

For each of the following problems, use the most appropriate statistical test to answer the question. Unless instructed otherwise, follow the protocol for hypothesis testing. Staple this sheet on top, followed by protocol sheet(s) and output. Label and separate the different analyses with horizontal lines on the SYSTAT output. **LATE ASSIGNMENTS WILL NOT BE ACCEPTED.**

1. The frequencies of different color patterns of a tiger beetle (*Cicindela fulgida*) observed in samples taken in different seasons of the year are shown below. Is color pattern dependent on (=related to) season?

Season	Color pattern	
	Bright red	Not bright red
Early spring	29	11
Late spring	273	191
Early summer	8	31
Late summer	64	64

2. A behaviorist studied the aggressive displays of territorial male bottom trout (*Salvelinus whitworthus*) that were presumably elicited by intruding non-territory holding males. Aggression was recorded on a ranked scale of 1-7 with 7 being the most aggressive. The data are:

Case no.	1	2	3	4	5	6	7	8	9	10	11	12
Aggressive response (rank 1-7)	3	6	4	4	7	7	6	6	1	7	5	2
Spread of gill covers (cm)	11	15	10	12	10	14	18	9	9	10	13	7
Body weight (g)	53	59	64	49	55	57	61	63	44	45	37	32
Testosterone rank index (rank 1-10)	3	6	4	7	10	8	7	3	5	9	6	1
Swimming speed (cm/sec)	19	4	13	12	2	1	3	2	25	2	4	17

a. Which characteristic of the intruder (spread of gill covers, body weight, relative testosterone rank index, swimming speed) had the strongest relationship with aggression in the territorial males? Support your answer.

b. Which characteristic of the intruder (spread of gill covers, body weight, relative testosterone rank index, swimming speed) had no relationship with aggression in the territorial males? Support your answer.

3. Assume that the data in RANDOM.SYD are normally distributed and the population variances are homogeneous. Do both a Pearson correlation analyses and a regression analysis between WGT and SVL and between LWGT (\log_{10} transformed WGT) and SVL. A protocol sheet is not necessary.

a. Is there a correlation between WGT and SVL and between LWGT and SVL? If so, what is its strength?

	Correlation? (yes or no)	Strength? (value)
Raw (wgt)		
Log (lwgt)		

b. Write the regression equations describing the functional relationship between the linear WGT and SVL and between the log-transformed LWGT and linear SVL.

Raw (wgt)	
Log (lwgt)	

c. What percent of the variation in the dependent variable is explained by regressing WGT and LWGT on SVL?

Raw (wgt)	%
Log (lwgt)	%

d. Predict the weight (g) of a 520 mm snake from each of the equations. Show calculations.

	Prediction	Calculation
Raw (wgt)		
Log (lwgt)		

e. Which is the better prediction in part d? Why?

f. Construct two regression plots: (1) WGT against SVL and (2) LWGT against SVL.