

ESP  
Kouba  
Worksheet 14 1/2

- 1.) Use Newton's Method to estimate the root of  $7x^3 + x - 5 = 0$  to four decimal places.
- 2.) Use Newton's Method to estimate the largest root of  $x^3 + 6x^2 + 9x + 1 = 0$  to four decimal places.
- 3.) Use Newton's Method to estimate the root of  $\cos x = 2x$  to four decimal places.
- 4.) Use Newton's Method to estimate  $10^{1/3}$  to four decimal places.  
HINT : Solve  $x^3 - 10 = 0$ .
- 5.) Consider the graph of  $f(x) = x^{1/3}$ . Clearly, the root of  $f(x) = 0$  is  $x = 0$ . Set up Newton's Method with  $x_1 = 1$  and discover what happens when you compute  $x_2, x_3, x_4$ , and  $x_5$ . What do you conjecture?
- 6.) For this problem assume that  $D \ln x = \frac{1}{x}$ . Consider the function  $f(x) = \frac{1 + \ln x}{x}$ . Set up Newton's Method to estimate the root of  $f(x) = 0$ .
  - a.) Let  $x_1 = 1.2$  and discover what happens when you compute  $x_2, x_3$ , and  $x_4$ .
  - b.) Let  $x_1 = 0.5$  and discover what happens when you compute  $x_2, x_3$ , and  $x_4$ .
  - c.) Sketch a graph of  $f$ . What do you conjecture based on this graph and your work in a.) and b.)?