Quiz 2 Makeup

Many Students found Quiz 2 particularly challenging. To support students understanding of the material, we are offering an opportunity to remediate quiz 2. As solutions are already available for quiz 2, students are invited to give explanations for questions that students answered incorrectly in the original quiz. For example, if you answered questions 2, 7, and 9 incorrectly on the first round of the quiz, you may only submit explanations for questions 2, 7, and 9.

* Solutions will be graded on whether the student appears to understand the relevant concept, not completion alone.
* Explanations should be as concise as possible, using algebra or text when necessary.
* Explanations only need to demonstrate why the correct answer is correct (not that the incorrect answers are incorrect) unless otherwise indicated (Q5).
* If you provide a good explanation, I may share your (anonymized) solution with the class.
* Explanations should use the following definitions and notations when referencing the model fit in Lab 2:

Text, letter

Description automatically generated

* Your explanations for each question should contain the following components:

1. Algebra and a single sentence.
2. Algebra and a calculation.
3. Mathematically define the contextual effect, and algebraically show why the interpretation works.
4. Algebra.
5. Explain why approach d is correct and approaches a-c are incorrect.
6. Algebraically show why the interpretation works.
7. Algebraically show how to calculate the coefficient for Contextual Model 2 from the fitted values from Contextual Model 1.
8. Write out the model researchers are able to fit from aggregate data (using a single covariate X). If a researchers goal were to make “inferences about associations among characteristics of individuals within clusters,” what model would they fit if they had individual-level data (using the same single covariate X)? Algebraically show that the slope coefficient for the two models are the same when there is no contextual effect.
9. Suppose you fit Marginal Contextual Model 1, but wanted estimates for residual and random effect variances for Contextual Model 1. Show algebraically how you would calculate these. Given that you know the answer is true, how would you define “mathematically equivalent” in this context?