Investigation 9: Popular diets? (assigned on Mon Nov 30; due on Thur Dec 3)

You may work with in a group of as many as three students on this assignment, handing in one report with all names, provided that you all contribute to the work. Word-processed reports are preferred to hand-written ones. Integrate computer output into your report as appropriate.

An article in the *Journal of the American Medical Association* reported on a randomized, comparative experiment in which 160 subjects were randomly assigned to one of four popular diet plans: Atkins, Ornish, Weight Watchers, and Zone (40 subjects per diet). These subjects were recruited through newspaper and television advertisements in the greater Boston area; all were overweight or obese with body mass index values between 27 and 42. Among the variables measured were:

- which diet the subject was assigned to
- whether or not the subject completed the twelve-month study
- the subject’s weight loss after two months, six months, and twelve months (in kilograms, with a negative value indicating weight gain)

Data for the 93 subjects who completed the 12-month study are in the Minitab worksheet *PopularDiets.mtw*.

a) Examine (submit) comparative boxplots of the weight loss amounts, comparing the four diet plans. Write a paragraph comparing and contrasting the distributions of weight loss across the four plans. [Remember to comment on center, spread, shape, and outliers.]

b) Report the sample mean and sample standard deviation of the weight loss amounts within each group.

c) Examine whether the technical conditions for ANOVA appear to be satisfied here. Comment on and justify your conclusion.

d) Use Minitab to perform an ANOVA to investigate whether the experimental data provide strong evidence that there is a significant difference in mean weight loss among these four diet plans. Report the ANOVA table, as well as the hypotheses, test statistic, and \( p \)-value. Summarize your conclusion.

e) For each diet plan, determine the sample proportion of subjects who completed the study. [Hint: Remember that 40 subjects were assigned at random to each diet plan, and the Minitab worksheet only contains data for the subjects who completed the study.]

f) Produce a segmented bar graph to compare these four proportions. Comment on what the graph reveals.

g) Perform the appropriate test to determine if the proportions in g) differ significantly. Report the test statistic and \( p \)-value. Also summarize your conclusion.