Name: Date:

2F Exercises

Derivatives of Logarithms

Find the Derivatives (from 5.1)

47.
$$f(x) = \ln(3x)$$

49.
$$g(x) = \ln x^2$$

53.
$$y = \ln(t+1)^2$$

55.
$$y = \ln(x\sqrt{x^2 - 1})$$

57.
$$f(x) = \ln\left(\frac{x}{x^2 + 1}\right)$$

63.
$$y = \ln \sqrt{\frac{x+1}{x-1}}$$

71.
$$y = \ln \left| \frac{\cos x}{\cos x - 1} \right|$$

74.
$$y = \ln\sqrt{2 + \cos^2 x}$$

Use implicit differentiation to find an equation of the tangent line to the graph at the given point.

87.
$$x + y - 1 = \ln(x^2 + y^2)$$
, (1, 0)

88.
$$y^2 + \ln xy = 2$$
, $(e, 1)$

Find the Derivative (5.4)

39.
$$f(x) = e^{2x}$$

41.
$$y = e^{\sqrt{x}}$$



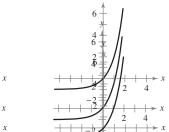
45
$$y = e^x \ln y$$



49.
$$g(t) = (e^{-t} + e^{t})^3$$



55.
$$y = \frac{e^x + 1}{e^x + 1}$$



Find the second derivative

73.
$$f(x) = (3 + 2x)e^{-3x}$$

Other Bases! Find these derivatives using the rules for bases other than e. (5.5)

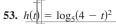
41.
$$f(x) = 4^x$$

43.
$$y = 5^{-4x}$$

$$\frac{1}{3} h(t) = \log (4 - t)^2$$

51. $y = \log_4(5x + 1)$







55.
$$y = \log_5 \sqrt{x^2 - 1}$$

57.
$$f(x) = \log_2 \frac{x^2}{x - 1}$$

Use logarithmic differentiation to solve these (i.e. take the natural log first)

67.
$$y = x^{2/x}$$

69.
$$y = (x - 2)^{x+1}$$