Derivatives of Logarithmic Functions

1. Find the derivative of the function
(Similar to p.291 #1-22)

$$f(x) = \ln(x^2 - 2)$$

2. Find the derivative of the function
(Similar to p.291 #1-22)

$$f(x) = \ln(3x - 1)^{5/2}$$

3. Find the derivative of the function
(Similar to p.291 #1-22)

$$f(x) = \ln\left(4x(5x - 1)^7\right)$$

4. Find the derivative of the function
(Similar to p.291 #1-22)

$$f(x) = \ln\sqrt[5]{\frac{5x - 2}{3x + 5}}$$

5. Find the derivative of the function
(Similar to p.291 #1-22)

$$f(x) = \ln\frac{e^{2x} - 3}{e^x - 5}$$

6. Find the derivative of the function
(Similar to p.291 #1-22)

$$f(x) = \frac{\ln(3x-1)^2}{e^{4x}}$$

7. Evaluate the logarithm without using a calculator
(Similar to p.291 #23-28)

$$\log_3 81$$

8. Evaluate the logarithm without using a calculator
(Similar to p.291 #23-28)

$$\log_2 \frac{1}{8}$$

9. Use the change-of-base formula and a calculator to evaluate the logarithm
(Similar to p.291 #29-34)

$$\log_7 2$$

10. Find the derivative of the function
(Similar to p.291 #35-44)

$$y = \left(\frac{1}{5}\right)^{4x-2}$$

11. Find the derivative of the function
(Similar to p.291 #35-44)

$$y = \log_4(9x+1)$$

12. Find an equation of the tangent line to the graph of the function at the given point
(Similar to p.291 #45-52)

$$y = \ln x^{3/2}; \quad \left(e, \frac{3}{2}\right)$$

13. Find an equation of the tangent line to the graph of the function at the given point
(Similar to p.291 #45-52)

$$y = \ln\left(x\sqrt[3]{x-2}\right); \quad (10, \ln 20)$$

14. Find dy/dx implicitly
(Similar to p.291 #53-56)

$$\ln(xy) - y^2 + 4x = 3$$

15. Use implicit differentiation to find an equation of the tangent line to the graph of the function at the given point
(Similar to p.291 #53-56)

$$4y^3 - 2 - \ln(xy) = 1; \quad (e, 1)$$

16. Analyze and sketch the graph of the function. Label any relative extrema, points of inflection, and asymptotes
(Similar to p.292 #67-72)

$$y = x\ln\left(x^2\right)$$