cálculo 1, stewart, vol 1, ed 5, cap 3.5

1 $f(x) = \operatorname{sen}(4x)$ $\quad F(x) = \operatorname{sen}(x)$ $\quad F'(x) = \cos(x)$

$G(x) = 4x$ $\quad G'(x) = 4$

$F'(x) = F'(G(x)) \cdot G'(x) = \cos(4x) \cdot 4 = 4\cos(4x)$

3 $f(x) = (1-x^2)^{10}$ $\quad F(x) = x^{10}$ $\quad F'(x) = 10x^9$

$G(x) = 1-x^2$ $\quad G'(x) = -2x$

$F'(x) = 10(1-x^2)^9 \cdot -2x = -20x(1-x^2)^9$

5 $f(x) = e^{\sqrt{x}}$ $\quad F(x) = e^x$ $\quad F'(x) = e^x$

$G(x) = \sqrt{x}$ $\quad G'(x) = \frac{1}{2}x^{-1/2}$

$f'(x) = e^{\sqrt{x}} \cdot \frac{1}{2}x^{-1/2}$

7 $f(x) = (x^3+4x)^7$ $\quad F(x) = x^7$ $\quad F'(x) = 7x^6$

$G(x) = x^3+4x$ $\quad G'(x) = 3x^2+4$

$f'(x) = 7(x^3+4x)^6 \cdot (3x^2+4)$

9 $F(x) = \sqrt[4]{1+2x+x^3}$ $\quad F(x) = \sqrt[4]{x} = x^{1/4}$ $\quad f'(x) = \frac{1}{4}x^{-3/4}$

$g(x) = 1+2x+x^3$ $\quad g'(x) = 3x^2+2$

$F'(x) = \frac{1}{4}(1+2x+x^3)^{-3/4} \cdot 3x^2+2$

11 $q(t) = \dfrac{1}{(t^4+1)^3}$ $\quad F = \dfrac{1}{x}$ $\quad G = x^3$ $\quad H = t^4+1$

$G' = 3x^2$ $\quad H' = 4t^3$

$q'(t) = \dfrac{-((t^4+1)^3)'}{((t^4+1)^3)^2} = \dfrac{-(t^4+1)^3)'}{(t^4+1)^6}$ $\quad 3(t^4+1)^2 \cdot 4t^3$

$= \dfrac{-3(t^4+1)^2 \cdot 4t^3}{(t^4+1)^6} = \dfrac{-3 \cdot 4t^3}{(t^4+1)^4} = \dfrac{-12t^3}{(t^4+1)^4}$

13 $f(x) = \cos(a^3+x^3)$ $\quad F(x) = \cos(x)$ $\quad G(x) = a^3+x^3$

$F'(x) = -\operatorname{sen}(x)$ $\quad G'(x) = 0+3x^2$

$f'(x) = -\operatorname{sen}(a^3+x^3) \cdot 3x^2$

17 $g(x) = (1+4x)^5 (3+x-x^2)^8$

$g'(x) = [(1+4x)^5]' \cdot (3+x-x^2)^8 + (1+4x)^5 \cdot [(3+x-x^2)^8]'$

$F(x) = x^5 \quad F'(x) = 5x^4 \quad G(x) = 1+4x \quad G'(x) = 4$

$\Rightarrow 5(1+4x)^4 \cdot 4 = 20(1+4x)^4$

$F(x) = x^8 \quad F'(x) = 8x^7 \quad G(x) = 3+x-x^2 \quad G'(x) = 1-2x$

$\Rightarrow 8(3+x-x^2)^7 \cdot (1-2x)$

$g'(x) = 20(1+4x)^4 \cdot (3+x-x^2)^8 + (1+4x)^5 \cdot (8(3+x-x^2)^7 \cdot (1-2x))$

19 $g(x) = \dfrac{(2x-5)^4}{(8x^2-5)^3}$

$[2x-5]^4$

$\hookrightarrow 4(2x-5)^3 \cdot 2 = 8(2x-5)^3$

$[8x^2-5]^3$

$\hookrightarrow 3(8x^2-5)^2 \cdot 8 \cdot 2x = 48(8x^2-5)^2$

$g'(x) = \dfrac{8(2x-5)^3 \cdot (8x^2-5)^3 - ((2x-5)^4 \cdot 48(8x^2-5)^2)}{(8x^2-5)^6}$

$= \dfrac{8(2x-5)(8x^2-5) - 48(2x-5)^4}{(8x^2-5)^4}$

21 $f(x) = xe^{-x^2} = \dfrac{x}{e^{x^2}}$

$[e^{x^2}]' \Rightarrow F(x) = e^x \quad G(x) = x^2$

$F'(x) = e^x \quad G'(x) = 2x$

$e^{x^2} \cdot 2x = 2xe^{x^2}$

$f'(x) = \dfrac{1 \cdot e^{x^2} - x \cdot 2xe^{x^2}}{(e^{x^2})^2} = \dfrac{e^{x^2}(1-2x^2)}{(e^{x^2})^2} = \dfrac{1-2x^2}{e^{x^2}}$