Assignment 8: Due Nov 25, 2019

*** * Please print your assignment and submit it to the lecturer on the due date, thanks for your cooperation.**

1. To determine whether or not a particular gene is important in skeletal strength, you compare the bone mineral density (BMD) of 20 mutant mice which lack the gene with the BMD of 20 wild type mice.

   The mean BMD for the 20 mutant mice is 1.10 g/cm2
   The mean BMD for the 20 wild type mice is 1.22 g/cm2
   SS_{mutant}= "sum of squares for mutant mice" = .05
   $SS_{wildtype}$= "sum of squares for wild type mice" = .10

   a. You fill a ANOVA table, and run an ANOVA analysis.

   b. Perform the appropriate type of t-test to test the difference between the mean BMD of the two types of mice. (Calculate the t-statistic, and just give a rough guess at the corresponding p-value.)

2. Kudzu is a plant that was imported from Japan and now covers over seven million acres in the South. The plant contains chemicals called isoflavones that have been shown to have beneficial effects on bones. One study used three groups of rats to compare a control group with rats that were fed either a low dose or a high dose of isoflavones from kudzu. One of the outcomes examined was the bone mineral density in the femur (in grams per square centimeter).
   Here are the data:

Treatment	Bone mineral density (g/cm^2)					
Control	0.228	0.207	0.234	0.220	0.217	0.228
	0.209	0.221	0.204	0.220	0.203	0.219
	0.218	0.245	0.210			
Low dose	0.211	0.220	0.211	0.233	0.219	0.233
	0.226	0.228	0.216	0.225	0.200	0.208
	0.198	0.208	0.203			
High dose	0.250	0.237	0.217	0.206	0.247	0.228
	0.245	0.232	0.267	0.261	0.221	0.219
	0.232	0.209	0.255			

   (a) Examine the assumptions necessary for ANOVA. (b) Run the ANOVA test and report the results. (c) Compare the high dose group and the control group using ANOVA.

3. Your patient is taking one of the standard drugs that was shown to be statistically less effective in minimizing motion sickness (i.e., significant p-value for the comparison with the experimental drug). Assuming that none of these drugs have side effects but that the experimental drug is slightly more costly than your patient's current drug-of-choice. What (if any) other information would you want to know before you start recommending that the patient switch to the new drug?