**Class 9:** *Monday, September 26*

**Differentiability and Linear Approximations**

Reading: *Smith&Minton*, Sections 3.1

You have already learned that the derivative of a function $f$ at a point $a$, if it exists, is the slope of the line tangent to the graph of $f$ at the point $(a, f(a))$. In this class you will learn an application of this concept and connections between the existence of a tangent line, local linearity and differentiability. We will also introduce the concept of a "First Order Taylor Polynomial."

**Homework 4:** *Smith&Minton* Section 3.1: 2, 6, 15, 17

**EXAM 1:** *Tuesday, September 27*

The midterm exam is in Fowler 301 and Fowler 302 from 7-9pm. You can bring your calculator as well as the Blue Notes sheet of paper in with notes handwritten on one side.

**Class 10:** *Wednesday, September 28*

**Review of Limits**

Reading: *Smith&Minton*, Sections 1.1 and 1.2.

In successively approximating the solution to an initial value problem using Euler's Method, you noticed that solutions "stabilized." The Microscope Approximation is based on the idea that some function graphs approach straight lines as you "zoom in" on a point on them. To make these ideas precise, we will introduce the idea of limits and review some of the basic calculations with them.

**Homework 4:** *Smith&Minton* Section 1.1: 5, 7, 41; Section 1.2: 11, 26 **Bonus:** *Smith&Minton* Section 1.2: 57, 58

**Class 12:** *Friday, September 30*

**The Definition of the Derivative**

Reading: Read *Smith&Minton*, Section 2.2

When we combine the formal tools of limits with the Microscope Approximation, we get a good and useful definition for the *slope* of the graph of a function or its *rate of change* at a point where the function is locally linear. This is also called the *derivative* of the function at such a point. We will use this definition to calculate derivatives for some simple functions.

**Homework 5:** *Smith&Minton* Section 2.2: 5-7, 24, 25

**Homework 4 Due in the Math 114 Course Box by 4:30 pm**