Stat 151.003 Fall 2006 (Kozdron)
Practice Exam

(This was, word-for-word, the second midterm given to STAT 151.006 on November 15, 2006, by Dr. A. Herman.)

Note: Problem #5 is not applicable to our Section this year. (And so it will NOT be on the common final exam.)

1. (*3 points*) In 1993, Consumer Reports gave the following prices for a sample of 12 cellular phones (in dollars):

499	279	669	550	207	600
200	235	489	300	299	200

Assuming the variable is normally distributed, construct a 90% confidence interval for the mean price of a cellular phone in 1993.

2. (*4 points*) An irrigation company wants to test the claim that the PVC pipes it is selling have a mean bursting pressure of more than 350 psi (pounds per square inch). It tests a random sample of 50 pipes, and finds that the mean bursting pressure of the sampled pipes is 343 psi, with the standard deviation for the sample being 29 psi. Test the company's claim at the 0.05 significance level.

3. (*3 points*) A random sample of 864 requests for MRI (magnetic resonance imaging) scans made in 1991 was evaluated in a study reported in the New England Journal of Medicine. In 502 of these requests, the requesting physician had an ownership interest in the imaging facility. Construct a 95% confidence interval for the population proportion of physicians requesting MRI scans that had an ownership interest in the imaging facility. (Round your proportions to 3 decimal places.)

4. (*3 points*) Mickey has to write a test. There are 25 multiple choice problems on Mickey's test, with four possible answers (a, b, c, or d) for each problem. Mickey guesses randomly at every one.

(a) (*1 point*) Calculate the expected value of Mickey's score on the test (out of 25).

(b) (*2 points*) What is the probability that Mickey passes the test? (Give your answer correct to three decimal places.) Hint: It should be very helpful to know that the probability that Mickey's score is 10 or less is 0.97.

(continued)

5. (*4 points*) In the game of roulette, if a player bets \$1 on Black and \$1 on Number 1, then three possible outcomes can occur. If the roulette ball lands on the Black Number 1, the player's net return is \$34. If the roulette ball lands on one of the other 17 Black numbers, the player's net return is \$0 - they just win their \$2 back. If the roulette ball stops on one of the 18 red numbers or on one of the two green numbers, the player loses their \$2 bet.

(a) (*2 points*) Complete the Probability Distribution Table by calculating the probabilities for each possible net return. (Give your probabilities up to 3 decimal places.)

(b) (*2 points*) Compute the expected value (mean) and standard deviation for the player's net returns in this game. (Round your answers to 3 decimal places.)

6. (*3 points*) You read in the newspaper that a nationwide survey estimates the proportion of Canadians opposed to deploying more Canadian troops to Afghanistan is 53.7%, correct to within 2.0 percentage points, 9 times out of 10.

(a) (*1 point*) What level of confidence was used to construct the confidence interval in this survey?

(b) (*2 points*) What sample size was most likely used for this survey?

7. (*3 points*) A company hires you to analyze some data they have collected. They provide 20 measurements of a random variable and would like to have a 99% confident estimate of the population mean for this variable. Of course, the sample is small and you would like to see that the data are approximately normally distributed. List the steps you need to take in order to check that the data are approximately normally distributed.

8. (*2 points*) The size of a person's foot is a normally distributed variable, with mean 25 cm and population standard deviation 3 cm.

(a) (*1 point*) Calculate the probability that a random person's foot measures between 22 and 28 cm. (Round your answer to 3 decimal places.)

(b) (*1 point*) Calculate the probability that the average foot length for a random sample of 100 people measures between 24.7 and 25.3 cm. (Round your answer to 3 decimal places.)