Math 124 **Autumn 2015**

A List of Topics for the First Midterm

Here's what you should be able to do for the midterm next week.

1. Limit rules
   (a) Calculate limits using basic properties: if you know the limits of two expressions, can you find the limits of their sum, product, etc.?
   (b) Compute more difficult limits using cancellation, multiplication by the conjugate, and other algebraic tricks.
   (c) Recognize when limits tend to infinity or do not exist.
   (d) Do all of the above when x tends to ∞ or $-\infty$ rather than some real number a.
2. Graph properties
   (a) Recognize when a function is continuous, and what needs to be true for this to happen.
   (b) Compute the horizontal and vertical asymptotes of a curve.
   (c) Determine whether and where a function is differentiable.
3. Basic derivatives
   (a) Understand the relationship between derivatives and limits, and compute basic derivatives by evaluating limits.
   (b) Compute limits of monomials (via the power rule), e^x, trigonometric functions, and sums and differences of the above.
   (c) Use the product rule and quotient rule to find derivatives of functions that are products and quotients of other functions.
   (d) Find the equation for a tangent line to a function at a certain point.
   (e) Find a tangent line to a given curve based on certain information, such as a point (not on the curve) that it passes through.