STAT516 Exam II   Spring 2006

Name:

Student ID:

Show all work. Explain your answers. Partial credit will be given. There are 3 questions, and a total of 50 points. Points are shown for each question.

1. (13 points) Assume a sample of size n is drawn from a normal distribution with mean μ and standard deviation σ. Will $n = 45$ be a sufficiently large sample to test $H_0 : \mu = 10$ versus $H_1 : \mu \neq 10$ at the $\alpha = 0.05$ level of significance if the experimenter wants the type II error probability to be no greater than 0.20 when $\mu = 12$? Assume that $\sigma = 4$.

2. (13 points) Suppose that X is a binomial random variable from n trials with probability p. We want to test $H_0 : p = 0.5$ versus $H_1 : p \neq 0.5$. Find λ, the GLRT statistic. (No need to simplify the formula you get for λ.)

3. (24 points) A drapery store manager was interested in determining whether a new employee can install vertical blinds faster than an employee who has been with the company for two years. The manager takes independent samples of 10 vertical blind installations of each of the two employees and computes the following information.

	New Employee	Veteran Employee
Sample size	10	10
Sample Mean	22.2min	24.8min
Standard Deviation	0.90min	0.75min

Assume the installation times are normally distributed for both employees.

(a) (12 points) Is it reasonable to assume equality of variances in this problem? Set up an appropriate hypothesis and test it using the critical value approach.

(b) (12 points) Set up the hypothesis to test whether the new employee installs vertical blinds faster, on average, than the veteran employee and test the hypothesis using the p-value approach.