8.4 Derivatives of Logarithmic Functions

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

$$\frac{d}{dx}\ln|x| = \frac{1}{x}$$

Proof:

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$$\frac{d}{dx}b^x = b^x \ln b$$

$$\frac{d}{dx}\log_b x = \frac{1}{x \ln b}$$

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Find the derivative of each of the following:

$$y = x \ln x$$

$$f(x) = \ln(\cos x)$$

$$y = \left(\ln x\right)^4$$

$$y = \ln\frac{x}{\sqrt{x+1}}$$

$$y = 2^{x^2}$$

$$f(x) = \log_{10}\left(3x+1\right)^4$$

Sketch the graph of $f(x) = \ln\left(x^2 - 1\right)$

Domain: Intercepts: Symmetry:

Asymptotes: Intervals of Increase or Decrease:

                           Maximum or Minimum:

Concavity:

                           Points of Inflection: