

**MATH 4340 - Numerical Methods**  
**Homework 2.4 - The Secant Method**  
**Due - Tuesday, November 24, 2015**

Instructions: For each of these problems, please tabulate your answers using the following format:

$k$	$p_k$	$e_k =  p_k - P $	$e_{k+1}/e_k^R$
0			
1			
2			
3			
4			

Record all answers to at least 10 significant digits, except for the ratio of errors.

1. Use 6 iterations of the secant method to estimate the root of the function  $f(x) = x^3 + 2x^2 - 5x - 6$  when starting at  $p_0 = 3.0$  and  $p_1 = 2.9$ . Tabulate the error, and the ratio of errors for the cases of linear and quadratic convergence.
2. Use 6 iterations of the secant method to estimate the root of the function  $f(x) = x^2 - 2x - 4$  when starting at  $p_0 = 2.9$  and  $p_1 = 3.0$ . Tabulate the error, and the ratio of errors for the cases of linear and quadratic convergence. Use the quadratic formula to determine the actual value of the root of this function. Based on the results of the error ratios for Problems 5 and 6, what can we conclude about the rate of convergence for the secant method?
3. By using a function that only involves addition, subtraction and multiplication, use the secant method to estimate the value of  $\sqrt{5}$  when starting at  $p_0 = 2.5$  and  $p_1 = 2.0$ .
4. By using a function that only involves addition, subtraction and multiplication, use the secant method to estimate the value of  $\sqrt[3]{6}$  when starting at  $p_0 = 2$  and  $p_1 = 1.0$ .