Math 148 Topics for the Final Exam

You may have a notecard (4" × 6" - both sides).

Here are topics that you should master for the final.

Derivatives

- Derivative defined as an instantaneous rate of change/**slope** - §2.1
- The derivative as a function (Sketching the derivative, $f'(x) > 0 \Rightarrow f(x)$ increasing, etc.) - §2.2
- Units of the derivative and interpretation (Local Linear Approximation) - §2.3
- Concavity and the Second Derivative - §2.4
- Computing derivatives using the derivative formulas (Chain rule, product & quotient rule) - §3.1-3.4
- Applications of the derivative:
  - Finding equations of tangent lines
  - Finding local maxima & minima (Critical points, 1st & 2nd deriv. tests) - §4.1
  - Finding global maxima & minima on a closed interval - §4.3
  - Finding max profit or revenue ($MR = MC$) - §4.4

Antiderivatives

- Basic antiderivative rules & using substitution to find antiderivatives - §7.1 & 7.2
  - Don't forget the + C!

The Definite Integral

- Definite integrals as the sum of the "positive" and "negative" area between $f(x)$ and the x-axis - §5.3
- Units and interpretation of the definite integral - §5.4
- Calculating definite integrals exactly using the Fundamental Theorem of Calculus - §5.5 & 7.3
  - The final will **not** cover improper integrals.
- Sketching the function $f(x)$ given the graph of $f'(x)$ - §7.4
- Applications of the definite integral:
  - Consumer & Producer Surplus - §6.2
  - Present & Future Value - §6.3

Functions of Several Variables

- Working with functions of several variables (Increasing/decreasing in a variable) - §9.1
- Calculating partial Derivatives and interpretation (Rate of change of a function with respect to one variable while we hold the other variable constant)- §9.3 & 9.4