UMC 202
PROBLEM SET 2

(1) Use Newton's method to find solutions accurate to within 10^{-5} to the following problems

   (a) $x^3 - 2x^2 - 5 = 0$ on the interval $[1, 4]$.

   (b) $x^2 - 2\,xe^{-x} + e^{-2x} = 0$ on the interval $[0, 1]$.

   (c) $x^3 - 3x^2(2^{-x}) + 3\,x(4^{-x}) - 8^{-x} = 0$ on the interval $[0, 1]$.

(2) Use Newton's method, secant method and method of False position for finding the approximations of the two zeros, one in $[-1, 0]$ and other in $[0, 1]$ to within 10^{-6} accuracy of $f(x) = 230x^4 + 18x^3 + 9x^2 - 221x - 9$. Use the end points of the interval as initial guesses for the secant method, method of False position and the midpoint for Newton's method.

(3) Let $f(x) = e^x - x - 1$.

   (a) Show that f has a zero of multiplicity 2 at $x = 0$.

   (b) Find the rate of convergence for the Newton's method.

   (c) Is any modification in the Newton's method improves the rate of convergence.