

Name _____

Student Number _____

STA 441s 2024 Quiz Three

1. (4 points) In a study comparing the effectiveness of different exercise programmes, volunteers were randomly assigned to either a control condition or one of four exercise programmes (1, 2, 3 or 4). Thus, there were five experimental treatments. Denote the true treatment means by $\mu_c, \mu_1, \mu_2, \mu_3$ and μ_4 .

Aerobic capacity is the body's ability to process oxygen. Using a standard treadmill test, aerobic capacity was measured before and after 6 months of participation in the program (or 6 months of elapsed time for the control condition). The response variable was improvement in aerobic capacity.

- (a) What null hypothesis would you test to determine whether experimental treatment (including the control) had any effect on average improvement in aerobic capacity? State the null hypothesis in symbols.
- (b) For the test of whether experimental treatment had any effect on average improvement in aerobic capacity, give the contrast or contrasts you would test. Make a table. There is one column in your table for each treatment mean, and one row for each contrast.
- (c) What null hypothesis would you test to determine whether the average improvement from the four exercise programs was greater than improvement from the control condition? State the null hypothesis in symbols.
- (d) For the test of whether average improvement from the four exercise programs was greater than improvement from the wait list control, give the contrast or contrasts you would test. Make a table. There is one column in your table for each treatment mean, and one row for each contrast.

2. Please refer to your analysis of the Chick Weights data.

- (a) (1 point) What proportion of the variation in the chicks' weight is explained by type of feed? The answer is a number on your printout. Write the number in the space below. on the printout, circle the number and write "Question 2a" beside it.
- (b) (5 points) In your analysis of the Chick Weights data, you used Tukey multiple comparisons to test for all pairwise differences between means, at joint significance level 0.05. Based on this, answer each of the questions below "Yes" or "No." *To get any marks for this question, you can get no more than one wrong.*
- Is there sufficient evidence to conclude that sunflower is better than horsebean?
 - Is there sufficient evidence to conclude that casin is better than soybean?
 - Is there sufficient evidence to conclude that sunflower is better than casin?
 - Is there sufficient evidence to conclude that casin is better than meatmeal?
 - Is there sufficient evidence to conclude that meatmeal is better than soybean?
 - Is there sufficient evidence to conclude that soybean is better than linseed?
 - Is there sufficient evidence to conclude that linseed is better than horsebean?

Attach your log file and your results file to the quiz paper. Make sure your name and student number are written clearly on both printouts.