Math 1314
Integration by Substitution
Sometimes the rules from the last lesson aren't enough. In this lesson, you will learn to integrate using substitution. This is related to the chain rule that you used in finding derivatives.

## Using Substitution to Integrate

The general idea is to simplify the integral by making a substitution into a different variable. We typically use the variable $u$ for substitutions, but you can really use anything other than the variable of the given function.

Example 1: $\int 5(5 x+2)^{3} d x$

Example 2: $\int 2 x\left(x^{2}-8\right)^{4} d x$

Example 3: $\int x \sqrt{x^{2}+1} d x$

Example 4: $\int 30 x^{2}\left(5 x^{3}+6\right)^{7} d x$

Example 5: $\int e^{-3 x} d x$

Example 6: $\int(2 x-5) e^{x^{2}-5 x+1} d x$

Example 7: $\int \frac{x}{4 x^{2}+3} d x$

Example 8: $\int \frac{(\ln x)^{4}}{x} d x$

From this section, you should be able to
Find indefinite integrals using substitution

