STAT 301 HW17 due Tues Mar 8

You may work with one partner on this assignment, submitting one report with both names, provided that both students contribute substantially to the work. Word-processed reports are preferred to hand-written ones. Integrate computer output into your report as appropriate.

Low-Carb Diet

A study by Foster el al., reported in the *The New England Journal of Medicine* (May, 2003), investigated the effectiveness of a popular "low-carb" diet. The researchers randomly assigned 63 obese men and women to either a low-carbohydrate, high-protein, high-fat (Atkins) diet or a low-calorie, high-carbohydrate, low-fat (conventional) diet. The mean amount of weight lost, as percent of body weight, after 3 months, 6 months and 12 months are shown in the table below. (The baseline weight was carried forward in the case of missing values.)

Time	Diet	Sample size	Mean	SD
3 months	Low-carb	33	6.8	5.0
	Conventional	30	2.7	3.7
6 months	Low-carb	33	7.0	6.5
	Conventional	30	3.2	5.6
12 months	Low-carb	33	4.4	6.7
	Conventional	30	2.5	6.3

a) Is this an observational study or an experiment? Explain.

b) Identify the explanatory and response variables.

c) Report the relevant hypotheses (in symbols) for testing whether the mean weight losses differ significantly between the two diets.

d) Calculate the *t*-test statistic for testing these hypotheses at the 3-month point. (You can use either a pooled or an unpooled test, but indicate which you use. Feel free to use R or Minitab or the Test of Significance Calculator applet, or you may do this by hand.) Also report the p-value and your test decision at the .05 significance level.

e) Repeat (d) for comparing the weight losses between the two diets at the 6-month point and again at the 12-month point.

f) Summarize your conclusions from these three tests. In particular, what do you notice about the trend in the p-value as time passes, and what does that reveal?

g) Report the 95% confidence intervals for the difference in mean weight loss between the two diets at each time point. (Again feel free to use software.) Comment on how these confidence intervals change across the three time points.