Section 2.3 The Chain Rule (Minimum problems: 17 – 38 odds)

#1-10: Find $f[g(x)]$, and do not simplify your answer!!!

1) $f(x) = x^3;\ \ g(x) = x^2 + 1$ 2) $f(x) = x^4;\ \ g(x) = 4x^2 + 5$

3) $f(x) = 5x^2;\ \ g(x) = 3x - 4$ 4) $f(x) = 4x^2;\ \ g(x) = 2x - 5$

5) $f(x) = 7x^{2/3};\ \ g(x) = 5x + 4$ 6) $f(x) = 8x^{3/4};\ \ g(x) = 6x + 4$

7) $f(x) = e^x;\ \ g(x) = x^2 + 2x + 1$ 8) $f(x) = e^x;\ \ g(x) = 4x^2 + x - 5$

9) $f(x) = ln(x);\ g(x) = 3x + 5$ 10) $f(x) = ln(x);\ g(x) = 2x - 7$

#11-16: Create two functions $f(x)\ and\ g(x)$ whose composition is the given function $f[g(x)]$

11) $f[g(x)] = (7z - 3)^2$ 12) $f[g(x)] = (8z - 5)^2$

13) $f[g(x)] = 2(4x + 7)^5$ 14) $f[g(x)] = 3(5x + 4)^4$

15) $f[g(x)] = \sqrt{x + 5}$ 16) $f[g(x)] = \sqrt[3]{7x + 1}$

#17-24: Use the Chain rule to find the derivative of each function.

$\frac{d}{dx} f[g(x)] = g'(x) * f'[g(x)]$

17) $h(x) = (7x - 3)^2$ 18) $h(x) = (8x - 5)^2$

19) $h(x) = 2(4x + 7)^5$ 20) $h(x) = 3(5x + 4)^4$

21) $h(x) = 4(2x - 1)^3$ 22) $h(x) = 2(5x - 6)^3$

23) $h(x) = (x^2 + 6x + 1)^3$ 24) $h(x) = (3x^2 - 5x + 2)^3$

#25-46: Find the derivative of each function.

25) $y = 5x(2x - 4)^3$ 26) $y = 5x(7x + 1)^3$

27) $g(t) = 6t^2(2t + 5)^2$ 28) $g(t) = 5t^2(4t - 1)^2$

29) $h(y) = (6y - 3)(5y + 4)^2$ 30) $f(y) = (2y - 3)(3y - 4)^2$

31) $y = \frac{2}{(3x-4)^2}$ 32) $y = \frac{5}{(2x-9)^3}$

33) $y = \frac{2x}{(3x-4)^4}$ 34) $y = \frac{5x}{(2x-9)^3}$

#35-38:

a) Find all values of x where the tangent line is horizontal

b) Find the equation of the tangent line to the graph of the function for the values of x found in part a.

35) $f(x) = (2x - 3)^2$

36) $f(x) = (3x - 4)^2$

37) $y = 5(x + 3)^4$

38) $y = 7(5x - 6)^2$