Probability and Statistics

Home Work due March 31, 2005.

Q1. X is a random variable having a Normal distribution with mean 0 and unknown variance σ^2. Test the null hypothesis that $\sigma^2 = 1$ against the alternative $\sigma^2 = 2$ at 5% level of significance based on a single observation. What is the critical region?

Q2. X is a random variable with values in the interval $[-1, 1]$. Test the null hypothesis (based on single observation) that X has a probability density

$$f_0(x) = \begin{cases} |x| & \text{if } |x| \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

against the alternative

$$f_1(x) = \begin{cases} \frac{1}{2} & \text{if } |x| \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

at 1% level of significance. What is the critical region?