# Q SCI 381 Dr. Bare

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Practice Hourly Examination Five**

**Closed book. May use calculator and formula card (sheets). Show all work for full credit. This means show which text book formula is used; plug in a few representative data points to demonstrate that you know how to use the formula; provide the correct numerical answer. Providing only a calculator input stream will not earn full credit.**

**(100 points)**

(20) 1. The following table shows the results of a random sample of skunks, categorized by geographical region and whether or not they tested positive for rabies.

|  |  |  |
| --- | --- | --- |
| **Area** | **With Rabies** | **Without Rabies** |
| East | 14 | 29 |
| West | 12 | 38 |

You wish to test whether presence of rabies is independent of geographical location, at the α = 0.05 level.

a) State the null and alternative hypotheses.

b) Calculate the test statistic.

c) Provide the critical value.

d) Make a decision.

e) State your conclusion in words.

(20) 2. A random sample of 9 wild ducks had a clutch size with a variance of 2.50. A random sample of 7 captive ducks had a clutch size with a variance of 0.48. Test the claim that the clutch size is less variable for captive than wild ducks, using α = .05.

1. Provide a mathematical description of the null and alternative hypotheses.
2. Calculate the test statistic.

c) Find the critical value (s).

d) Make a decision.

e) State your conclusion in words.

BONUS: (10) Calculate a 95% confidence interval for σ21/σ22

(30) 3. A researcher collected 8 measurements for air temperature (*x*) and oxygen consumption rate (*y*) in birds.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Temperature** **(ºC) (x)** | **O2 Consumption** **(ml/g/hr) (y)** |  |  |  |
| -18 | 5.2 |  |  |  |
| -15 | 4.7 |  |
| -10 | 4.5 |  |  |  |
| -5 | 3.6 |  |
| 0 | 3.4 |  |  |  |
| 5 | 3.1 |  |
| 10 | 2.7 |  |  |  |
| 19 | 1.8 |  |  |

a) Calculate the sample correlation coefficient between temperature and O2 consumption rate.

b) Interpret the meaning of the sample correlation coefficient (i.e., what can you conclude about the relationship between the two variables?)

c) Test the claim that there is a significant correlation between temperature and O2 consumption rate at the α = .05 level.

1. State the null and alternative hypotheses in mathematical terms.

ii) Find the critical value (s).

iii) Calculate the test statistic.

iv) State your conclusion in words.

(30) 4. Given the data shown in the previous problem calculate the best simple linear regression equation. That is:

1. Calculate the slope of the regression equation.

b) Calculate the intercept of the regression equation.

c) Use your equation to predict the O2 consumption rate when the temperature is 2ºC.

d) How much of the total variation is explained by your equation?

e) Calculate the 95% prediction interval for a temperature of 2ºC.