# Assignment 6

1. Find approximations for the two roots of the polynomial $0.0002358x^2 - 5535.0x + 0.00003513$ using the quadratic formula you learned in secondary school. Then, find the same roots, but choosing the appropriate formula for each.

2. Find approximations for the two roots of the polynomial $0.0002358x^2 + 5535.0x - 0.00003513$ using the quadratic formula you learned in secondary school. Then, find the same roots, but choosing the appropriate formula for each.

3. Given the function $f(x) = x^3 - x^2 - x - 1$, approximate the real root using two steps of each of:

   a. Newton's method starting with $x_0 = 2.0$,
   b. the bisection method starting with [1, 2],
   c. the bracketed secant method starting with [1, 2] (optional), and
   d. the secant method starting with $x_0 = 2.0$ and $x_1 = 1.9$.

4. Given the same function as in Question 3, approximate the first positive root using one step of each of:

   a. Muller's method starting with $x_0 = 2.0$, $x_1 = 1.9$ and $x_2 = 1.8$ (optional), and
   b. inverse quadratic interpolation with the same three points.

5. Given the function $f(x) = x^2\cos(0.4x)e^{-0.3x}$, approximate the first positive root using two steps of each of:

   a. Newton's method starting with $x_0 = 4.0$,
   b. the bisection method starting with [3, 4],
   c. the bracketed secant method starting with [3, 4] (optional), and
   d. the secant method starting with $x_0 = 3.8$ and $x_1 = 3.9$.

6. Given the same function as in Question 5, approximate the first positive root using one step of each of:

   a. Muller's method starting with $x_0 = 3.8$, $x_1 = 4.0$ and $x_2 = 3.9$ (optional), and
   b. inverse quadratic interpolation with the same three points.

7. Describe the issues with using root-finding techniques for finding all the roots of a polynomial.