Math 30

Date: _____ **Derivative Gateway Test** **Name:** _____

Find the derivative of each of the following functions. Do not simplify your answers.
Be careful when writing answers, since all errors count, including missing parentheses! **No notes or calculators allowed.**
Time Limit: 20 minutes.

5. $h(t) = (t^2 - 6t)^4 - t + \sqrt{2}$

37. $F(x) = (2x + 1)^{6e}(x^2 - 5)$

43. $y = \dfrac{\sqrt{t}}{t - \pi}$

64. $y = \dfrac{1}{x^{-5/2} + \sqrt{x}}$

97. $f(t) = (\ln 0.4)(0.4)^t$

101. $y = x\cos(2x^2 - x - 1)$

130. $s(t) = -\dfrac{g}{2}t^2 + v_0 t$, where g, v_0 are constants

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19. $y = \dfrac{(t^2+1)^5}{5} + \pi t$

22. $y = (x^2 - 5)\ln x$

52. $f(z) = \dfrac{z}{e^{2z} + e^z}$

72. $H = (1-t^3)^{-3} + (t^2+1)^{1/3}$

82. $y = e^{-x^2}$

110. $y = x^2\sqrt{1-x^4}$

138. $h(r) = 2\pi r^2 + \dfrac{80}{r}$

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11. $H = \left(\frac{s^2}{2} + 4\right)^3 - 2s$

24. $G = (\cos 2\phi)(\ln \frac{1}{2}\phi)$

48. $A = \dfrac{s^2 - s}{4s^3 - 2s + 1}$

79. $y = \sqrt[4]{t} - \dfrac{1}{t^3 - 1}$

93. $f(t) = 0.004e^{-0.0032t}$

110. $y = x^2\sqrt{1 - x^4}$

138. $h(r) = 2\pi r^2 + \dfrac{80}{r}$

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19. $y = \dfrac{(t^2+1)^5}{5} + \pi t$

31. $f(x) = \sqrt{x+1}\tan(\pi x)$

57. $f(x) = \dfrac{\ln x + \ln 5}{x^5 + \pi}$

67. $h(t) = \sqrt{e^{3t}+4}$

81. $y = ex + e^x$

108. $y = x^4 \ln(4.7x)$

121. $y = (ax)^2 + bx + c$, where a, b, c are constants

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

32. $f(s) = (s-1)\ln(s^2+1)$

47. $V = \dfrac{6^r}{2r+1}$

70. $g(\theta) = 2\theta + \dfrac{\sin\theta}{\theta}$

95. $f(t) = 1 + \dfrac{e^{2t}}{2}$

115. $f(x) = \sqrt{\ln x} + ex^2$

130. $s(t) = -\dfrac{g}{2}t^2 + v_0 t$, where g, v_0 are constants

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18. $y = (t^3 - 3t^2 + 4t - 2)^6 - 2\ln 2$

39. $H(x) = e^{-2x}\sin(x + \pi)$

52. $f(z) = \dfrac{z}{e^{2z} + e^z}$

72. $H = (1 - t^3)^{-3} + (t^2 + 1)^{1/3}$

87. $y = \frac{1}{2}(e^x - e^{-x})$

116. $F(s) = \ln\big(\cos(2s) + 2\big)$

138. $h(r) = 2\pi r^2 + \dfrac{80}{r}$

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13. $f(x) = (x \ln 3)^3 - 5x^2 - x$

38. $g(x) = \sqrt{x}\ln(x-3)$

50. $y = \dfrac{e^{2x}}{1 - e^{-x/2}}$

70. $g(\theta) = 2\theta + \dfrac{\sin\theta}{\theta}$

83. $y = 2^x + 3^2$

112. $f(x) = \left(\dfrac{2}{\sin x}\right)^3$

139. $h(r) = 2r^8\sqrt{1-r^2}$

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

26. $y = (x^2 - 3x)\cos(2x + 1)$

52. $f(z) = \dfrac{z}{e^{2z} + e^z}$

70. $g(\theta) = 2\theta + \dfrac{\sin\theta}{\theta}$

91. $f(t) = 5^{\sin t}$

103. $y = \dfrac{\ln(x+3)}{x^2}$

131. $g(y) = \cos(\ln y)$

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10. $B(\theta) = \sqrt{\frac{2\theta^3 - \theta - \pi}{2}} - \theta$

34. $f(\theta) = (\cos\theta)(\sin\frac{2}{\pi}\theta)$

50. $y = \dfrac{e^{2x}}{1 - e^{-x/2}}$

78. $y = t(t^3 - 4)^{1/4}$

92. $f(t) = 24(1.04)^t$

110. $y = x^2\sqrt{1 - x^4}$

122. $y = xe^{bx}$, where b is a constant

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

21. $y = e^t \sin(\pi t - 1)$

45. $y = \dfrac{x^2}{\ln x}$

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

90. $y = 4e^{3x+1}$

110. $y = x^2\sqrt{1 - x^4}$

133. $g(y) = \pi \cos(2\pi y)$