

**Class 16:** *Monday, October 10*

### Composition of Functions and the Chain Rule

Reading: *Smith & Minton* Sections 0.7 and 2.7.

If you have two functions  $f$  and  $g$  how can you use them to create a new function? One of the most important ways is by *composition* – using the output of one function as the input of the other one. The derivative of a composition of functions may be calculated using the Chain Rule. This is one of the most important and useful results about derivatives. We will use it to establish conditions under which a quotient of functions is differentiable, completing our derivation of the Quotient Rule.

**Homework 6:** *Smith & Minton* Section 0.7: 17, 26; Section 2.7: 1, 31, 38

**Lab 4:** *Monday October 10 and Tuesday, October 11*

### A Plethora of Derivatives

In this week's Lab we will have a **Derivatives gateway** exam.

**Class 17:** *Wednesday, October 12*

### Implicit Differentiation

Reading: *Smith & Minton* Section 2.8, pp. 220-225.

The Chain Rule is quite powerful. Here is an important application of this rule. Sometimes one variable is expressed implicitly rather than explicitly as a function of another variable. The Chain Rule gives you a way of determining the derivative of this *implicitly* defined function.

**Homework 6:** *Smith & Minton* Section 2.8: 1, 2, 12, 20

**Class 18:** *Friday, October 14*

### Related Rates Problems

Reading: *Smith & Minton* Section 2.8, pp. 225-226.

In some cases a relationship between two functions of the same variable can be found. The Chain Rule and other differentiation rules can then be used to find a relationship between the *derivatives* of these two functions, thus relating the rates of change of these functions.

**Homework 7:** *Smith & Minton* Section 2.8: 29, 30, 51; Problems on Homework Supplement Sheet (to be handed out in class).

**Quiz 6** (Take Home)

**Homework 6 Due in the Math 114 Course Box by 5:00 pm**