Math 370 Fall 98

Quiz **6** Numerical Analysis

Name: _____

Date: _____ **Friday October 30**
Time Begun: _____ Ron Buckmire
Time Ended: _____

Topic : Polynomial Interpolation

The idea behind this quiz is for you to actually do some interpolation and extrapolation.

Instructions:

1. Once you open the quiz, you have as much time as you need to complete it, but record your start time and end time at the top of this sheet.
2. You may use the book or any of your class notes. You must work alone.
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one.
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution.
6. Relax and enjoy...
7. **This quiz is due on Monday November 2**, in class. NO LATE QUIZZES WILL BE ACCEPTED.

Pledge: I, _____, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

Math 370 Fall 1998 **EXPLAIN YOUR ANSWERS** Quiz **6**

1. The data $(-1, 1/2)$, $(0, 1)$ and $(1, 2)$ is obtained from evaluating a mystery function $\gamma(x)$ at the given nodes. We want to construct the unique interpolating polynomial of degree 2 in order to estimate the value of the output of the mystery function at $x = 1.5$ and $x = -.5$.

a. [*3 points*] Write down the Lagrange interpolating polynomials of degree 2 for these nodes.

b. [*3 points*] Use your Lagrange interpolating polynomials from **a.** and the given data to find the unique interpolating polynomial $P(x)$ of degree 2.

c. [*2 points*] estimate the value of $\gamma(1.5)$ by extrapolation and estimate the value of $\gamma(-0.5)$ by interpolation.

d. [*2 points*] Suppose it is discovered that the mystery function is actually $\gamma(x) = 2^x$. Compute the absolute error of your answers in **c.**. Which estimated value, for $\gamma(1.5)$ or for $\gamma(-0.5)$, is more accurate? Give an explanation.