Section A: Select two of the following:

A1. Compare factor analysis, multiple regression, and discriminant analysis with regard to (a) how each “variate” is formed and what each means, (b) which are appropriate for hypothesis testing (give a sample hypothesis for each of the ones that are appropriate), and (c) what the three stats have in common.

A2. Imagine the following scenario:
   a. Correlation between X1 and Y: $r = .50$ ($r^2 = .25$)
   b. Correlation between X2 and Y: $r = .30$ ($r^2 = .09$)
   c. Correlation between X3 and Y: $r = .10$ ($r^2 = .01$)
   d. Multiple R-squared of Y with X1, X2, and X3 entered (forced) simultaneously in a multiple regression: $R^2 = .28$

Explain how this is possible (i.e., that $R^2$ is less than the sum of the three $r^2$'s). Roughly DRAW the Ballentines/Venn diagram that would show this.

A3. See Attachment A ("Table 2"), a table of zero-order Pearson correlation coefficients taken from an article by Brown and L’Engle (2009). This study examines correlations between use of sexually explicit content in adult magazines and subsequent sexual attitudes and behaviors. Subjects were 483 male and 484 female middle school students who completed a survey on computer. All measures were self-report. Choose one of the correlations, and explain its meaning fully. Also, comment on its significance or lack thereof. And, what does the correlation coefficient fail to tell us about the relationship between the two variables? Choose a third variable that you think might reduce the correlation if the third variable were controlled for in a partial correlation. Explain.

Section B: Select two of the following:

B1. Explain how you might use (a) dummy and (b) effects coding to include a 3-group nominal independent variable in a multiple regression. Show how you would code, and explain how you would interpret the betas and the $R^2$.

B2. Examine Figure 1 in Attachment B (from a study by Kim, 2008). Explain whether an interaction is shown, and if so, describe the nature of the interaction.

B4. Draw a series of Ballantines/Venn diagrams that show the following in a hierarchical regression:
   Block 1: X1 and X2 explain 15% of the variance of Y
   Block 2: X3 explains an additional 10% of Y’s variance
   Block 3: X4 and X5 explain an additional 25% of Y’s variance

B5. Explain the pros and cons of selecting orthogonal vs. oblique rotation in factor analysis.
Attachment A
Attachment B