

## Section 4.7 Worksheet:

Assigned problems: Exercises pp. 235-236, #1, 4, 5, 11, 14, 16, 20 (due Wednesday, 10/23).

1. What is an iterative process?
2. Write down the essential formula we use to find an approximate root using Newton's method. What do the components represent?
3. Give a graphical description of how Newton's method works (similar to Figure 2, with a different looking function).
4. Describe at least three different ways in which Newton's method may fail.

### Notes:

1. Newton's method for computing roots of a function is based on the linearization of the function. Once again, we replace a function by a closely related linear function, hoping that the linear function will inform us about the function itself. Linear functions are the simplest interesting functions we have, and they pop up constantly in mathematics (e.g. slant asymptotes are good replacements for the original functions far from the origin).
2. As described in the text, this method is similar (if not the same as) the methods used by calculators to find roots. So when you use the "solve" button on your TI, this is the sort of procedure your calculator is using to produce its answer.
3. It is possible to find different roots from different starting points, in the event that there are multiple roots (e.g. a quadratic equation may have two, etc.). This method often gives a good approximation, but there are a variety of reasons for why Newton's method may fail.