Biology 4605 / 7220 Name _____
Quiz #4b 11 October 2007

1. According to a Gunther and Morgado (2005, *Biological Research* 38:207-212) the time to reproductive maturity (T = days) depends upon body mass as follows:

$$T = T(1\ kg) \cdot W^{b}$$

where $b = 0.29$

If T(1 kg) = 274 days, calculate the time to reproductive maturity for a 50 kg organism.

T = __852 days____[1]

Convert your calculation to years, then report it as a ratio relative to the normal time to reproductive maturity (in years) of a 50 kg human.

852/365 = 2.3 years *Ratio* = ($T_{calculated}$ / T_{human}) = __2.3 yrs / 13yrs = 0.18__[1]

use 13 or any reasonable number: 5 years old is wrong, for example

Write the H_A/H_o pair for testing whether the parameter b differs from simple isometric scaling, for which $b = 1$. [2]

$H_A : b \neq 1$ or $H_A : b = 1$

$H_o : b = 1$ $H_o : b \neq 1$

2. According to Fries et *al* (2000, *Journal of Gerontology* 55A:M336-M341) the prevalence of congestive heart failure in nursing home residents increases in a linear fashion with age up to age 98, then decreases with age beyond age 98. Define variables with symbols to test whether the increase up to age 98 is statistically significant. [1]

pchf = prevalence of congestive heart failure

A = age

Using your symbols, fill in the first two columns of an ANOVA table for the linear regression of congestive heart failure on age. Assume one observation per year, for ages 80 to and including 98. [3]

Source	df
A	1
error	19-2
total	19-1

The p-value in an ANOVA table, as computed from the F-distribution, assumes homogeneous errors. How would you evaluate the assumption? [2]

plot residuals versus fitted values; uniform band for homogeneous errors; spindle, cone or other shape for heterogeneous errors.