Math 370 Fall 2004

BONUS QUIZ

Numerical Analysis

Name: _____

Date: _____ **Friday December 3**
Time Begun: _____ Ron Buckmire
Time Ended: _____

Topic : Approximation Theory

The idea behind this quiz is for you to indicate your ability to use MATLAB to find the "best fit" curve to experimental data.

Reality Check:

EXPECTED SCORE : _____**/10** ACTUAL SCORE : _____**/10**

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 bonus quiz is due on Monday December 6**, 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 2004 **EXPLAIN YOUR ANSWERS** BONUS Quiz **FOUR**

x	1.0000	2.0000	4.0000	5.5000	7.0000
y	2.2361	10.9329	24.6765	42.8382	65.0486

Consider the experimental data above to postulate a relationship of $y = P(x) = c_1 x^{c_2}$ between the input and output experimental data.

a. [*2 points*] Derive transformations involving $Y = Y(x, y)$ and $X = X(x, y)$ which change the nonlinear relationship $y = c_1 x^{c_2}$ into a linear one between Y and X

b. [*6 points*] Use MATLAB's `linefit` function or some other calculations to find c_1 and c_2. (Show all your calculations, such as MATLAB commands and what output it produces.)

c. [*2 points*] What is the least square error between the experimental data and the curve of best fit? That is, evaluate $E = \sum_{k=0}^{n} (y_k - P(x_k))^2$