

**Homework Assignment 21: Due at the beginning of class 12/11/02**

The specific learning goals of this assignment are for you to:

- Learn to recognize composite functions by their algebraic appearance.
- Gain proficiency in identifying the “inside” and “outside” functions that make up a composite function.
- Calculate formulas for derivatives using the Chain Rule.

Over the course of the semester, you have all done an admirable job of getting to grips with some very complicated mathematics, and skillfully grappled with some very real and complicated world problems.

This homework is intended to be very straightforward. In each of the five problems on this assignment, all that you have to do is:

- Write down a formula for the “inside” function,  $p(x)$ .
- Write down a formula for the “outside” function,  $q(x)$ .
- Write down a formula for the derivative of the composite function,  $f'(x)$ .

You are **not** required to simplify any of your answers.

1.  $f(x) = (1 + x + x^2)^{100}$

2.  $f(x) = \sqrt{1 + \ln(x) + e^2}$

3.  $f(x) = \ln(1 + \sqrt{x})$

4.  $f(x) = 5 \cdot 2^{x^2 + \ln(x) + 1} + \frac{1}{\sqrt{x^2 + \ln(x) + 1}}$

5.  $f(x) = e^{\ln(x)}$