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
   SSmutant= "sum of squares for mutant mice" = = .05
   SSwildtype= "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/cm²)					
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 and report the results. (c) Compare the high dose group and the

control group using ANOVA.

3. In a high school in the United States, dietary counseling is being tested to measure the program's long-term impact on student's fat intake. Of the three hundred students at the school, 150 are randomized to receive five one-hour sessions of dietary counseling; the other 150 students receive no counseling. Six months after the last counseling sessions, all students are asked to keep a food diary for one week. Each student's average fat intake in grams, is calculated at the end of this week The results of this exercise are as follows:

Intervention group :
$\bar{x}_1$ = 54.8 grams , SD₁ = 28.1 grams, n1 = 146

Control group :
$\bar{x}_2$ = 62.8 grams, SD_2 = 34.7 grams, n2 = 142

(Please note—follow up sample sizes differ slightly from initial sample size because of loss to follow up)

The public-health question of interest is whether there is a difference in mean fat intake between the two groups, six months after the intervention ended.

You are going to help answer this question:

  (a) Construct a 95% CI for the population mean difference in daily fat intake for the intervention group as compared to the control group.
  (b) Compute a p-value for testing the null of no association between counseling and average fat intake. Is this consistent with the confidence interval estimated