

## Statistics 1040, Section 004, Quiz 12 (20+ Points)

Friday, April 16, 2004 — Due Monday, April 19, 2004 (in class!)

**Your Name:** \_\_\_\_\_

This is a take-home quiz. You may work on it at your own pace but you have to complete it and turn it in at the beginning of class on Monday, April 19, 2004. If you cannot attend class on Monday, please FAX your answers to (435) 797-1822 **before** class starts. Solutions will be provided in class on Monday and will also be posted to the course Web site on Monday afternoon. Late turn-ins will not be accepted.

This quiz contains three questions, formulated as they may appear in the Final Exam. The first question is worth 20 points. The second and the third questions are extra-credit questions that are optional. These questions are worth 10 extra-points each.

Please work on this quiz independently, using as little help as possible from your friends, books, and notes. To get used to the formula sheet provided in the final, you should look at this sheet only and not at any of our previously used formula sheets. A copy of the formula sheet used in previous final exams and the required tables can be found in the “Old Exams (1998–2003)” section of our workbook (you should use the formula sheet/tables from the Fall 2003 exam).

### Question 1:

**(20 Points)** A random sample of 18 Penn State students was selected. The nose length of each student was measured in millimeters, and was recorded in the following data set:

41 57 43 42 55 35 36 40 45 55 55 36 45 44 45 47 37 48

A student thinks that the average nose length of Penn State students is fairly large. He thinks that the average nose length could be more than 44 millimeters. Does this sample of 18 students provide evidence to suggest that the average nose length is more than 44 millimeters? State the null and the alternative hypothesis, calculate the test statistic (after finding the average and SD of the sample), obtain the P-value, and clearly state your conclusions. Assume that the nose lengths follow the normal curve. (If we **cannot** conduct a test, state so and explain why not!)

### Question 2:

**(10 Points)** Who drives older cars? Students or faculty? In a study conducted at a small university, it was found that the average age of all 5482 student cars registered with Parking Services was 7.89 years, with a standard deviation of 3.67 years. The average age of all 473 faculty cars registered with Parking Services was 5.99 years, with a standard deviation of 3.15 years. Can we conclude from those numbers that student cars are indeed older than faculty cars? Conduct an appropriate statistical test to find this out, and clearly state your conclusions. (If we **cannot** conduct a test, state so and explain why not!)

### Question 3:

**(10 Points)** Do “A” students tend to sit in a particular part of the classroom? A researcher recorded the locations of the students who received grade A by interviewing a random sample of students from a huge class (several hundreds of students) with these results: 19 sat in the front, 9 sat in the middle, and 5 sat in the back of the classroom. Can we conclude from those numbers that the “A” students are not evenly distributed throughout the classroom? Conduct an appropriate statistical test to answer this question. (If we **cannot** conduct a test, state so and explain why not!)