The Weekly Rigor

No. 180 "A mathematician is a machine for turning coffee into theorems." December 2, 2017

101 Problems in Calculating Derivatives Using the Chain Rule with Solutions

(Part 16)

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

53. $f(x) = (\ln(2x) + \ln(x))^3$

54. $f(x) = \left(\sqrt{x} + \sqrt[3]{x^2}\right)^{\frac{4}{3}}$

55. $f(x) = \sin^5(x^2)$

56. $f(x) = \ln(2x)$

57. $f(x) = \arctan(\arcsin(x))$

58. $f(x) = \frac{1}{\sqrt[4]{\sqrt{x}+x}}$

59. $f(x) = e^{3x}$

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

61. $f(x) = \sqrt{x^2 + 3}$

62. $f(x) = \cos^3(x)$

63. $f(x) = \left(x^{\frac{3}{4}} + x^{\frac{1}{2}}\right)^{-4}$

64. $f(x) = \tan(\arcsin(x))$

65. $f(x) = \ln(\ln(x))$

66. $f(x) = \cos\left(\frac{1}{2}x\right)$

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

68. $f(x) = \frac{1}{(x^5+x^2)^{\frac{3}{7}}}$

69. $f(x) = e^{\arctan(x)}$

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

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

72. $f(x) = (x^3 + x^2 + 2)^5$

73. $f(x) = \ln(\arcsin(x))$

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

75. $f(x) = \left(x^{\frac{2}{3}} + x^{\frac{1}{2}}\right)^3$

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

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

78. $f(x) = \frac{1}{(x^4+x)^{\frac{5}{6}}}$

79. $f(x) = \ln^4(3x^5)$

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

81. $f(x) = \frac{1}{\sqrt[5]{\left(\sqrt{x}+x^{\frac{1}{3}}\right)^2}}$

82. $f(x) = \ln^3(5x)$

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

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

85. $f(x) = (x^3 + x^2 + 1)^{-\frac{1}{2}}$

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

87. $f(x) = \arcsin(\tan(x))$

88. $f(x) = \ln(\ln(2x))$

89. $f(x) = \arcsin^3(x)$

90. $f(x) = \ln^2(x)$

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

92. $f(x) = \frac{1}{(x^5+x^2)^3}$

93. $f(x) = \sin(x^2)$

94. $f(x) = \tan^4(x^5)$

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

96. $f(x) = \arccos(e^x)$

97. $f(x) = \sqrt[4]{x^3 + x^2 + 4}$

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

99. $f(x) = \left(\sqrt[3]{x^5} + \sqrt[5]{x^{\frac{9}{2}}}\right)^{\frac{4}{3}}$

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

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