The Weekly Rigor

No. 166 "A mathematician is a machine for turning coffee into theorems." August 26, 2017

101 Problems in Calculating Derivatives Using the Chain Rule with Solutions

(Part 2)

52. $f(x) = \ln(\arctan(x))$
53. $f(x) = \ln(\arcsin(x))$
54. $f(x) = (\ln(2x) + \ln(x))^3$
55. $f(x) = \left(\ln^2(x^5) - \ln(x)\right)^{-2}$
56. $f(x) = \sin(3x)$
57. $f(x) = \cos\left(\frac{1}{2}x\right)$
58. $f(x) = \tan(3x)$
59. $f(x) = \sin(x^2)$
60. $f(x) = \cos\left(x^{\frac{3}{4}}\right)$
61. $f(x) = \tan(x^5)$
62. $f(x) = \sin^2(x)$
63. $f(x) = \cos^3(x)$
64. $f(x) = \tan^4(x)$
65. $f(x) = \sin^5(x^2)$
66. $f(x) = \cos^5(x^2)$
67. $f(x) = \tan^4(x^5)$
68. $f(x) = \sin(e^x)$
69. $f(x) = \tan(e^{3x})$
70. $f(x) = \arctan(3x)$
71. $f(x) = \arctan^2(x)$
72. $f(x) = \arctan^2(3x)$
73. $f(x) = \arcsin^3(x)$
74. $f(x) = \arcsin^3(x^2)$
75. $f(x) = \arccos(e^x)$
76. $f(x) = \sin(\arctan(x))$
77. $f(x) = \tan(\arcsin(x))$
78. $f(x) = \arctan(\sin(x))$
79. $f(x) = \arcsin(\tan(x))$
80. $f(x) = \arcsin(\arccos(x))$
81. $f(x) = \arctan(\arcsin(x))$
82. $f(x) = \ln(\sin(x))$
83. $f(x) = \ln\left(1 + \sqrt{x}\right)$
84. $f(x) = \tan(\sin(x))$

85. $f(x) = (x^3 + 1)^3(5 + x^2)^4$

86. $f(x) = (x^2 + 3)^4(x^2 + 2)^{\frac{3}{2}}$

87. $f(x) = (x^2 + x)^2(-x^2 + x^3)^{\frac{3}{2}}$

88. $f(x) = \sqrt{x^3 + 1}(x^2 + 1)^4$

89. $f(x) = \sin(2x)\cos(3x)$

90. $f(x) = e^{2x}\tan^3(x)$

91. $f(x) = \frac{(x^2+3)^4}{(x^2+2)^{\frac{3}{2}}}$

92. $f(x) = \frac{e^{2x}}{\sin(3x)}$

93. $f(x) = \frac{\ln(4x)}{\arctan(3x)}$

94. $f(x) = e^{\cos(4x)}$

95. $f(x) = e^{\tan(\ln(3x))}$

96. $f(x) = \sin^3(\cos(2x))$

97. $f(x) = \tan^4\left(\ln\left(e^{\sin(3x)}\right)\right)$

98. $f(x) = \ln^4\left(\cos\left(e^{\sin(x^2)}\right)\right)$

99. $f(x) = \arctan^4(\cos(\ln(5x)))$

100. $f(x) = \sin\left(\sin^2\left(\sin^3(x^4)\right)\right)$

101. $f(x) = \arctan\left(\sin\left(\ln\left(e^{\sqrt{x}}\right)\right)\right)$