

I. Exponentials and Logarithms

A. Natural Logarithms

1. $f(x) = \ln(\sin x)$
2. $f(x) = \frac{1}{\ln x}$
3. $f(x) = \ln(x^2)$
4. $f(x) = \ln\left(\frac{10}{x}\right)$
5. $f(x) = \ln(x^{10})$
6. $f(x) = \ln(3x) + 4 \ln x + \ln 5$
7. $f(x) = x^2 \ln(2x)$
8. $f(x) = x \ln x$
9. $f(x) = \ln \frac{1}{x}$
10. $f(x) = (\ln x)^3$
11. $f(x) = x \ln(\sqrt{x})$
12. $f(x) = (\ln x)^{1/2}$
13. $f(x) = \ln\left(\frac{x-1}{x^2+1}\right)$
14. $f(x) = \ln \sqrt{\frac{x}{x^2+1}}$
15. $f(x) = x^2 \ln(1-x^2)$
16. $f(x) = \ln\left(\frac{x^2+2}{x^2+3}\right)^{2/3}$
17. $f(x) = \sin(\ln 2x)$
18. $f(x) = \frac{\ln(x^2+3)}{\ln(x^3+2)}$
19. $f(x) = \ln|x^3-x^2|$
20. $f(x) = \ln|\tan 2x|$

B. Natural Exponentials

21. $f(x) = e^{x^2}$
22. $f(x) = (x^2 + 3x)e^x$
23. $f(x) = xe^x - e^{-x}$
24. $f(x) = \frac{e^{x^2}}{e^{x-1}}$
25. $f(x) = e^{\sqrt{x}}$
26. $f(x) = e^{3x} + 2e^{2x} - 3e^x + 7$
27. $f(x) = e^{x^2-2}$
28. $f(x) = \frac{1 + e^{2x}}{2 - e^{2x}}$
29. $f(x) = e^{3x-1} - 4e^{-x}$
30. $f(x) = \cos(e^x)$
31. $f(x) = 3e^{2x} - 4e^x + 1$
32. $f(x) = e^{3 \cos(2x)}$
33. $f(x) = e^{-2x} + 4e^{-3x} + 7$
34. $f(x) = e^{2x+1}$
35. $f(x) = e^{\sin x}$
36. $f(x) = e^{2x} + e^4$
37. $f(x) = \frac{1}{1 - e^{-x}}$
38. $f(x) = \frac{e^{-x}}{x}$
39. $f(x) = x^2 e^{-x}$
40. $f(x) = e^{-1/x^2}$
41. $f(x) = e^{\sqrt{x^2+1}}$
42. $f(x) = \frac{e^{2x} - e^{-x}}{2}$
43. $f(x) = e^{2x} \tan(3x)$
44. $f(x) = e^{\sec(4x)}$
45. $f(x) = \frac{e^x + e^{2x}}{e^{3x} + e^{4x}}$

C. General Exponentials

46. $f(x) = x^2 \cdot 2^x$

47. $f(x) = 3^{5x}$

48. $f(x) = x^4 + 4^x$

49. $f(x) = 9^{-x}$

50. $f(x) = \tan(5^x)$

51. $f(x) = 3^{4x+1} + 2^{4x+2}$

52. $f(x) = 3^{x^2+1}$

53. $f(x) = 2^x$

54. $f(x) = 2^{-x}$

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

56. $f(x) = 7^{x^4}$

57. $f(x) = 3^x \tan x$

58. $f(x) = \frac{x^2 + 2^x}{x^e + e^x}$

59. $f(x) = (5x^7 + 3) \cdot 5^x$

60. $f(x) = x^{3x}$

61. $f(x) = x^{x^3+5}$

62. $f(x) = (\sin x)^x$

63. $f(x) = (\tan x)^{\sin x}$

64. $f(x) = (x^e)^x$

65. $f(x) = (x^4 + 3)^x$

II. Inverse Trig Functions

66. $f(x) = \arcsin(2x)$

67. $f(x) = \arctan(x^2)$

68. $f(x) = x \operatorname{arcsec} x$

69. $f(x) = \arcsin\left(\frac{2}{x}\right)$

70. $f(x) = \operatorname{arcsec}(2x - 3)$

71. $f(x) = 2x \arctan x$

72. $f(x) = \arctan(5x)$

73. $f(x) = \operatorname{arcsec}(x^4 + 3)$

74. $f(x) = \arctan(3x - 4)$

75. $f(x) = \arcsin\left(\frac{x}{4}\right)$

76. $f(x) = (\sin^{-1} x)^2$

77. $f(x) = (1 + x^2) \tan^{-1} x$

78. $f(x) = \tan^{-1}(\sin x)$

79. $f(x) = \frac{1}{\tan^{-1} x}$

80. $f(x) = \frac{\sin^{-1} x}{\sec^{-1} x}$

III. General Combinations

81. $f(x) = e^x \ln x$

82. $f(x) = e^{(x^2 + \ln x)}$

83. $f(x) = \frac{e^{(x^2)}}{\ln(x^2 + 5)}$

84. $f(x) = \ln(3xe^{-x})$

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

86. $f(x) = \ln(e^{\sin 2x})$

87. $f(x) = \ln(e^x + 2x)$

88. $f(x) = x^{\ln x}$

89. $f(x) = x^{(e^x)}$

90. $f(x) = x^{\tan^{-1} x}$

91. $f(x) = (\ln x)(\sin^{-1} x)$

92. $f(x) = \ln(\sin^{-1} x)$

93. $f(x) = e^{3x} \sin^{-1}(5x)$

94. $f(x) = e^x (\sin x)(\sin^{-1} x)$

95. $f(x) = e^{\tan^{-1} x}$

96. $f(x) = \frac{x^2 + \sec^{-1} x}{x^2 + \sec x}$

97. $f(x) = \arctan(\ln x)$

98. $f(x) = \operatorname{arcsec}(e^x)$

99. $f(x) = \frac{\ln(3x) + e^{4x}}{\tan^{-1}(5x)}$

100. $f(x) = x \sec^{-1}(1 + e^x)$