Integration Review

Reed Rosenbluth

Integration: The process of finding the antiderivative of a function.

1. Integral of powers

$$\int x^n dx = \frac{x^{n+1}}{n+1},\ (n \neq -1)$$

2. Chain Rule Integration

$$\int f'(g(x)) \cdot g'(x) = f(g(x)) + c$$

3. Trig Integrals (Big 6)

$$\int \cos(x)\ dx = \sin(x) + c$$

$$\int \sin(x)\ dx = -\cos(x) + c$$

$$\int \csc^2 x\ dx = -\cot(x) + c$$

$$\int \sec^2 x\ dx = \tan(x) + c$$

$$\int \sec(x)\tan(x)\ dx = \sec(x) + c$$

$$\int \csc(x)\cot(x)\ dx = -\csc(x) + c$$

4. More Trig Integrals (Big 4)

$$\int \tan^2 x\ dx = \int (\sec^2 x\ -1)dx = \tan(x) - x + c$$

$$\int \cot^2 x\ dx = \int (\csc^2 x\ -1)dx = -\cot(x) - x + c$$

$$\int \sin^2 x\ dx = \int \frac{1-\cos(2x)}{2}dx = \frac{1}{2}x - \frac{1}{4}\sin 2x + c$$

$$\int \cos^2 x\ dx = \int \frac{1+\cos(2x)}{2}dx = \frac{1}{2}x + \frac{1}{4}\sin 2x + c$$

5. Chain Rule Example

$$\int \sec^2(5x)\ dx = \frac{\tan(5x)}{5} + c$$