Power Analysis Exercise

I would like you to work in large groups in discussing coding changes; you will want to separate into groups of 2 or 3 when running the code. Hand in *informal* responses to questions.

Suppose you have a Completely Randomized Design with 4 levels: 3 treatments and 1 control. In the analysis, you are particulary interested in comparing the control mean against the average of the treatment means:

$$H_o : \frac{\mu_1 + \mu_2 + \mu_3}{3} - \mu_4 = 0$$

1. What are the contrast coefficients? Substitute your answer into the formula for the noncentrality parameter for a contrast and simplify.
2. Suppose $\sigma^2 = 4$ and you would like to detect an alternative contrast of 1; use this information to rewrite the noncentrality parameter as a simple function of n. Now modify `power.sas` in order to conduct a power analysis. Note that you do not need to loop on `s02` since L is fixed at 1; eliminate this loop. Based on your modified code, construct a scatterplot of the power as a function of n; what range of n values gives you good power to detect $L = 1$?
3. With $\sigma^2 = 4$, modify `power.sas` to compute power for a range of choices of L and n; it helps if you rewrite the noncentrality parameter `nc` as a function of L. The output file should contain the power for a grid of values of n and L.
4. Produce a power contour plot in Minitab (see homepage for using Minitab's contour plot). You may have to manipulate your choice of n in order to obtain a satisfactory plot. What are some choices of *(L,n)* for the .80 power contour?