Biology 4605/7220 Name____________________________
8 November 2007 Exam #2b

For each of the following situations (1 and 2):

(A) Define variables in a tabular format, as follows.

name	symbol	scale

scale = nominal, ordinal, or cardinal
cardinal = interval or ratio scale.

nv = number of variables nt = number of terms A. score = 3nv B. score = nt C. score = 2nv + 2 D. score = 1

(B) Using the symbols, write a general linear model relating the response variable to explanatory variable(s) and interaction terms (if appropriate).

(C) Complete the first two columns of the ANOVA table

source	df

(D) State the name of the analysis, from the following list.
t-test, one-way ANOVA, two-way ANOVA, three-way ANOVA
paired comparisons, randomized blocks,
hierarchical (nested) ANOVA
regression, multiple regression,
ANCOVA (at least 1 nominal and at least 1 cardinal scale explanatory variable)
none of the above.

1. Huntsberger (1967, *Elements of Statistical Inference*, p277) reported income per acre (1956 through 1965) produced by a commercial system for taking game animals. What was the rate of growth in income?

A=6 B=2 C=6 D=1

A.

name	symbol	scale

C.

source	df

B. ________ = ____ + ϵ

D.

2. Huntsberger (1967 p324) reported yields in kilograms per plot that resulted when four equally spaced levels of nitrogen N_o, N_4, N_8, N_{12} were applied to a variety of grain. Each treatment was applied to its own plot in each of four areas that differed in levels of irrigation.

A=9 B=4 C=8 D=1

A. name	symbol	scale

C. source	df

B. ________ = ____ + ϵ

D.

3. (From Huntsberger, 1967, Problem 8, p 173) Given *n* random samples of the variable *Y*, which is distributed normally, the quantity *t* will follow a t-distribution with $n-1$ degrees of freedom. The quantity F will follow the F-distribution, where $F = t^2$

$$t = \frac{\sqrt{n}\left(\bar{Y} - \mu\right)}{s}$$

Find *t*, given n =50, s = 3, $\bar{Y} - \mu = 6$ __________[2]

Find s^2, given n =50, $\bar{Y} - \mu = 6$, t = 2.312 __________[2]

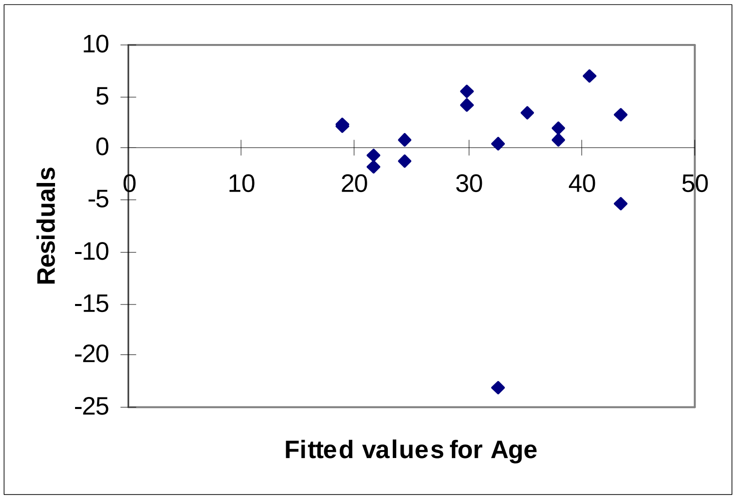
Find *F*, given n =37, s = 3, $\bar{Y} - \mu = 6$ __________[2]

4. Huntsberger (1967 p225) reported the percent fat found in samples of two types of meat (10 samples per type). Complete the ANOVA table. [7]

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*
Types	_______	___	_______	3.3922	0.082
Within Types (error)	_______	___	31.189		
Total	667.2	___			

5. Huntsberger (1967 p281) reported on heights of trees in relation to age.
Here are the fitted and residual values for the regression of tree height on age.

Predicted	*Residuals*
32.56638	0.433619
29.85017	4.249828
21.70154	-0.701544
32.56638	-23.06638
29.85017	5.549828
24.41775	0.882247
18.98533	2.414666
40.71501	6.984991
21.70154	-1.701544
24.41775	-1.317753
43.43122	-5.331218
43.43122	3.168782
18.98533	2.114666
37.9988	0.901201
35.28259	3.41741
37.9988	2.001201



List and evaluate 5 assumptions for the regression, stating the evidence you used. [15]

6. Two different methods were used to determine the fat content in different samples of meat. Both methods were used on portions of the same meat sample. The data are percentages (Huntsberger 1967, p227).

Define response and explanatory variables, with symbols. [3]

Meat	Method	
Sample	I	II
1	23.1	22.7
2	23.2	23.6
3	26.5	27.1
4	26.6	27.4
5	27.1	27.4
6	48.3	46.8
7	40.5	40.4
8	25.0	24.9

In the space below, arrange the data in model format, with column headings for explanatory and response variables. [6]