Quiz 4.2A AP Statistics Name:

1. A family restaurant chain wants to test the market for a new menu item: a grilled chicken sandwich with chipotle salsa. They are interested in both how to market the item and the right price to charge for it. They decide to offer the sandwich at 60 different restaurants in the chain, using two different descriptions on the menu. Half the restaurants' menus will emphasize "healthy eating" and half will emphasize "value." These two groups of restaurants will be further divided in three groups, each charging either a High, Medium, or Low price for the sandwich. After a month, they will measure what proportion of customers order the new sandwich.

(a) Suppose the company plans to conduct a completely randomized design. List the experimental units, factors, and treatments in this experimental design.

(b) Suppose that 30 of the restaurants in the study are free-standing buildings and the other 30 are located inside malls. The company suspects that the different building types may have impact on how people respond to the advertising campaign and the price. How might they alter the design of this experiment to take this into account?

2. A college fitness center offers an exercise program for staff members who choose to participate. The program assesses each participant's fitness using a treadmill test, and also administers a personality questionnaire. There is a moderately strong positive correlation between fitness score and score for self-confidence. Explain why it would not be possible to conclude from this study that the exercise program increases one's self-confidence.

3. A medical study of heart surgery investigates the effect of a drug called a beta-blocker on the pulse rate of the patient during surgery. The pulse rate will be measured at a specific point during the operation. The investigators will use 20 patients facing heart surgery as subjects. Describe the design of a completely randomized, controlled experiment to test the effect of beta-blockers on pulse rate during surgery. Your answer should address all four basic principles of experimental design.