Math 0120
Exam #3 Review
(Chapter 5, 6.1, 7.1, 7.2)

Antiderivatives

Indefinite integrals: $\int f(x)dx = \mathbf{F}(x) + C$ where F(x) is an antiderivative of f(x).

Rewrite or expand before integration, if necessary.
Know the basic formulas, given in #1 - #4 in the back cover of the text book.
Be familiar with examples in which data is given for the evaluation of the constant of integration.
These include marginal analysis.

Definite integrals and area

Riemann sums with a specified number of rectangles to approximate.
Areas of triangles, rectangles, trapezoids to evaluate exactly.
The Fundamental Theorem of Calculus to evaluate exactly.
Definite integrals are real numbers and do not contain "+ C".

Average value of a function on [a,b]: $f_{avg} = \frac{1}{b-a}\int_a^b f(x)\,dx$

Area between two curves

Interval [a,b] is given.
Find the points of intersection within [a,b]
Use the points of intersection to divide [a,b] into subintervals
Integrate the upper curve minus the lower curve on each subinterval
(Area under a curve is the area between the curve and the x-axis.)

Area bounded by two curves:

No interval will be given.
Find all points of intersection: $c_1<c_2<\ldots<c_n$.
Use the points of intersection to divide $[c_1, c_n]$ into n-1 subintervals.
Integrate the upper curve minus the lower curve on each subinterval.

Consumers' surplus

Producers' surplus

Differentials

Integration by substitution:

Know the basic formulas, given in #5 - #7 in the back cover of the text book

Integration by parts:

Know the basic formula, given in #8 in the back cover of the text book
Review the rules in the textbook
Note the example on use with finding the present value of a continuous income stream

Functions of Several Variables

Domain
Value
First and second order partial derivatives