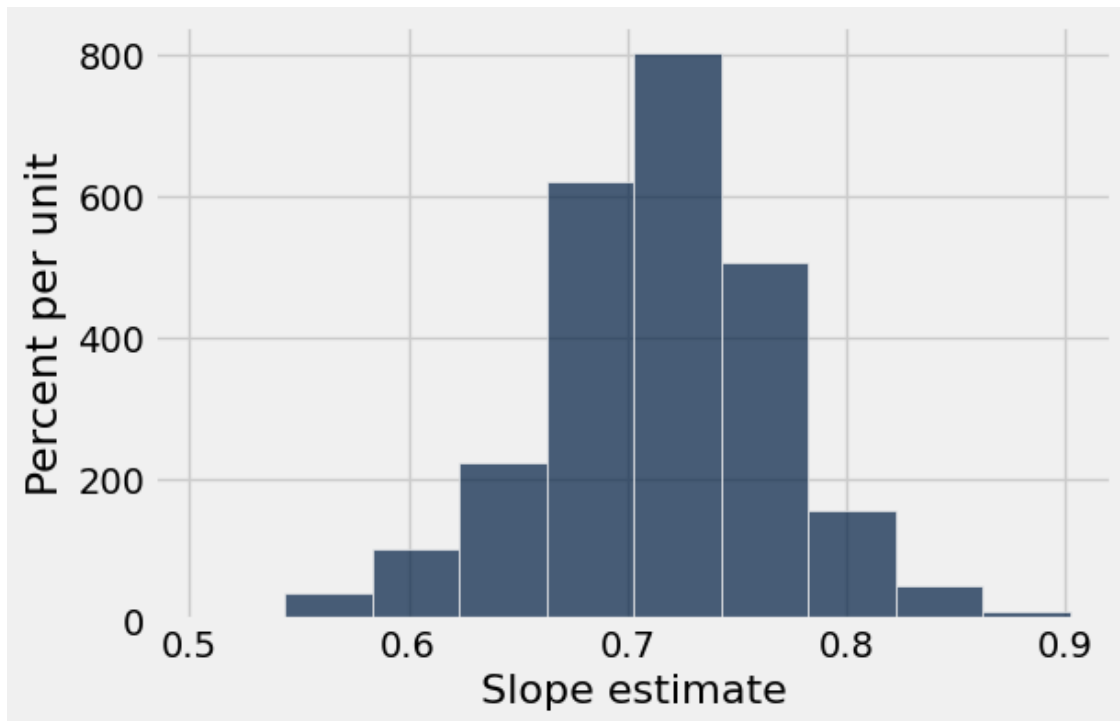


```
In [13]: grader.check("q1_4")
```

```
Out[13]: q1_4 results: All test cases passed!
```

3

Question 1.6. Based on your confidence interval, would you reject or fail to reject the null hypothesis that the true slope is 0? Why? What p-value cutoff are you using? **(8 points)**

Hint: Read the introduction of this homework!

Using the 5% cutoff for the p-value, I would reject the null hypothesis, as the 95% confidence interval for slope is [0.60819, 0.820936], which is doesn't include 0.

Question 1.7. Using your results from previous questions, **provide an estimated range for the true slope**. How confident are you that the true slope falls within this range? **(8 points)**

The estimated range for the true slope is [0.60819, 0.820936]. I'm 95% confident the true slope falls within this range.

Question 2.4. Create an array called `predictions_for_eight` that contains the predicted bird weights based on an egg of weight 8 grams for each regression line in `regression_lines`. **(6 points)**

```
In [24]: predictions_for_eight = make_array()
         for i in np.arange(1000):
             slope = regression_lines.column('Slope').item(i)
             intercept = regression_lines.column('Intercept').item(i)
             prediction = slope * 8 + intercept
             predictions_for_eight = np.append(predictions_for_eight, prediction)

         # This will make a histogram of your predictions:
         table_of_predictions = Table().with_column('Predictions at Egg Weight=8', predictions_for_eigh
         table_of_predictions.hist('Predictions at Egg Weight=8', bins=20)
```
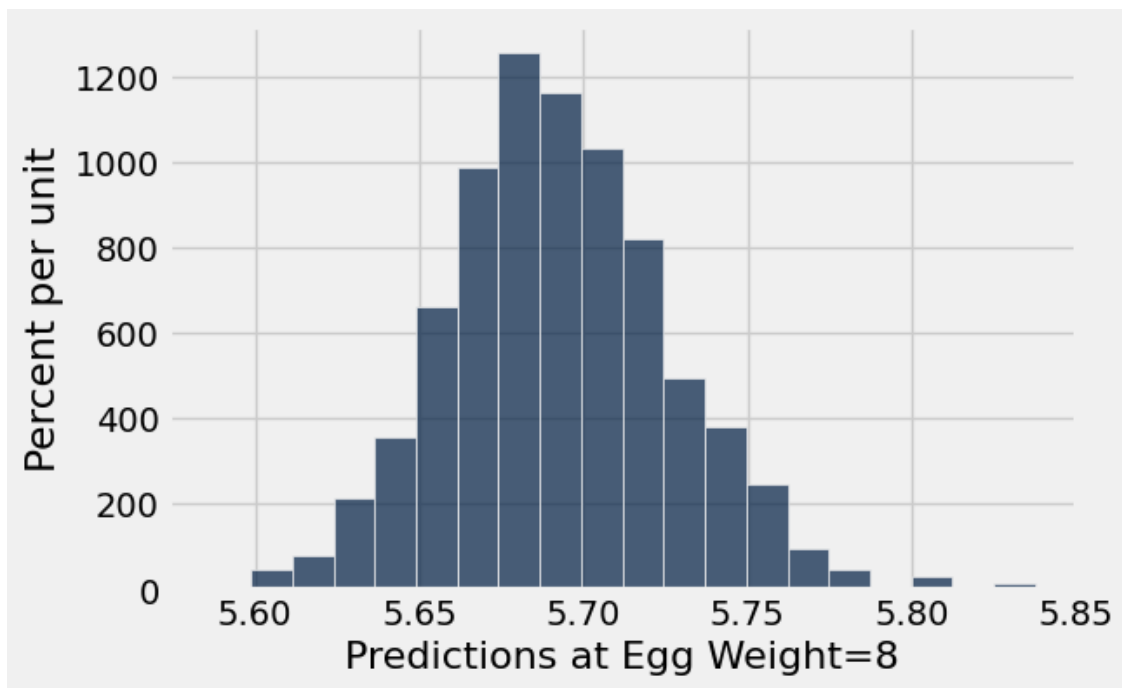


```
In [25]: grader.check("q2_4")
```

```
Out[25]: q2_4 results: All test cases passed!
```