Ground Rules:

1. **You may work in groups of (atmost) two and can submit one solution for each group.** *All the individuals in a group will be equally responsible for the solution.*
2. *Please return the answer script (print out of code/plot if needed) to Prof. Muthuramalingam by 3pm on February 1st, 2005.*
3. *It is suggested that you spend the first 10 minutes in class reading the entire worksheet and thinking about how to solve the questions given. After which you may move to the demolab or CC and (are strongly encouraged to) work together on this and help each other out.*
4. *The problems in this worksheet are designed so that you will have just enough time to do the work so please do not waste time.*

Imp: *In each of the following questions please write a function file that performs exactly what is asked for. Trying to do anything more may land you in time trouble.*

Bisection Method

1. Write an function file called `Bisection(a)` which takes in a real number a finds an approximation to $\sqrt[3]{a}$ to within 10^{-4} using the bisection algorithm. What is the result for $a = 25$?

Fixed point Iteration

2. One can show that each of the following functions has a fixed point p precisely when $f(p) = 0$, where $f(x) = x^4 + 2x^2 - x - 3$.
   (a) $g_1(x) = (3 + x - 2x^2)^{\frac{1}{4}}$
   (b) $g_2(x) = (\frac{x+3-x^4}{2})^{\frac{1}{2}}$
   (c) $g_3(x) = (\frac{x+3}{x^2+2})^{\frac{1}{2}}$
   (d) $g_4(x) = \frac{3x^4+2x^2+3}{4x^3+4x-1}$

   Write an function file called `fixedpoint(g)` which will take in a function g and do four iterations of the fixed point method (starting with $x_0 = 1$).

   Then decide which function gives the best approximation to the solution and give reasons for your answer.

Newton Raphson Method

3. Write a function file `Newton` that uses Newton Raphson method to approximate within 10^{-4}, the value of x that produces the point on the graph of $y = x^2$ that is closest to $(1, 0)$.