**Stat 204**
**Quiz 5 4/19/18** **Name:** SOLUTIONS

Read the introduction to Exploration 9.2 on page 494, then answer the following related questions. You will use the **Diets** data from the book's website.

1. What is the research question? What are the observational units?

Q: Are these 4 diets equally effective? units: women (311 of them)

2. Identify the explanatory and response variables and their types.

explanatory: diet (categorical; 4 categories)
response: change in BMI (quantitative)

3. State the relevant null and alternative hypotheses using correct notation.

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$ vs. $H_A$: not all equal

4. Examine the boxplots for the different groups before doing anything else. What kind of $p$-values do you expect, and what conclusion do you anticipate?

Boxplots look similar — suggest a large p-value?

5. There are two observed statistics: MAD and $F$. What are their values?

MAD = 0.585 ; F = 3.8

6. Using the MAD statistic, conduct a simulation and compute the relevant $p$-value.

MAD p-value: 1.419. (varies)

7. Using the $F$ statistic, conduct a simulation and compute the relevant $p$-value.

F p-value (simulated): .759. (varies)

8. What is the theoretical $p$-value based on the $F$ statistic?

F p-value (theoretical): 1.069.

9. These three $p$-values should be consistent. What do you conclude from them?

reject the null — all 4 diets do not seem to be equally effective

10. For a follow-up analysis, compute confidence intervals for pairwise differences. Which conditions differ significantly?

Atkins differs from the other 3