Chapter 13 ^ means to power

1. Describe the similarities between an F-ratio and a t statistic?
2. Explain why you should use ANOVA (ANALYSI OF Variance) instead of several t tests to evaluate mean differences when an experiment consists of three or more treatment conditions.
3. A research study comparing three treatment conditions produced means of M^1 = 2, M^2 = 4, and M^3 = 6.
4. Compare the variance for the set of three means. (Treat the means as a sample of n=3 values and compute the sample variance.)
5. Now we will change the third mean from M^3 = 6 to M^3 = 15. Notice that we have substantially increased the difference among the three means. Compute the variance for the new set of n = 3 means. You should find that the variance is much larger than the value obtained in part a. Note: the variance provides a measure of the size of the mean differences.
6. The results from an independent measures research study indicate that there are significant differences between treatments, F(3, 36)= 3.28, p < .05.
7. How many treatment conditions were compared in the study?
8. How many individuals participated in the entire study?
9. The following summary table presents the results from an ANOVA comparing three treatment conditions with n = 8 participants in each treatment. Complete all missing values. (Hint: Start with the df column.)

**Source SS df MS**

Between treatments ------- ------- 20 F = ------

Within treatments ------- -------- - -----

Total 124 --------

1. A common science fair project involves testing for the effects of music on the growth of plants. For one of these projects, a sample of 40 newly sprouted bean plants is obtained. These plants are randomly assigned to four treatments with n = 10 in each group. The four conditions are rock, heavy metal, country, and classical music. The dependent variable is the height of each plant after 2 weeks. The data from this experiment were examined using an ANOVA, and the results are summarized in the following table. Fill in the missing values.

**Source SS df MS**

Between treatments 72 --------- ------- F= -----

Within treatments - ----- --------- 3

Total ------- ---------

Chapter 14

1. Explain the advantage of using a two factor design instead of using two single factor designs (one for each of the two factors).

2) The following matrix presents the results of a two factor experiment with two levels of factor A, two levels of factor B, and n = 10 subjects in each treatment condition. Each value in the matrix is the mean score for the subjects in that treatment condition. Notice that one of the mean values is missing

Factor B

**B^1 B^2**

**Factor A**  **A^1** 10 50

**A^2** 40

A) What value should be assigned to the missing mean so that the resulting data would show no main effect for factor A?

B) What value should be assigned to the missing mean so that the data would show no interaction?