

More 5.1 and 5.2 Practice

5.1

Find the derivative of the function.

46. $h(x) = \ln(2x^2 + 1)$

55. $y = \ln(\ln x^2)$

47. $y = (\ln x)^4$

56. $y = \ln(\ln x)$

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

58. $y = \ln \sqrt[3]{\frac{x-1}{x+1}}$

50. $y = \ln \sqrt{x^2 - 4}$

59. $f(x) = \ln\left(\frac{\sqrt{4+x^2}}{x}\right)$

52. $f(x) = \ln\left(\frac{2x}{x+3}\right)$

64. $y = \ln|\csc x|$

53. $g(t) = \frac{\ln t}{t^2}$

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

Find the equation of the tangent line to the graph of f at the given point.

71. $f(x) = 3x^2 - \ln x$, $(1, 3)$

76. $f(x) = \frac{1}{2}x \ln(x^2)$, $(-1, 0)$

Use implicit differentiation to find dy/dx .

78. $\ln xy + 5x = 30$

Locate any relative extrema.

83. $y = \frac{x^2}{2} - \ln x$

86. $y = \frac{\ln x}{x}$

85. $y = x \ln x$

Use logarithmic differentiation to find dy/dx .

95. $y = \frac{x^2 \sqrt{3x-2}}{(x-1)^2}$

97. $y = \frac{x(x-1)^{3/2}}{\sqrt{x+1}}$

5.2

Find the indefinite integral.

1. $\int \frac{1}{x} dx$

2. $\int \frac{10}{x} dx$

4. $\int \frac{1}{x-5} dx$

5. $\int \frac{1}{3-2x} dx$

7. $\int \frac{x}{x^2+1} dx$

8. $\int \frac{x^2}{3-x^3} dx$

10. $\int \frac{x}{\sqrt{9-x^2}} dx$

11. $\int \frac{x^2+2x+3}{x^3+3x^2+9x} dx$

13. $\int \frac{x^2-3x+2}{x+1} dx$

14. $\int \frac{2x^2+7x-3}{x-2} dx$

16. $\int \frac{x^3-6x-20}{x+5} dx$

17. $\int \frac{x^4+x-4}{x^2+2} dx$

19. $\int \frac{(\ln x)^2}{x} dx$

20. $\int \frac{1}{x \ln(x^3)} dx$

22. $\int \frac{1}{x^{2/3}(1+x^{1/3})} dx$

23. $\int \frac{2x}{(x-1)^2} dx$

Find the indefinite integral.

29. $\int \frac{\cos \theta}{\sin \theta} d\theta$

31. $\int \csc 2x dx$

32. $\int \sec \frac{x}{2} dx$

34. $\int \frac{\csc^2 t}{\cot t} dt$

35. $\int \frac{\sec x \tan x}{\sec x - 1} dx$

Solve the differential equation.

$$37. \frac{dy}{dx} = \frac{3}{2-x}$$

$$40. \frac{dr}{dt} = \frac{\sec^2 t}{\tan t + 1}$$

Find the definite integral.

$$47. \int_0^4 \frac{5}{3x+1} dx$$

$$50. \int_e^{e^2} \frac{1}{x \ln x} dx$$

$$49. \int_1^e \frac{(1 + \ln x)^2}{x} dx$$