Econ.326 (Spring 2012)

Homework #2 (10 points)

Tentative Due date: Tuesday Feb. 28

**Important Note:** To receive full credit for each question, please take the following into the consideration:

1. Show all of your work, write legibly and neatly, and staple your answer sheets.
2. Questions 1 and 2 (below), worth 4 and 6 points respectively.
3. Answer the following questions using Microsoft EXCEL, and submit your computer print-out sheets (one print-out per question). Make sure to indicate your name on the print-out sheets. **I am unable to grade your homework if you don’t hand in your computer print-out sheets. If your computer print-out is not done correctly, I’ll deduct 2.50 points per print-out for a total of 5 points (assuming everything is correct).**
4. The human resource director at Potts Industries is investigating dental claims submitted by married employees having at least one child. Of interest is whether the average annual dollar amounts of dental work claimed by the husband, by the wife, and per child are the same. Data were collected by randomly selecting 16 families and recording these three dollar amounts (total claims for the year by the husband, by the wife, and per child). The results of the sample (shown below) are used to answer the following questions.
5. Can the human resource director conclude that there is a difference in the three population means using a significance level of 0.05?
6. At 5 percent level of significance, test for significance of the block (family) effect. Make sure to specify your null and alternative hypotheses and write your conclusion.

|  |  |  |  |
| --- | --- | --- | --- |
| **Family** | **Husband** | **Wife** | **Per Child** |
| 1 | 75 | 80 | 110 |
| 2 | 100 | 80 | 270 |
| 3 | 95 | 180 | 300 |
| 4 | 85 | 160 | 280 |
| 5 | 150 | 180 | 260 |
| 6 | 250 | 210 | 145 |
| 7 | 125 | 145 | 340 |
| 8 | 120 | 75 | 130 |
| 9 | 155 | 110 | 240 |
| 10 | 145 | 205 | 260 |
| 11 | 85 | 110 | 180 |
| 12 | 105 | 170 | 250 |
| 13 | 220 | 185 | 320 |
| 14 | 145 | 90 | 230 |
| 15 | 175 | 305 | 150 |
| 16 | 130 | 160 | 220 |

1. The human resource director at Schultz Industries is interested in examining the effect of gender and employee classification on the annual dollar amount of dental claims for unmarried employees in the company. Employee classifications range from category 1 (production-line worker) to category 4 (upper-level management). The director decided to use three replicates for each of the eight treatment combinations, requiring annual claims from 24 different employees. Use the sample results (below) to test for the significance of the gender, employee classification, and interaction between gender and employee classification. Use a significance level of 0.05.

**Employee Classification**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Category 1** | **Category 2** | **Category 3** | **Category 4** |
| Male | 190 | 135 | 260 | 310 |
| Male | 225 | 180 | 330 | 280 |
| Male | 200 | 100 | 350 | 240 |
| Female | 235 | 275 | 160 | 160 |
| Female | 200 | 310 | 205 | 110 |
| Female | 270 | 285 | 140 | 80 |

(**Note 1:** To conduct your hypothesis test for parts (A) and (B) in problem #1, you need to use the randomized block design procedure in Excel denoted by “ANOVA: Two factors without Replication”).

(**Note 2:** For problem #2, you will be using “ANOVA: Two factor with Replication” procedure and will be conducting three hypothesis tests. Please make sure to specify your null and alternative hypotheses for each case and write your conclusion in each case).