

Statistics 506
Test 1

1. A marketing student wanted to test three factors' effect upon unit sales of a grocery item. Factor A was aisle position (Center of aisle, end of aisle); Factor B was shelf level (Lower Level, Eye Level) and Factor C was double coupon day (No, Yes). Eight weekend shopping days were randomly assigned to each combination of treatments and unit sales for each were recorded below.
- (a) Using the responses below, analyze the data.
 - (b) Using only the effects that seem significant, compute the mean response for the factor combinations that would maximize sales.
 - (c) Using all effects, compute the mean response for the factor combinations that would maximize sales. What do you notice about this mean response?

| (A,B,C) | Unit sales |
|------------------------|------------|
| (Center,Lower,No) | 282 |
| (End,Lower,No) | 318 |
| (Center,Eye Level,No) | 301 |
| (End,Eye Level,No) | 318 |
| (Center,Lower,Yes) | 344 |
| (End,Lower,Yes) | 420 |
| (Center,Eye Level,Yes) | 349 |
| (End,Eye Level,Yes) | 432 |

2. Runs from a randomized 2^3 experiment appear below.

- (a) Compute the factor effects and construct a normal plot.
- (b) It was found afterwards that 38 should have been recorded as 18; compute factor effects and construct a normal plot with the correct value for this run.
- (c) Compute the difference in the factor effects for the two runs. What do you notice?
- (d) What effect did the miscoded run have on the normal plot?
- (e) If you had only the factor effects and normal plot (and not the original data) for the data with the miscoded run, do you think you could detect which entry had had been miscoded? Could you correct this entry? Explain.

| A | B | C | Response |
|----|----|----|----------|
| 1 | 1 | 1 | 17 |
| -1 | 1 | -1 | 10 |
| 1 | -1 | -1 | 16 |
| 1 | -1 | 1 | 15 |
| -1 | 1 | 1 | 12 |
| -1 | -1 | 1 | 9 |
| -1 | -1 | -1 | 13 |
| 1 | 1 | -1 | 38 |