

Announcements

- Bonus homework and HW 13 due today.
- **Final exam: Monday, 12/10, 10:00 to 12:00, BA 057.**
 - **Covers chapters 1 through 5.5 of Strauss text.**
 - **Practice problems and solutions posted.**
 - You can also buy old finals (and solutions) from the math club. See fliers in math building.
 - Bluebooks will be provided
 - (Optional) review session Friday, 12/7, at 1:00 in CH 107
- Extra office hours this week:
 - Thursday: 10:00 to 11:30
 - Friday: review at 1:00 in CH 107 (here)

Integration by substitution

This is like the Chain Rule backwards.

Let f , g , and u be differentiable functions of x such that

$$f(x) = g(u) \frac{du}{dx}$$

Then

$$\int f(x) dx = \int g(u) \frac{du}{dx} dx = \int g(u) du = G(u) + C$$

where G is an antiderivative of g .

Substitution with definite integrals

If $f(u)$ is a continuous function of u and $u(x)$ is a differentiable function of x , then

$$\int_a^b f[u(x)]u'(x) dx = \int_{u(a)}^{u(b)} f(u) du$$

Substitution with definite integrals

We have two methods for evaluating a definite integral with substitution:

1. Use substitution to evaluate the indefinite integral, then evaluate the result between the original limits of integration.
2. Change the limits of integration to conform to the change of variable $u = u(x)$ by making the limits of integration $u(a)$ and $u(b)$.