

Statistics 147 PRACTICE EXAM II

♠ **DATA FILES: agegroup_f19.dat and litter2_f19.dat** . (The data starts on Line 2 in each of these files.)

agegroup_f19.dat

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G1 G2 G3 G4
29 20 37 28
33 21 25 29
26 30 22 34
27 28 33 36
39 20 28 21
35 23 26 20
33 23 30 25
29 23 34 24
36 21 27 33
22 25 33 32
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Litter	Male	Female
1	475	425
2	775	750
3	580	550
4	1375	1275
5	950	925
6	850	875
7	890	840
8	1500	1475
9	350	300
10	750	725

✓ All files are located on Blackboard under **Data Files**.

1 Complete using R

1. An experiment was conducted to examine the effect of age on heart rate when a person is subjected to a specific amount of exercise. Ten male subjects were randomly selected from four age groups (10-19, 20-39, 40-59, and 60-69). Each subject walked on a treadmill at a fixed grade for 12 minutes. The increase in heart rate (difference between after and before exercise, was recorded, in beats per minute. The data are shown in the table below: (The data is located in a file named **agegroup_f19.dat**.)
 - (i) Read in and print out the data, making sure the columns are accessible individually.
 - (ii) Perform the appropriate test(s) of hypothesis to determine whether there is a significant difference in mean increase in heart rate between the four age groups.
 - (a) Test for normality of each of the 4 age groups. (Use the Anderson-Darling test.)
 - (b) If appropriate, test for equality (homogeneity) of variances.
 - (c) If appropriate, test for equality of means.
 - (d) If appropriate, employ multiple comparisons (use Tukey's test) to determine which mean(s) is(are) significantly different.
 - (iii) Perform the appropriate test(s) of hypothesis to determine whether there is a significant difference in mean increase in heart rate between age group 3 (40-59) and 4 (60-69). (Pretend you don't have the results from Part (ii).)

- (a) Test for equality of variances.
 - (b) Test the means, based on your results in part (a).
 - (iv) Perform the appropriate test of hypothesis to determine whether the mean increase in heart rate for age group 3 (40-59) more than 25.
 - (v) Find and interpret a 98% confidence interval for the mean increase in heart rate for age group 4 (60 - 69).
2. A dog breeder was interested in determining whether there is a significant difference in the selling price of male and female puppies from the same litter. The breeder obtained random samples of 10 litters of puppies and recorded the selling price (in \$) of a male and a female puppy from each litter. The data is located in a data file named *litter2-f19.dat*, which you should have downloaded from Blackboard. (NOTE: The data represents the selling price, measured in \$, for each dog in each litter.) (NOTE: Different breeds of dogs are represented by the litters. For example, Litter 1 contains the selling prices of a male and female Australian Cattle dog. Litter 2 represents the selling prices of a male and female Siberian Husky.)
- (i) Read in and print out the data, making sure the columns are accessible individually.
 - (ii) Perform the appropriate test of hypothesis to test whether the average selling price of male puppies is significantly higher than the average selling price of the female puppies. Use $\alpha = 0.05$.

2 Complete using SAS

3. Consider Problem #1. Complete the following using SAS. (The data is located in a file named **agegroup_f19.dat**.)
- (i) Perform the appropriate test(s) of hypothesis to determine whether there is a significant difference in mean increase in heart rate between the four age groups.
 - (a) Test for normality of each of the 4 age groups. (Use the Shapiro-Wilk test.)
 - (b) If appropriate, test for equality (homogeneity) of variances.
 - (c) If appropriate, test for equality of means.
 - (d) If appropriate, employ multiple comparisons (use Tukey's test) to determine which mean(s) is(are) significantly different.
 - (ii) Perform the appropriate test(s) of hypothesis to determine whether there is the mean increase in heart rate age group 1 (10-19) is significantly larger than the mean increase in heart rate for group 2 (20-39).
 - (a) Test for equality of variances.
 - (b) Test the means, based on your results in part (a).
 - (iii) Perform the appropriate test of hypothesis to determine whether the mean increase in heart rate for age group 3 (40-59) is greater than 25.
 - (iv) Find and interpret a 98% confidence interval for the mean increase in heart rate for age group 4 (60 - 69).
4. Consider Problem #2. Complete using SAS.
- (i) Write the appropriate SAS code to read in and print out the data. (DO NOT use do loops!)
 - (ii) Perform the appropriate test of hypothesis to determine if there is a significant difference in average selling price between male and female puppies.