

NAME (Please Print): _____

HONOR PLEDGE (Please Sign): _____

Prof: _____

Time: _____

Statistics 101 – **Lab Report 9**

Please write neatly. When asked to write the explanations or conclusions in complete sentence, please respect the brevity restrictions stated explicitly in the lab instructions.

You are welcome to discuss methods and ideas with your peers or the TAs, but your write-up should be your own work.

The instructions can be found online: www.isds.duke.edu/~banks/stat101.html

Unit 1: Composition of Ancient Earth's Atmosphere

- 1) Do the nitrogen and oxygen variables follow a normal distribution? (circle one for each)

Nitrogen: **Yes** **No**

Oxygen: **Yes** **No**

- 2) Modern air is known to contain 20.9 % oxygen.

Is there evidence that the percentage of oxygen in ancient air differed from the percentage in modern air?

Use a two-sided t-test, since we are looking for any difference from the modern percentage.

a. Null Hypothesis _____

b. Alternative Hypothesis: _____

c. Value of the test statistic: _____

d. p-value: _____

e. Do you reject the null hypothesis? (circle one)

Yes

No

3) Modern air is known to contain 78.1% nitrogen.

Is there evidence that the percentage of nitrogen in ancient air differed from the percentage in modern air?

Use a two-sided t-test again.

a. Value of the test statistic: _____

b. p-value: _____

c. Do you reject the null hypothesis (at the .05 level)? (circle one)

Yes

No

4) Construct a 95% confidence interval for the percentage of *nitrogen* in ancient air.

a. Lower Bound _____

b. Upper Bound: _____

c. Explain in **one sentence** what this confidence interval tells you about the percentage of *nitrogen* in ancient air.

5) Do the variables for difference in depression scores and difference in button presses follow a normal distribution? (circle one for each)

Depression: **Yes** **No** Button Presses: **Yes** **No**

6) Test the hypothesis that there is a difference in the average depression score for when the subjects are on the caffeine pill versus when they are on the placebo. Use a two-sided t-test.

a. Null Hypothesis: _____

b. Alternative Hypothesis: _____

c. Value of the test statistic: _____

d. p-value: _____

e. Do you reject the null hypothesis (at the .05 level)?

Yes

No

7) Test the hypothesis that there is a difference in the average number of button presses for when the subjects are on the caffeine pill versus when they are on the placebo. Use a two-sided t-test.

a. Value of the test statistic: _____

b. p-value: _____

c. Do you reject the null hypothesis(at the .05 level)?

Yes

No

- 8) *For each group*, does the variable for improvement scores follow a normal distribution? (circle one)

Treatment Group: **Yes** **No** Control Group: **Yes** **No**

- 9) Is there evidence of a difference in the average improvement in test scores (post-test score – pre-test score) between the subliminal and neutral message groups?

a. Null Hypothesis: _____

b. Alternative Hypothesis: _____

c. Value of the test statistic: _____

d. p-value: _____

e. Do you reject the null hypothesis (at the .05 level)? (circle one)

Yes

No

- 10) Construct a 95% confidence interval for the difference in average improvement between the subliminal and neutral groups.

a. Lower Bound: _____

b. Upper Bound: _____

Part (c) on last page

c. Explain in one sentence what this confidence interval tells you about the effect of subliminal messages (versus neutral messages) on improvement in math.
