ECO 4004: Mathematical Statistical Economics
Problem Set 11: Testing Hypothesis

1. Let $X_1, X_2, \cdots, X_{25}$ be a sample from a normal distribution having a variance of 100.
(1) Find the rejection region for a test at level $\alpha = 0.10$ of $H_0 : \mu = 0$ versus $H_a : \mu > 0$.
(2) What is the power of the test when $\mu = 1.5$?
(3) What is the power of the test for $\alpha = 0.01$?

2. Suppose $X_1, X_2, \cdots, X_n$ are i.i.d. normal with mean μ and variance $\sigma^2 = 1$. Consider the hypotheses $H_0 : \mu = 4$ versus $H_1 : \mu \neq 4$.
(1) Suppose the usual test statistic for testing these hypotheses equals -2.6. What is the p-value for the test?
(2) If the test statistic equals 1.96, what is the p-value of the test?
(3) Suppose the hypotheses are $H_0 : \mu = 4$ versus $H_1 : \mu > 4$. Then, what are the answers to the question in parts (1) and (2)?