4 Techniques of Integration

4.1 Review of Integrals

$$\int x^n \, dx = \frac{x^{n+1}}{n+1} \qquad \int \frac{1}{x} \, dx = \ln|x|$$

$$\int e^x \, dx = e^x \qquad \int a^x \, dx = \frac{a^x}{\ln a}$$

$$\int \sin(x) \, dx = -\cos(x) \qquad \int \csc^2(x) \; = -\csc(x)$$

$$\int \cos(x) \, dx = \sin(x) \qquad \int \csc(x)\cot(x) \, dx = -\csc(x)$$

$$\int \sec^2(x) \, dx = \tan(x) \qquad \int \cot(x) \, dx = \ln|\sin(x)|$$

$$\int \sec(x)\tan(x) \, dx = \sec(x) \qquad \int \tan(x) \, dx = \ln|\sec(x)|$$

$$\int \frac{1}{x^2+1} \, dx = \tan^{-1}(x) \qquad \int \frac{1}{\sqrt{1-x^2}} \, dx = \sin^{-1}(x)$$

$$\int \frac{1}{a^2+x^2} \, dx = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)$$