1 Differentiation

Find the derivative.

1. $y = \frac{1}{x} + \sqrt{x} - \frac{1}{\sqrt{x}}$
2. $y = x^3 \left(x^2 + 1\right)^{1/3}$
3. $y = \ln \sqrt{5x^2 - 4}$
4. $y = \left(e^{x^2+2}\right)^2$
5. $y = \ln \left[\frac{(x+5)(2x-3)^2}{(2-x)}\right]$
6. $y = (3x-2)^4 \left(5x^2+3\right)^{2/3}$
7. $y = \frac{\sqrt{\ln x}}{e^{2x}}$
8. $x^2y^3 + 5xy^4 + 3y^2 = x^4 - 2x$
9. $y = 2^{x+4}$
10. $y = x - \sqrt{x^2+1}$
11. $y = \left(x^{1/3} - a^{1/3}\right)^{1/3}$
12. $y = \frac{e^{3x}}{x} + x \ln x$
13. $y = (x-1)^3 (2x+3)^{-2}$
14. $x^3 + x^2y + y^2 - x = 0$
15. $y = x \cos x$
16. $y = \frac{x^2+2}{x^2-1}$
17. $y = \sin^2 x + \tan x^3$
18. $y = \ln\left(1 + x^2\right)$
19. $y = e^{\csc x + x}$
20. $y = \frac{x^2+x}{x^2+5}$
21. $y = \left(3x^2+2\right)^5$
22. $y = x^2 \tan x$
23. $y = \sin\left(x^3\right) + \cot^2 x$
24. $y = e^{2x+3}$
25. $y = \ln\left(x^3+5\right)$
26. $x^2 + y^2 + 2y = 0$
27. $y = \left(1+2x^2\right)\left(4x^2+1\right)^5$
28. $y = \frac{1+\tan x}{1+x^2}$
29. $y = \csc 3x + \cot 2x$
30. $y = e^{-x^2} + \ln x^4$
31. $y = \log_{10} x^2 + 2^x$
32. $y = 5x^3 - 3x + \frac{2}{x} - \sqrt{x} + 3$
33. $y = \frac{x^2-5}{x^2+5}$
34. $y = \sec x + \tan^2 x - \sin x$
35. $y = \ln \cos x$
36. $y = e^{x + \cot x}$
37. $xy - y^2 = 4$
38. $y = \left(2x^3 - 3x^2 + x\right)^{2/5}$
39. $y = (1-2x)^3 \sin x$
40. $y = \frac{\sqrt{x}+1}{\sqrt{x}-1}$
41. $y = \cos^2\left(x^3+2\right) - \csc(\tan x)$
42. $x^2y - x + y^2 - y = 0$
43. $y = \ln(\sec x) + e^{x^2}$
44. $x^3 + y^3 + 7 = 0$
45. $y = 3x^2 + \frac{2}{x^2} - \sqrt[3]{2x} + \frac{10}{\sqrt{x}}$
46. $y = \left(x^2-1\right)\sqrt[3]{3-x}$
47. $y = \ln\left[e^x e^{\sqrt{x}}\right]$
48. $y = \frac{(x-1)^3}{(2x^2+3)^2}$
49. $y = x^\pi + 2^x + \frac{4}{x^3} - e^{\pi^2+2\pi-7}$
50. $y = \ln\left(\frac{3x^2-4}{5x^3-4}\right)$
51. $y = \tan\left(\frac{x-2}{x+2}\right)$
52. $y = e^{\sin^3 x^2}$
53. $y = \sqrt{1 + \cos^2 3x}$
54. $x^2 = y^2 + 25$
55. $y = \frac{3}{x^2} + \frac{x^2}{3} - (3x)^2 + \frac{1}{3x^2}$
56. $y = x^5\left(3x^2 + 5x - 7\right)^{2/3}$
57. $y = \ln \sqrt[3]{x + \cos^2 3x}$
58. $y = e^{\sqrt{x}} + \sqrt{x} \cdot e^x$
59. $y = 3\tan(2x + \pi)$

60. $y = \left[\ln x^2\right]^3$

61. $y = \frac{\sqrt{x}}{15x+3}$

62. $y = e^{x \ln x}$

63. $y = \frac{14}{e} + \ln 7 - 3\pi^2 - \frac{1}{x}$

64. $y = x\left(x+1\right)^2\left(x+2\right)^3$

65. $3xy + y^2 = 5x + 17$

66. $x^2 + xy - y^2 + 1 = 0$

67. $y = -4x^3 + \frac{5}{x} + \sqrt{x} + \ln 2x$

68. $y = \frac{\sqrt{x^2-4}}{x+4}$

69. $y = x\left(\cos 2x\right)^3$

70. $y = e^{\tan x} + \ln\left(\frac{1+x}{2-x}\right)$

71. $y = \frac{\sqrt{x+1}\left(x^2+3\right)^5}{x+2}$

72. $\sqrt{xy} = \frac{1}{x} + \frac{1}{y}$

73. $y = \frac{5}{x} + \frac{x}{5} + \sqrt[5]{x} + x^5 + x^{-5}$

74. $y = (3x)^{2e}$

75. $y = \frac{3x^2+8}{2x^3-x^2}$

76. $y = \sqrt{2x^2+1}\left(5x^3+x\right)^4$

77. $y = \tan^2 x + \sec x^2 - \sqrt{\cot x} + \csc\left(\ln x\right)$

78. $y = \frac{x\sqrt{x+1}}{x+5}$

79. $y = (5x)^3 - 3x^4 + \frac{6}{\cos x}$

80. $y = \frac{x^2+3x-1}{(x^3-5)^2}$

81. $y = e^{\pi} + \sqrt{\cos x^2} - \frac{1}{3\sqrt{x}}$

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

83. $xy^2 - 2x^3 = 2$

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

85. $y = (3x-4)^2(2x-1)^2$

86. $xy = (x-y)^2 + 1$

87. $y = \frac{(x+1)^{1/3}}{2x^{1/6}}$

88. $y = \sin^2 2x + \tan x^3$

89. $y = \ln\left(x^3 - 2x^2 + x - 1\right)$

90. $y = e^{x^2 \sec x}$

91. $y = x^{\sqrt[3]{x}}$

92. $y = \ln \sin x$

93. $y^3 = 4 + 2yx + x^2$

94. $y = 3x^2 + \frac{2}{x^2} - \sqrt{x} + 10$

95. $y = \left(x^2 - x\right)^{10}\left(x^3 + 2x - 1\right)$

96. $y = \frac{e^{x^2+2x}}{(x^3+1)^{4/3}}$

97. $y = \ln\left[\frac{\sqrt{(x^3+1)^5}}{(x^2-1)^3}\right]$

98. $y = x^{x^2}$

99. $y = 3x^{1/3} - 2x^{-2/5}$

100. $y = 2\left(x^4 - 5\right)^9$

101. $y = x^7 e^{3x}$

102. $y = \ln\left(\frac{x}{3x^2+1}\right)$

103. $y = (2x-3)\left(\tan x + 1\right)^2$

104. $y = \left(2 - e^{x^2}\right)^3 + \log_3 x$

105. $y = (2x)^{\cos x}$

106. $xy^2 + y\ln x = x$

107. $y = \left(2x^3\right)\sqrt{3x^2-1}$

108. $y = \left[\ln\left(x^2+1\right)\right]^2 - \ln\left[\left(x^2+1\right)^2\right]$

109. $y = \frac{2x^3}{[\tan(3x+1)]^2}$

110. $x^5 + xy - y^5 = 8x^2$

111. $y = (x+3)^2\left(x^2 - 2x\right)$

112. $y = \sqrt[3]{x^2 + \sqrt{x}}$

113. $y = \frac{e^{\sin x}}{2x-5}$

114. $y = (\cos x)^{\ln x}$

115. $y = \sqrt{\tan 2x} - \sec^3(4x-1)$

116. $y = \ln\left[\frac{\left(3x^2-2x\right)^2(x-1)}{e^{x^2-2x}}\right]$

117. $y = x^2 \cos x$

118. $y = \sin 2\theta$ and $\theta = 3x + \pi/6$

119. $\ln(xy) + x + y^2 = 2$

120. $y = (x+1)^{1/x}$

121. $y = \ln\left[\frac{e^x+1}{x+5}\right]$

122. $y = \tan\sqrt{x}\sec x^2$

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

124. $y = e^{x^2} + \ln\left(2^{x^2}+1\right)$

125. $y = (\ln x)^{x^2}$

126. $y = \frac{5x^2\csc^4 7x}{2}$

127. $y = \frac{1}{\left(\sqrt[3]{5-2x^3}\right)^2}$

128. $y = \frac{\tan(5x-\pi)}{e^{4+x^2}}$

129. $y = 7\ln\left[\frac{1}{x}\right] + \frac{3}{\ln 4x} + (\ln 2)^{-x}$

130. $y = \sqrt{\tan^3 5x}$

131. $y = \log\left(\frac{x}{x+3}\right)$

132. $y = x^2\sin\sqrt{x}$

133. $y = 3^{x\ln x}$

134. $y = \left(x^2+1\right)^{2x-1}$

135. $y = 2u - 1$ and $\frac{du}{dx} = \frac{x+1}{x-1}$

136. $y = \sqrt{\sec 2x}$

137. $y = 4x\left(x^2-9\right)^5$

138. $\cos(x+y) = y\sin x$

139. $y = \ln\left[\frac{x^2}{x^2+1}\right] + e^{x^3-1}$

140. $y = (3x)^{2x}$

141. $y = \sin^4\left(3e+x^2\right)$

142. $y = \ln\frac{\left(3x^5-2x^3\right)^4}{\sqrt[3]{x^4+5x}}$

143. $y = \csc\left[\frac{3x-1}{x^2+1}\right]$

144. $y = \left(x^2+1\right)^{x^2}$

Answers:

1. $\frac{dy}{dx} = -\frac{1}{x^2} + \frac{1}{2\sqrt{x}} + \frac{1}{2x^{3/2}}$

2. $\frac{dy}{dx} = \frac{x^2\left(11x^2+9\right)}{3(x^2+1)^{2/3}}$

3. $\frac{dy}{dx} = \frac{5x}{5x^2-4}$

4. $\frac{dy}{dx} = 4x\left(e^{x^2}+2\right)^2$

5. $\frac{dy}{dx} = \frac{1}{x+5} + \frac{4}{2x-3} + \frac{1}{2-x}$

6. $\frac{dy}{dx} = \frac{4(3x-2)^3\left(60x^2-10x+27\right)}{3(5x^2+3)^{1/3}}$

7. $\frac{dy}{dx} = \frac{1-4x\ln x}{2xe^{2x}\sqrt{\ln x}}$

8. $\frac{dy}{dx} = \frac{4x^3-2xy^3-5y^4-2}{3x^2y^2+20xy^3+6y}$

9. $\frac{dy}{dx} = 2^{x+4}\ln 2$

10. $\frac{dy}{dx} = 1 - \frac{x}{\sqrt{x^2+1}}$

11. $\frac{dy}{dx} = \frac{1}{9x^{2/3}\left(x^{1/3}-a^{1/3}\right)^{2/3}}$

12. $\frac{dy}{dx} = \frac{(3x-1)e^{3x}}{x^2} + 1 + \ln x$

13. $\frac{dy}{dx} = \frac{(2x+13)(x-1)^2}{(2x+3)^3}$

14. $\frac{dy}{dx} = \frac{1-3x^2-2xy}{x^2+2y}$

15. $\frac{dy}{dx} = \cos x - x\sin x$

16. $\frac{dy}{dx} = \frac{-6x}{(x^2-1)^2}$

17. $\frac{dy}{dx} = 2\sin x\cos x + 3x^2\sec^2 x^3$

18. $\frac{dy}{dx} = \frac{2x}{1+x^2}$

19. $\frac{dy}{dx} = (-\csc x\cot x + 1)\,e^{\csc x+x}$

20. $\frac{dy}{dx} = \frac{-x^2+10x+5}{(x^2+5)^2}$

21. $\frac{dy}{dx} = 30x\left(3x^2+2\right)^4$

22. $\frac{dy}{dx} = 2x\tan x + x^2\sec^2 x$

23. $\frac{dy}{dx} = 3x^2\cos x^3 - 2\cot x\csc^2 x$

24. $\frac{dy}{dx} = 2e^{2x+3}$

25. $\frac{dy}{dx} = \frac{3x^2}{x^3+5}$

26. $\frac{dy}{dx} = \frac{-x}{y+1}$

27. $\frac{dy}{dx} = 4x\left(4x^2+1\right)^4\left(24x^2+11\right)$

28. $\frac{dy}{dx} = \frac{\left(1+x^2\right)\sec^2 x - 2x(1+\tan x)}{(1+x^2)^2}$

29. $\frac{dy}{dx} = -3\csc 3x \cot 3x - 2\csc^2 2x$

30. $\frac{dy}{dx} = -2xe^{-x^2} + \frac{4}{x}$

31. $\frac{dy}{dx} = \frac{2}{x \ln 10} + 2^x \ln 2$

32. $\frac{dy}{dx} = 15x^2 - 3 - \frac{2}{x^2} - \frac{1}{2\sqrt{x}}$

33. $\frac{dy}{dx} = \frac{20x}{(x^2+5)^2}$

34. $\frac{dy}{dx} = \sec x \tan x \left(1 + 2\sec x\right) - \cos x$

35. $\frac{dy}{dx} = -\tan x$

36. $\frac{dy}{dx} = -e^{x+\cot x}\cot^2 x$

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

38. $\frac{dy}{dx} = \frac{2\left(6x^2-6x+1\right)}{5\left(2x^3-3x^2+x\right)^{3/5}}$

39. $\frac{dy}{dx} = (1-2x)^2\left[-6\sin x + (1-2x)\cos x\right]$

40. $\frac{dy}{dx} = \frac{-1}{\left(\sqrt{x}-1\right)^2\sqrt{x}}$

41. $\frac{dy}{dx} = -6x^2\cos\left(x^3+2\right)\sin\left(x^3+2\right) + \csc\left(\tan x\right)\cot\left(\tan x\right)\sec^2 x$

42. $\frac{dy}{dx} = \frac{1-2xy}{x^2+2y-1}$

43. $\frac{dy}{dx} = \tan x + 2xe^{x^2}$

44. $\frac{dy}{dx} = -\frac{x^2}{y^2}$

45. $\frac{dy}{dx} = 6x - \frac{4}{x^3} - \frac{\sqrt[3]{2}}{3x^{2/3}} - \frac{5}{x^{3/2}}$

46. $\frac{dy}{dx} = \frac{-7x^2+18x+1}{3(3-x)^{2/3}}$

47. $\frac{dy}{dx} = \frac{1+2\sqrt{x}}{2\sqrt{x}}$

48. $\frac{dy}{dx} = \frac{-(x-1)^2\left(2x^2-8x-9\right)}{(2x^2+3)^3}$

49. $\frac{dy}{dx} = \pi x^{\pi-1} + 2^x \ln 2 - \frac{12}{x^4}$

50. $\frac{dy}{dx} = \frac{6x}{3x^2-4} - \frac{15x^2}{5x^3-4}$

51. $\frac{dy}{dx} = \frac{4}{(x+2)^2}\sec^2\left(\frac{x-2}{x+2}\right)$

52. $\frac{dy}{dx} = 6x\sin^2 x^2 \cdot \cos x^2 \cdot e^{\sin^3 x^2}$

53. $\frac{dy}{dx} = \frac{-3\cos 3x \sin 3x}{\sqrt{1+\cos^2 3x}}$

54. $\frac{dy}{dx} = \frac{x}{y}$

55. $\frac{dy}{dx} = -\frac{6}{x^3} + \frac{2x}{3} - 18x - \frac{2}{3x^3}$

56. $\frac{dy}{dx} = \frac{x^4\left(57x^2+85x-105\right)}{3(3x^2+5x-7)^{1/3}}$

57. $\frac{dy}{dx} = \frac{1-3\sin 6x}{3(x+\cos^2 3x)}$

58. $\frac{dy}{dx} = \frac{e^{\sqrt{x}}+(2x+1)e^x}{2\sqrt{x}}$

59. $\frac{dy}{dx} = 6\sec^2\left(2x+\pi\right)$

60. $\frac{dy}{dx} = \frac{24\ln^2 x}{x}$

61. $\frac{dy}{dx} = \frac{1-5x}{6(5x+1)^2\sqrt{x}}$

62. $\frac{dy}{dx} = (1+\ln x)\, e^{x\ln x}$

63. $\frac{dy}{dx} = \frac{1}{x^2}$

64. $\frac{dy}{dx} = 2\left(x+1\right)\left(x+2\right)^2\left(3x^2+5x+1\right)$

65. $\frac{dy}{dx} = \frac{5-3y}{3x+2y}$

66. $\frac{dy}{dx} = \frac{2x+y}{2y-x}$

67. $\frac{dy}{dx} = -12x^2 - \frac{5}{x^2} + \frac{1}{2\sqrt{x}} + \frac{1}{x}$

68. $\frac{dy}{dx} = \frac{4(x+1)}{(x+4)^2\sqrt{x^2-4}}$

69. $\frac{dy}{dx} = \cos^2 2x\left(\cos 2x - 6x\sin 2x\right)$

70. $\frac{dy}{dx} = e^{\tan x}\sec^2 x + \frac{1}{x+1} - \frac{1}{x-2}$

71. $\frac{dy}{dx} = \frac{\sqrt{x+1}\left(x^2+3\right)^5}{x+2}\cdot\left[\frac{1}{2(x+1)} + \frac{10x}{x^2+3} - \frac{1}{x+2}\right]$

72. $\frac{dy}{dx} = -\frac{y^2\left(x^{3/2}\sqrt{y}+2\right)}{x^2\left(y^{3/2}\sqrt{x}+2\right)}$

73. $\frac{dy}{dx} = -\frac{5}{x^2} + \frac{1}{5} + \frac{1}{5x^{4/5}} + 5x^4 - \frac{5}{x^6}$

74. $\frac{dy}{dx} = 6e\left(3x\right)^{2e-1}$

75. $\frac{dy}{dx} = \frac{-2\left(3x^3+24x-8\right)}{x^3(2x-1)^2}$

76. $\frac{dy}{dx} = \frac{2x^3\left(5x^2+1\right)^3\left(65x^4+35x^2+2\right)}{\sqrt{2x^2+1}}$

77. $\frac{dy}{dx} = 2\tan x\sec^2 x + 2x\sec x^2\tan x^2 + \frac{\csc^2 x}{2\sqrt{\cot x}} - \frac{\csc(\ln x)\cot(\ln x)}{x}$

78. $\frac{dy}{dx} = \frac{x^2+15x+10}{2(x+5)^2\sqrt{x+1}}$

79. $\frac{dy}{dx} = 375x^2 - 12x^3 + 6\sec x\tan x$

80. $\frac{dy}{dx} = \frac{-4x^4-15x^3+6x^2-10x-15}{(x^3-5)^3}$

81. $\frac{dy}{dx} = -\frac{x\sin x^2}{\sqrt{\cos x^2}} + \frac{1}{6x^{3/2}}$

82. $\frac{dy}{dx} = (x+1)^{x-1}\left[\ln(x+1) + \frac{x-1}{x+1}\right]$

83. $\frac{dy}{dx} = \frac{6x^2-y^2}{2xy}$

84. $\frac{dy}{dx} = \frac{2}{x} + \frac{2x}{3+2x^2} - \frac{6\left(2x^2+1\right)}{x(x^2+1)}$

85. $\frac{dy}{dx} = 2(3x-4)(2x-1)(12x-11)$

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

87. $\frac{dy}{dx} = \frac{x-1}{12x^{7/6}(x+1)^{2/3}}$

88. $\frac{dy}{dx} = 2\sin 4x + 3x^2\sec^2 x^3$

89. $\frac{dy}{dx} = \frac{3x^2-4x+1}{x^3-2x^2+x-1}$

90. $\frac{dy}{dx} = \left(2x\sec x + x^2\sec x\tan x\right)e^{x^2\sec x}$

91. $\frac{dy}{dx} = x^{\sqrt[3]{x}}\left[\frac{3+\ln x}{3x^{2/3}}\right]$

92. $\frac{dy}{dx} = \cot x$

93. $\frac{dy}{dx} = \frac{2(y+x)}{3y^2-2x}$

94. $\frac{dy}{dx} = 6x - \frac{4}{x^3} - \frac{1}{2\sqrt{x}}$

95. $\frac{dy}{dx} = 10\left(x^2-x\right)^9\left(x^3+2x-1\right)(2x-1)$
$+\left(x^2-x\right)^{10}\left(3x^2+2\right)$

96. $\frac{dy}{dx} = 2e^{x^2+2x}\left[\frac{x^4+x^3-2x^2+x+1}{(x^3+1)^{7/3}}\right]$

97. $\frac{dy}{dx} = \frac{15x^2}{2(x^3+1)} - \frac{6x}{x^2-1}$

98. $\frac{dy}{dx} = x^{x^2+1}(1+2\ln x)$

99. $\frac{dy}{dx} = \frac{1}{x^{2/3}} + \frac{4}{5x^{7/5}}$

100. $\frac{dy}{dx} = 72x^3\left(x^4-5\right)^8$

101. $\frac{dy}{dx} = x^6(7+3x)e^{3x}$

102. $\frac{dy}{dx} = \frac{1}{x} - \frac{6x}{3x^2+1}$

103. $\frac{dy}{dx} = 2(\tan x+1)^2$
$+2(2x-3)(\tan x+1)\sec^2 x$

104. $\frac{dy}{dx} = -6x\left(2-e^{x^2}\right)^2 e^{x^2} + \frac{1}{x\ln 3}$

105. $\frac{dy}{dx} = (2x)^{\cos x}\left(-\sin x\ln 2x + \frac{\cos x}{x}\right)$

106. $\frac{dy}{dx} = \frac{x-xy^2-y}{x(2xy+\ln x)}$

107. $\frac{dy}{dx} = \frac{6x^2\left(4x^2-1\right)}{\sqrt{3x^2-1}}$

108. $\frac{dy}{dx} = \frac{4x\left[\ln\left(x^2+1\right)-1\right]}{x^2+1}$

109. $\frac{dy}{dx} = \frac{6x^2\left[\tan(3x+1)-2x\sec^2(3x+1)\right]}{\tan^3(3x+1)}$

110. $\frac{dy}{dx} = \frac{16x-5x^4-y}{x-5y^4}$

111. $\frac{dy}{dx} = 2(x+3)\left(2x^2-3\right)$

112. $\frac{dy}{dx} = \frac{1+4x\sqrt{x}}{6\sqrt{x}\left(x^2+\sqrt{x}\right)^{2/3}}$

113. $\frac{dy}{dx} = \left[\frac{(2x-5)\cos x-2}{(2x-5)^2}\right]e^{\sin x}$

114. $\frac{dy}{dx} = (\cos x)^{\ln x}\left(\frac{\ln(\cos x)}{x} - \ln x\cdot\tan x\right)$

115. $\frac{dy}{dx} = \frac{\sec^2 2x}{\sqrt{\tan 2x}} - 12\sec^3(4x-1)\tan(4x-1)$

116. $\frac{dy}{dx} = \frac{2}{x} + \frac{6}{3x-2} + \frac{1}{x-1} - 2x + 2$

117. $\frac{dy}{dx} = 2x\cos x - x^2\sin x$

118. $\frac{dy}{dx} = 6\cos\left(6x+\frac{\pi}{3}\right)$

119. $\frac{dy}{dx} = \frac{-y(1+x)}{x(1+2y^2)}$

120. $\frac{dy}{dx} = (x+1)^{1/x}\left[-\frac{\ln(x+1)}{x^2} + \frac{1}{x(x+1)}\right]$

121. $\frac{dy}{dx} = \frac{e^x}{e^x+1} - \frac{1}{x+5}$

122. $\frac{dy}{dx} = \frac{\sec^2\sqrt{x}\cdot\sec x^2}{2\sqrt{x}}$
$+2x\sec x^2\tan x^2\tan\sqrt{x}$

123. $\frac{dy}{dx} = \frac{-5(2x+1)}{(3x+1)^{2/3}(2x-1)^3}$

124. $\frac{dy}{dx} = 2xe^{x^2} + \frac{2\ln 2\cdot x2^{x^2}}{2^{x^2}+1}$

125. $\frac{dy}{dx} = (\ln x)^{x^2}\left[2x\ln(\ln x) + \frac{x}{\ln x}\right]$

126. $\frac{dy}{dx} = 5x\csc^4 7x - 70x^2\csc^4 7x\cot 7x$

127. $\frac{dy}{dx} = \frac{4x^2}{(5-2x^3)^{5/3}}$

128. $\frac{dy}{dx} = \frac{5\sec^2(5x-\pi)-2x\tan(5x-\pi)}{e^{4+x^2}}$

129. $\frac{dy}{dx} = -\frac{7}{x} - \frac{3}{x\ln^2 4x} - \frac{\ln(\ln 2)}{(\ln 2)^x}$

130. $\frac{dy}{dx} = \frac{15}{2}\sec^2 5x\cdot\sqrt{\tan 5x}$

131. $\frac{dy}{dx} = \frac{3}{x(x+3)\ln 10}$

132. $\frac{dy}{dx} = 2x\sin\sqrt{x} + \frac{1}{2}x^{3/2}\cos\sqrt{x}$

133. $\frac{dy}{dx} = 3^{x\ln x}(1+\ln x)\ln 3$

134. $\frac{dy}{dx} = (x^2+1)^{2x-1}\left(2\ln\left(x^2+1\right) + \frac{2x(2x-1)}{x^2+1}\right)$

135. $\frac{dy}{dx} = \frac{2(x+1)}{x-1}$

136. $\frac{dy}{dx} = \tan 2x\sqrt{\sec 2x}$

137. $\frac{dy}{dx} = 4\left(x^2-9\right)^4\left(11x^2-9\right)$

138. $\frac{dy}{dx} = -\frac{\sin(x+y)+y\cos x}{\sin(x+y)+\sin x}$

139. $\frac{dy}{dx} = \frac{2}{x} - \frac{2x}{x^2+1} + 3x^2e^{x^3-1}$

140. $\frac{dy}{dx} = 2\left(3x\right)^{2x}\left(\ln 3x + 1\right)$

141. $\frac{dy}{dx} = 8x\sin^3\left(3e+x^2\right)\cos\left(3e+x^2\right)$

142. $\frac{dy}{dx} = \frac{12}{x} + \frac{24x}{3x^2-2} - \frac{1}{3x} - \frac{x^2}{x^3+5}$

143. $\frac{dy}{dx} = \frac{3x^2-2x-3}{(x^2+1)^2}\csc\frac{3x-1}{x^2+1}\cot\frac{3x-1}{x^2+1}$

144. $\frac{dy}{dx} = \left(x^2+1\right)^{x^2}\cdot\left[2x\ln\left(x^2+1\right) + \frac{2x^3}{x^2+1}\right]$