

## Derivatives of Logarithm Exercises

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

$$\begin{aligned} f(u) &= \ln u & \frac{df}{du} \cdot \frac{du}{dx} &= \frac{1}{u} \cdot a = \frac{1}{ax} \cdot a = \frac{1}{x} \\ u(x) &= ax \end{aligned}$$

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Exercise 2.)  $\frac{d}{dt} t \ln t$

$$f'(t) + (t)'f = \ln t + 1$$

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Exercise 3.)  $\frac{d}{dx} \log_{10} x$

$$\frac{d}{dx} \left( \frac{\ln x}{\ln 10} \right) = \frac{1}{\ln 10} \frac{d}{dx} (\ln x) = \frac{1}{\ln 10} \frac{1}{x} = \frac{1}{x \ln 10}$$

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Exercise 4.)  $\frac{d}{dx} 2^x$

$$\frac{d}{dx} (x^2) = 2x, \quad \frac{d}{dx} (2^x) = 2^x \ln 2$$

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