

Calculus I  
Spring 1997

Assignment #2

Due 3/26/97  
Dr. D. P. Story

Instructions. Solve each of the following problems from the book using **Newton's Method**.

1. First construct the recursion formula

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}.$$

2. Construct a table of calculations using the format of the the examples given on this handout.

<u><math>n</math></u>	<u><math>x_n</math></u>	<u><math>f(x_n)</math></u>
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3. Continue to calculate until the first 6 digits are established.
4. Clearly write out your final approximation.

Problems. Do each of the following two problems.

**Solutions** are given on a **Maple** worksheet.

1. Depending on your last name, solve the equation using Newton's method. Use as your initial guess  $x_0 = .5$ . (*Note: Obviously,  $x = 0$  is a solution; we are not interested in that solution. :-)*)
  - a. If your last name begins with A–H, find the solution to the equation  $\cos(2x) = x$  between  $0 < x \leq 1$ .
  - b. If your last name begins with I–P, find the solution to the equation  $\cos(3x) = x$  between  $0 < x \leq 1$ .
  - c. If your last name begins with Q–Z, find the solution to the equation  $\cos(4x) = x$  between  $0 < x \leq 1$ .

2. Consider the equation:  $x^3 - 3x^2 + 1 = 0$ . There are three solutions to this equation:  $-1 \leq r_1 \leq 0$ ,  $0 \leq r_2 \leq 1$ , and  $2 \leq r_3 \leq 3$ .
- If your last name begins with A–H, find  $r_2$  using an initial guess of  $x_0 = 0.5$ .
  - If your last name begins with I–P, find  $r_3$  using an initial guess of  $x_0 = 2.5$ .
  - If your last name begins with Q–Z, find  $r_1$  using an initial guess of  $x_0 = -1$ .

*Final Note:* These are **your** problem. I expect you to do them yourself.