

**EXAM 2**  
(Take home portion)  
Stat 201  
April 18, 2008

Name \_\_\_\_\_

1. In a study of myocardial transit times, appearance transit times were obtained on a sample of 30 patients with coronary artery disease. The sample variance was found to be 1.03. Construct 99% confidence intervals for  $\sigma^2$  and for  $\sigma$ . State any assumptions you made in order to do this. (15 pts)
  
2. Measurements of gastric secretion of hydrochloric acid (milliequivalents per hour) in 16 normal subjects and 10 subjects with duodenal ulcer yielded the following results:  
Normal subjects: 6.3, 2.0, 2.3, 0.5, 1.9, 3.2, 4.1, 4.0, 6.2, 6.1, 3.5, 1.3, 1.7, 4.5, 6.3, 6.2  
Ulcer subjects: 13.7, 20.6, 15.9, 28.4, 29.4, 18.4, 21.1, 3.0, 26.2, 13.0  
Construct a 95% confidence interval for the ratio of the two population variances. State any assumptions needed in your procedure. Could you conclude that the average gastric secretion of hydrochloric acid in ulcer subjects is at least 15 units (milliequivalents per hour) larger than the average gastric secretion of hydrochloric acid in normal subjects? (Show all 10 steps and use  $\alpha = .01$ .) Does your conclusion make sense in light of your 95% C.I.? (20 pts)
  
3. In an experiment to assess the effects on rats of exposure to cigarette smoke, 11 animals were exposed and 11 control animals were not exposed to smoke from unfiltered cigarettes. At the end of the experiment, measurements were made of the frequency of the ciliary beat (beats/min at 20°C) in each animal. The variance for the exposed group was 3400 and 1200 for the unexposed group. Do these data indicate that in the populations represented, the variances are truly different? Let  $\alpha = .05$  Draw a conclusion (if possible). (13 pts)
  
4. In a certain area of a large city it is hypothesized that 40 percent of the houses are in a dilapidated condition. A random sample of 75 houses from this section and 90 houses from another section yielded a difference,  $\hat{p}_1 - \hat{p}_2$  of .09. If there is no actual difference between the two areas in the proportion of dilapidated houses, what is the probability of observing a difference this large or larger? (That is, greater than or equal to .09) (Show all ten steps and use  $\alpha = .05$ ) (12 pts)