

Math 1, Fall 2003
Goals for Week 6: October 27-31, 2003

Statement of the Chain Rule: You should know the statement of the Chain Rule. You should be able to apply the Chain Rule when you are explicitly given two functions with derivatives to compose. You should be able to apply the Chain Rule given a numerical table of values for two functions and their derivatives.

Applying the Chain Rule: Given a function which is clearly the composition of two or more other functions, you should be able to apply the Chain Rule to find the derivative of the original function. You should know how to apply the Chain Rule repeatedly when the original function is the composition of three or more other functions. You should know how the Power Rule is just a special case of the Chain Rule.

A Review of Exponents and Logarithms: You should have mastery of the rules of exponents and the rules of logarithms. You should be aware of the number e and the natural logarithm, and how the two are related.

Generalized Exponential Functions: You should know what the exponential function is, and what generalized exponential functions are. You should know the basic shape of the graphs of generalized exponential functions. You should be able to graphically identify the horizontal asymptote of a generalized exponential function. You should know the shapes of the graphs of generalized exponential functions differ when $a > 1$, when $0 < a < 1$, and when $a = 1$.

Properties of Generalized Exponential Functions: You should know that all generalized exponential functions are always positive. You should know the vertical intercept of all generalized exponential functions, and why the vertical intercepts of generalized exponential functions are all the same. You should understand conceptually what a left horizontal asymptote is and what a right horizontal asymptote is. You should be able to describe a horizontal asymptote algebraically using limit notation. You should know how the horizontal asymptotes of generalized exponential functions vary as $a > 1$, $a = 1$, and $0 < a < 1$.

Differentiating Exponential Functions: You should know the formula for the derivative of generalized exponential functions. You should know a reason related to derivatives as to why the exponential function e^x is so important in calculus. You should be able to apply the product rule, chain rule, etc. to functions built using generalized exponential functions.

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Lecture Notes for Week 6: Lectures 14 and Lecture 15

Homework for Week 6: Homework 11 and Homework 12