Math 121 HW #5

Due: Mar. 30

Chapter 11.1

14. Use the definition of derivative to find

$$\frac{d}{dx}(x^2 - x - 3)$$

and show your work.

Chapter 11.2

Differentiate the following functions

4. $f(x) = x^{21}$
6. $x^{5.3}$
9. $g(x) = 8w^7$
15. $f(x) = x + 3$
19. $g(p) = p^4 - 3p^3 - 1$
21. $x^3 - \sqrt{x}$
24. $V(r) = r^8 - 7r^6 + 3r^2 + 1$
35. $x^{3/4} + 2x^{5/3}$
36. $5x^3 - x^{-2/5}$
40. $y = 4x^{2/8}$
44. $f(x) = 100x^{-3} + 10x^{1/2}$
49. $$g(x) = \frac{4}{3x^3}$$
55. $-9x^{1/3} + 5x^{-2/5}$
61. $y = x^2\sqrt{x}$
62. $f(x) = (2x^3)(4x^2)$
68. $f(x) = x^{3/5}(x^2 + 7x + 11)$
73. $$w(x) = \frac{x^2 + x^3}{x^2}$$
74. $$f(x) = \frac{7x^3 + x}{6\sqrt{x}}$$

Chapter 11.4

Differentiate the following functions, likely using the product or quotient rules.

11. $f(w) = (w^2 + 3w - 7)(2w^3 - 4)$
15. $F(p) = \frac{3}{2}(5\sqrt{p} - 2)(3p - 1)$
16. $f(x) = (\sqrt{x} + 5x - 2)(x^{1/3} - 3\sqrt{x})$
21. $$y = \frac{5x}{x - 1}$$
28. $$z = \frac{2x^2 + 5x - 2}{3x^2 + 5x + 3}$$
30. $$f(x) = \frac{x^3 - x^2 + 1}{x^2 + 1}$$
33. $$g(x) = \frac{1}{x^{100} + 7}$$
40. $$q(x) = 2x^3 + \frac{5x + 1}{3x - 5} - \frac{2}{x^3}$$

Chapter 12.1

Differentiate the following functions. Using the rules of logarithms effectively may make many of these problems easier.

1. $y = 4\log x$
5. $y = \log(x^2)$
12. $y = x^2 \log x$
24. $y = 6\log(x^{1/3})$
38. $y = x^{\log 2}$

Chapter 12.2

Differentiate the following functions. Using properties of exponentials will be necessary.

1. $y = 5e^x$
5. $y = e^{9-5x}$
9. $y = xe^x$
10. $y = 3x^4e^{-x}$
14. $$y = \frac{e^x - e^{-x}}{e^x + e^{-x}}$$
16. $y = 2^x x^2$
17. $$f(w) = e^{2w}w^2$$
24. $y = e^{2x}(x + 6)$
26. $y = e^{-x} \log x$
28. $y = \log(e^{4x+1})$