

**Derivatives and Integrals of Logarithmic Functions**

$$\frac{d}{dx} \ln x = \frac{1}{x} dx \quad \text{so, } \int \frac{1}{x} dx = \ln|x| + C$$

**Derivatives of Natural Log. Functions:** Differentiate.

1)  $y = \ln(x^3 + 1)$

2)  $y = \sqrt[3]{\ln x}$

**Derivatives of Logarithmic Functions:** Differentiate.

3)  $y = \log_4 \cos x$

4)  $f(x) = \log_2(1 + 4x^{-1})$ , Find  $f'(4)$

**Indefinite Integrals of Logarithmic Functions:** Integrate.

5)  $\int \frac{e^x}{1+e^x} dx$

6)  $\int \frac{2y}{y^2 - 25} dy$

**Definite Integrals of Logarithmic Functions:** Integrate.

7)  $\int_2^3 \frac{x}{x^2+1} dx$

8)  $\int_1^2 \frac{4x+12}{(x^2+6x+1)^2} dx$

**Logarithmic Differentiation:** Use logarithmic differentiation to find the derivative of the function.

9)  $y = \frac{x^2 \sqrt[3]{7x-14}}{(1+x^2)^4}$

10)  $y = \frac{(x^2-8)^{1/3} \sqrt{x^3+1}}{x^6-7x+5}$