

1. According to a Gunther and Morgado (2005, *Biological Research* 38:207-212) gestation time ( $T = \text{days}$ ) depends upon body mass as follows:

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

where  $b = 0.258$

If  $T(1 \text{ kg}) = 65.3$  days, calculate the gestation time for a 50 kg organism.

$$T = \text{_____} [1]$$

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

$$\text{Ratio} = ( T_{\text{calculated}} / T_{\text{human}} ) = \text{_____} [1]$$

Write the  $H_A/H_o$  pair for testing whether the parameter  $b$  differs from the theoretical value of  $1/4$ . [2]

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 98. Define variables with symbols to test whether the decrease beyond age 98 is statistically significant. [1]

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 99 to and including 105. [3]

How would you evaluate the assumption of a linear relation of prevalence to age? [2]