Math 3070 § 1.
Treibergs $a t$

Fourth Quiz

This is an open book quiz. You are allowed to use your text, handouts and notes. Other books, laptops, PDA's, phones and text messaging devices are prohibited. Calculators are permitted. Be sure to give complete explanations to receive full credit. There are [30] total points.

Hypothesis tests and $p$-values. Are answer keys to multiple choice tests generated randomly? A 2002 study in The American Statistician looked at 1024 questions on real Scholastic Aptitude Tests (SAT's) that had five choices. They found that for 184 questions, the correct choice (A, $\mathrm{B}, \mathrm{C}, \mathrm{D}$ or E ) was the same as the correct choice for the question immediately preceding. If the choices were generated at random, then the probability that a question would have the same answer as the one immediately preceding would be 0.20 . Is there compelling evidence that the choices for the SAT are not random (that the proportion of questions with the same answer as the previous question is not equal to 0.20 )?

1. [15] State the null and alternative hypotheses. State the test statistic and the $H_{0}$ rejection region for a level- $\alpha$ test. Under what assumptions is your statistic valid?
2. [15] Compute the value of the test statistic. Find the $p$-value using the tables in the text. What is your conclusion?
