**CB[1] – Decomposition**

**Type in your score here 🡪 \_\_\_\_ out of 28 points**

1. (5 points) Ponder/Reflect Exercise – Reflect on what you have learned from this portion of the class. Examples of what you can do are: a brief outline of material covered, insights you gained from class or personal study, or items you feel that you need to follow up or work on. (3-5 sentences)

Blocking can help take out random bias that comes when you completely random an experiment. This will help decrease the residual noise that comes from randomizing. This is helpful when you want to test different factors within the same block.

2. (3 points) #A1 on pages 250-1

a) Nuisance factor – Blocks of Farmland

b) Unit - Plot within each block

c) The plots within each block of Farmland are homogenous (a shared property). Each plot within each block was randomly assigned a treatment.

3. (3 points) #A2 on pages 250-1

a) Nuisance factor – Sets of Twins

b) Unit – A twin

c) Each person is a within a set of twins (a shared property). One twin lives in a rural area and one twin lives in an urban area. (Didn’t specify if each person was randomly assigned to live in a rural area and the other in an urban area.

4. (3 points) #A3 on pages 250-1

a) Nuisance factor – The occasions the experimenter put cotton balls over a hive of bees

b) Unit – half a board of cotton balls (one half was fresh, the other half had stingers

c) The experimenter subdivided a block of material into two smaller chunks where one chuck had fresh cotton balls and the other half had stingers.

5. Use the file marketing.txt from the homework page. The first column is sales of a product of interest (in dollars), the second column is the shelf height factor (shelf height for the product being sold), and the third column is day of week (the blocking factor). On each day, the researcher in this study randomly assigned a product of interest to a location on a five-level store shelf and then recorded the total sales for each shelf at the end of the day. Our primary interest is to see if the shelf heights have different mean sales.

(a) (5 points) Write out a well-labeled factor diagram for these data. Also, write down the statistical model, carefully defining on the parameters in the model.

Grand Mean

* 
* Day of Week - Block
* 
* Shelf Height
* 
* Residuals
* 

(b) (2 points) Why would the researchers choose to treat day of the week as a block?

customers might be in a hurry more in some days of the week than others, for instance.

6. (a) (4 points) #D9 (this is a CB[1]) on pages 278-9

**Grand Mean Block Treatment Residuals**



**df=1 df=4 df=2 df=8**

(b) (3 points) Create an ANOVA table using the effects from problem (a)

