

$$26. \ln(3e^2)$$

$$\ln 3 + \ln e^2$$

$$\ln 3 + 2(1)$$

$$\ln 3 + 2$$

$$32. \quad 2 \left[\ln x - \ln(x+1) - \ln(x-1) \right]$$
$$\ln \left(\frac{x}{(x+1)(x-1)} \right)^{3/2}$$

$$54. \quad \frac{3}{2} \left[\ln(x^2+1) - \ln(x+1) - \ln(x-1) \right]$$

$$\sqrt{\ln \left(\frac{x^2+1}{(x+1)(x-1)} \right)^3}$$

$$\ln \sqrt{\quad}$$

$$\begin{array}{l|l} \ln 1 - e^{-1} & \ln e^{-1} \\ \ln 1 + \ln e^{-1} & -1 \ln e \\ \ln 1 - \ln e & \end{array}$$

5.1B Derivatives

A. $\frac{d}{dx}(\ln x) = \frac{1}{x}$

Ex. $\frac{d}{dx}(\ln(5x))$ $\ln 5 + \ln x$

$$u = 5x \quad y = \ln(u)$$

$$du = 5 \quad dy = \frac{1}{u}$$

$$\frac{5}{5x} = \frac{1}{x}$$

$$\underline{\underline{\text{Ex.}}} \quad \frac{d}{dx} (\ln(x^2))$$

$$u = x^2$$

$$y = \ln u$$

$$du = 2x$$

$$dy = \frac{1}{u}$$

$$\frac{dx}{x^2} = \frac{2}{x}$$

$$\underline{\underline{\text{Ex. } \frac{d}{dx} [x \ln(x)]}}$$

$$1 \cdot \ln x + \frac{1}{x} \cdot x$$

$$\ln x + 1$$

$$\text{Ex } \frac{d}{dx} [\ln(x^2)]$$

$$2 \ln x$$

$$\frac{2}{x}$$

$$\text{Ex. } \frac{d}{dx} [(\ln x)^3]$$

$$u = \ln x \quad y = u^3$$

$$du = \frac{1}{x} \quad dy = 3u^2$$

$$\frac{1}{x} \cdot 3(\ln x)^2$$

$$\frac{3(\ln x)^2}{x}$$

$$B. \frac{d}{dx} [\ln|u|] = \frac{1}{u}$$

$$y - y_1 = m(x - x_1)$$

$$\text{Ex. } f = 4x + \ln x ; (1, 4)$$

$$f' = 4 + \frac{1}{x}$$

$$f'(1) = 5$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 5(x - 1)$$

S.1B 45-57 odd
63,64,70
71a,72a