

## STA 6934 – Fall 2003 – Quiz 4

**Print Name:** \_\_\_\_\_ **UFID:** \_\_\_\_\_

1) Three brands of pain reliever are to be compared. A sample of 15 subjects who regularly suffer from migraine headaches is obtained. When suffering from a migraine headache, the subject receives a pain reliever and rates the amount of pain relief on a visual analogue scale. Each subject receives each pain reliever over the course of the study (over several weeks).

- a) This is an example of a crossover design because:
- i) All measurements are made on the same visual analog scale.
  - ii) There are three brands of pain reliever being compared.
  - iii) There are 15 subjects being observed.
  - iv) Each subject receives each pain reliever.

b) The partial Analysis of Variance (ANOVA) table is given below. Test whether there are differences in the true mean relief scores among the three brands of pain reliever, by completing the following steps (use  $\alpha = 0.05$  significance level).

Source	Sum of Squares
Treatments	4000
Blocks	14000
Error	5600
Total	23600

- i)  $H_0$  :
- ii)  $H_A$  :
- iii) Test Statistic:
- iv) Rejection Region:
- v) The  $P$ -value is **LARGER** or **SMALLER** than 0.05?

2) A study is conducted to compare prescription drug expenditures among elderly people in four states of the U.S.: Florida, New York, Texas, and California. Random samples of 100 elderly adults were obtained from each state, and each reports how much they spent on prescription drugs in the past year.

a) The  $P$ -value for testing whether the state population means are equal is 0.002. What do we conclude at  $\alpha = 0.05$  significance level?

- i) Cannot conclude that the four state population means are different.
- ii) Conclude that all four state means are different.
- iii) Conclude that the four state means are not all equal.

b) The following information is obtained:

$$\bar{Y}_{FL} = 250 \quad \bar{Y}_{NY} = 400 \quad \bar{Y}_{TX} = 300 \quad \bar{Y}_{CA} = 450 \quad t_{.05/2(6),396} \sqrt{MSE \left( \frac{1}{100} + 1100 \right)} = 118$$

Which pairs of states have significantly different mean prescription drug expenditures at an experiment-wise error rate of  $\alpha = 0.05$ ? Circle the pairs of states that have significantly different means, adjusting for the fact we are making 6 comparisons.

Florida/New York  
Texas/California

Florida/Texas

Florida/California

New York/Texas

New York/California