1.- $f(x) = x^2 \sin(x)$

$\frac{\partial}{\partial x}\left[f(x)\,g(x)\right] - f(x)\frac{\partial}{\partial x}\left[g(x)\right] + g(x)\frac{\partial}{\partial x}\left[f(x)\right.$

$f(x) = x^2 \quad + \quad g(x) = \sin(x)$

$x^2 \frac{\partial}{\partial x}\left[\sin(x)\right] + \sin(x)\frac{\partial}{\partial x}\left[x^2\right]$

$x^2 \cos(x) + \sin(x)\frac{\partial}{\partial x}\left[x^2\right]$

$x^2 \cos(x) + \sin(x)(2x)$

$x^2 \cos(x) + 2x \sin(x)$

2.- $f(x) = \frac{2x+1}{x^2-1}$

$x = -1 \ , x = 1$

$x = -1$

$x = 1$

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

$$\frac{\partial}{\partial x}[f(x)g(x)] - f(x)\frac{\partial}{\partial x}[g(x)] + g(x)\frac{\partial}{\partial x}[f(x)]$$

$f(x) = x^2+1$ y $g(x) = \cos(x)$

$$(x^2+1)\frac{\partial}{\partial x}[\cos(x)] + \cos(x)\frac{\partial}{\partial x}[x^2+1]$$

$$(x^2+1)(-\sin(x)) + \cos(x)\frac{\partial}{\partial x}[x^2+1]$$

$$(x^2+1)(-\sin(x)) + \cos(x)\left(\frac{\partial}{\partial x}[x^2] + \frac{\partial}{\partial x}[1]\right)$$

$$(x^2+1)(-\sin(x)) + \cos(x)(2x+0)$$

$$(x^2+1)(-\sin(x)) + \cos(x)(2x)$$

4.- $f(x) = e^{(2x)}\ln(x)$

$$\frac{\partial}{\partial x}[f(x)g(x)] - f(x)\frac{\partial}{\partial x}[g(x)] + g(x)\frac{\partial}{\partial x}[f(x)]$$

$f(x) = e^{2x}$ y $g(x) = \ln(x)$

$$e^{2x}\frac{\partial}{\partial x}[\ln(x)] + \ln(x)\frac{\partial}{\partial x}[e^{2x}]$$

$$e^{2x}\frac{1}{x} + \ln(x)\frac{\partial}{\partial x}[e^{2x}]$$

$$\frac{e^{2x}}{x} + \ln(x)\left(\frac{\partial}{\partial u}[e^u]\frac{\partial}{\partial x}[2x]\right)$$

$$\frac{e^{2x}}{x} + \ln(x)\left(e^{2x}\frac{\partial}{\partial x}[2x]\right)$$

5.- $f(x) = \dfrac{x^2 - 1}{x + 1}$

$x = -1$

$x - 1$

$y = x - 1$

6.- $f(x) = (2x^3+5)^4 (3x-1)^2$

$$\frac{\partial}{\partial x}\left[(2x^3+5)^4 \, ((3x-1)(3x-1))\right]$$

$$\frac{\partial}{\partial x}\left[(2x^3+5)^4 \, (3x(3x-1) - 1(3x-1))\right]$$

$$\frac{\partial}{\partial x}\left[(2x^3+5)^4 \, (3x(3x) + 3x \cdot -1 - 1(3x-1))\right]$$

$$\frac{\partial}{\partial x}\left[(2x^3+5)^4 \, (3x(3x) + 3x \cdot -1 - 1(3x) - 1 \cdot -1)\right]$$

$$\frac{\partial}{\partial x}\left[(2x^3+5)^4 (9x^2-6x+1)\right]$$

$$\frac{\partial}{\partial x}[f(x)g(x)] - f(x)\frac{\partial}{\partial x}[g(x)] + g(x)\frac{\partial}{\partial x}[f(x)]$$

$f(x) = (2x^3+5)^4 - g(x) = 9x^2-6x+1$

$$(2x^3+5)^4 \frac{\partial}{\partial x}[9x^2-6x+1] + (9x^2-6x+1)\frac{\partial}{\partial x}[(2x^3+5)^4]$$

$$(2x^3+5)^4 (18x-6) + (9x^2-6x+1)\frac{\partial}{\partial x}[(2x^3+5)^4]$$

$$\frac{\partial}{\partial x}[f(g(x))] - f'(g(x))\,g'(x) \quad - f(x) = x^4 \;y\; g(x)$$

$$= 2x^3+5$$

$$(2x^3+5)^4 (18x-6) + (9x^2-6x+1)\left(4(2x^3+5)^3 \frac{\partial}{\partial x}[2x^3+5\right.$$

$$(2x^3+5)^4 (18x-6) + 24(9x^2-6x+1)(2x^3+5)^3 x^2$$

7.- $f(x) = (sen x)^3 \; (cos x)^2$

$$\frac{\partial}{\partial x}\left[f(x)\,g(x)\right] - f(x)\frac{\partial}{\partial x}\left[g(x)\right] + g(x)\frac{\partial}{\partial x}\left[f(x)\right]$$

$$f(x) = sen^3(x) \text{ y } g(x) = \cos^2(x)$$

$$sen^3(x)\frac{\partial}{\partial x}\left[\cos^2(x)\right] + \cos^2(x)\frac{\partial}{\partial x}\left[sen^3(x)\right]$$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x))\,g'(x)$$

$$f(x) = x^2 \text{ y } g(x) = \cos(x)$$

$$sen^3(x)\left(2\cos(x)\frac{\partial}{\partial x}\left[\cos(x)\right]\right) + \cos^2(x)\frac{\partial}{\partial x}\left[sen^3(x)\right]$$

$$2\cdot sen^3(x)\cos(x)\frac{\partial}{\partial x}\left[\cos(x)\right] + \cos^2(x)\frac{\partial}{\partial x}\left[sen^3(x)\right]$$

$$2\,sen^3(x)\cos(x)\,(-sen(x)) + \cos^2(x)\frac{\partial}{\partial x}\left[sen^3(x)\right]$$

$$-2\,sen^3(x)\cos(x)\,sen(x) + \cos^2(x)\frac{\partial}{\partial x}\left[sen^3(x)\right]$$

$$-2(sen^1(x)\,sen^3(x))\cos(x) + \cos^2(x)\frac{\partial}{\partial x}\left[sen^3(x)\right]$$

$$-2\,sen^4(x)\cos(x) + \cos^2(x)\frac{\partial}{\partial x}\left[sen^3(x)\right]$$

8.- $f(x) = \dfrac{e^{(2x^2+5x)}}{2x+1}$

$$\frac{\partial}{\partial x}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)\,\frac{\partial}{\partial x}\left[f(x)\right] - f(x)\,\frac{\partial}{\partial x}\left[g(x)\right]}{g(x)^2}$$

$f(x) = e^{2x^2+5x}$ y $g(x) = 2x+1$

$$\frac{2x+1\,\frac{\partial}{\partial x}\left[e^{2x^2+5x}\right] - e^{2x^2+5x}\,\frac{\partial}{\partial x}\left[2x+1\right]}{(2x+1)^2}$$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x))\,g'(x)$$

$f(x) = e^{x}$ y $g(x) = 2x^2+5x$

$$\frac{(2x+1)\left(e^{2x^2+5x}\,\frac{\partial}{\partial x}\left[2x^2+5x\right] - e^{2x^2-5x}\,\frac{\partial}{\partial x}\left[2x+1\right]\right.}{(2x^2+1)^2}$$

$$\frac{(2x+1)\,e^{2x^2+5x}\,(4x+5) - 2e^{2x^2+5x}}{(2x+1)^2}$$

$$\frac{e^{2x^2+5x}\,(4x+1)(2x+3)}{(2x+1)^2}$$

9.- $\ln \frac{(2x+1)^2}{x^2+1}$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x))\, g'(x)$$

$f(x) = \ln(x)$ y $g(x) = \frac{(2x+1)^2}{x^2+1}$

$$\frac{1}{\frac{(2x+1)^2}{x+1}} \frac{\partial}{\partial x}\left[\frac{(2x+1)^2}{x^2+1}\right]$$

$$1 \; \frac{x^2+1}{(2x+1)^2} \frac{\partial}{\partial x}\left[\frac{(2x+1)^2}{x^2+1}\right]$$

$$\frac{x^2+1}{(2x+1)^2} \frac{\partial}{\partial x}\left[\frac{(2x+1)^2}{x^2+1}\right]$$

$$\frac{\partial}{\partial x}\left[\frac{f(x)}{g(x)}\right] - \frac{g(x)\frac{\partial}{\partial x}[f(x)] - f(x)\frac{\partial}{\partial x}[g(x)]}{g(x)^2}$$

$f(x) = (2x+1)^2$ y $g(x) = x^2+1$

$$\frac{(x^2+1)\frac{\partial}{\partial x}\left[(2x+1)^2\right] \; x+1}{(2x+1)^2} \cdot \frac{(2x+1)^2 \frac{\partial}{\partial x}\left[x^2+1\right]}{x^2+1}$$

$10.-\ f(x) = (1+x^2)^3 \cos(x^2+2)$

$$\frac{\partial}{\partial x}\left[f(x)g(x)\right] - f(x)\frac{\partial}{\partial x}\left[g(x)\right] + g(x)\frac{\partial}{\partial x}\left[f(x)\right]$$

$f(x) = (1+x^2)^3 \quad y \quad g(x) = \cos(x^2+1)$

$$(1+x^2)^3 \frac{\partial}{\partial x}\left[\cos(x^2+2)\right] + \cos(x^2+2 \frac{\partial}{\partial x}\left[(1+x^2)^3\right]$$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x))\, g'(x)$$

$f(x) = \cos(x) \quad y \quad g(x) = x^2+2$

$$(1+x^2)^3\left(-\sin(x^2+2)\frac{\partial}{\partial x}\left[x^2+2\right]\right) + \cos(x^2+2)\frac{\partial}{\partial x}\left[(1+x^2)^3\right]$$

$$(1+x^2)^3(-2\sin(x^2+2)x) + \cos(x^2+2)\frac{\partial}{\partial x}\left[(1+x^2)^3\right]$$

$$(1+x^2)^3(-2\sin(x^2+2)x) + \cos(x^2+2)\left(3(1+x^2)^2\frac{\partial}{\partial x}\left[1+x^2\right]\right)$$

$$-2x(1+x^2)^3 \sin(x^2+2) + 6x(1+x^2)^2\cos(x^2+2)$$

11.- $f(x) = \ln(2x^3 - 4x + 5)$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] = f'(g(x))\, g'(x)$$

$f(x) = \ln(x)$ y $g(x) = 2x^3 - 4x + 5$

$$\frac{\partial}{\partial u}\left[\ln(u)\right] \frac{\partial}{\partial x}\left[2x^3 - 4x + 5\right]$$

$$\frac{1}{u} \frac{\partial}{\partial x}\left[2x^3 - 4x + 5\right.$$

$$\frac{1}{2x^3 - 4x + 5} \frac{\partial}{\partial x}\left[2x^3 - 4x + 5\right]$$

$$\frac{1}{2x^3 - 4x + 5} (6x^2 - 4)$$

$$\frac{2(3x^2 - 2)}{2x^3 - 4x + 5}$$

12.- $f(x) = x \ln(x^2+1)$

$$\frac{\partial}{\partial x}\left[f(x)\,g(x)\right] - f(x)\frac{\partial}{\partial x}\left[g(x)\right] + g(x)\frac{\partial}{\partial x}\left[f(x)\right]$$

$f(x) = x$ y $g(x) = \ln(x^2+1)$

$$x\frac{\partial}{\partial x}\left[\ln(x^2+1)\right] + \ln(x^2+1)\frac{\partial}{\partial x}[x]$$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x))\,g'(x)$$

$f(x) = \ln(x)$ y $g(x) = x^2+1$

$$\frac{2x \cdot x}{x^2+1} + \ln(x^2+1)\frac{\partial}{\partial x}[x]$$

$$\frac{2(x'x)}{x^2+1} + \ln(x^2+1)\frac{\partial}{\partial x}[x]$$

$$\frac{2(x'x')}{x^2+1} + \ln(x^2+1)\frac{\partial}{\partial x}[x]$$

$$\frac{2x^2}{x^2+1} + \ln(x^2+1)\frac{\partial}{\partial x}[x]$$

$$\frac{2x^2}{x^2+1} + \ln(x^2+1)$$

$$\frac{2x^2}{x^2+1} + \frac{\ln(x^2+1)(x^2+1)}{x^2+1}$$

$$\frac{2x^2 + \ln(x^2+1)(x^2+1)}{x^2+1}$$

13.- $f(x) = \ln(2x + \ln(x))$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x)) \quad g'(x)$$

$$f(x) = \ln(x) \quad y \quad g(x) = 2x + \ln(x)$$

$$\frac{\partial}{\partial u}\left[\ln(u)\right]\frac{\partial}{\partial x}\left[2x + \ln(x)\right]$$

$$\frac{1}{u}\frac{\partial}{\partial x}\left[2x + \ln(x)\right]$$

$$\frac{1}{2x + \ln(x)}\frac{\partial}{\partial x}\left[2x + \ln(x)\right]$$

$$\frac{1}{2x + \ln(x)}\left(2 + \frac{1}{x}\right)$$

$14_0 - f(x) = (\ln(x))^2$

$$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x))\ g'(x)$$

$f(x) = x^2$ y $g(x) = \ln(x)$

$$\frac{\partial}{\partial u}[u^2]\ \frac{\partial}{\partial x}\left[\ln(x)\right]$$

$$2u\ \frac{\partial}{\partial x}\left[\ln(x)\right]$$

$$2\ln(x)\ \frac{\partial}{\partial x}\left[\ln(x)\right]$$

$$2\ln(x)\ \frac{1}{x}$$

$$\frac{2}{x}\ \ln(x)$$

$$\frac{2\ln(x)}{x}$$

$$\frac{\ln(x^2)}{x}$$

15.- $f(x) = \ln\left(\frac{2x+1}{3x-4}\right)$

$\frac{\partial}{\partial x}\left[f(g(x))\right] - f'(g(x)) \quad g'(x)$

$f(x) = \ln(x) \quad y \quad g(x) \; \frac{2x+1}{3x-4}$

$\frac{\partial}{\partial u}\left[\ln(u)\right] \frac{\partial}{\partial x}\left[\frac{2x+1}{3x-4}\right]$

$1 \; \frac{3x-4}{2x+1} \; \frac{\partial}{\partial x}\left[\frac{2x+1}{3x-4}\right]$

$\frac{3x-4}{2x+1} \; \frac{\partial}{\partial x}\left[\frac{2x+1}{3x-4}\right]$

$\frac{\partial}{\partial x}\left[\frac{f(x)}{g(x)}\right] - \frac{g(x)\frac{\partial}{\partial x}\left[f(x)\right] - f(x)\frac{\partial}{\partial x}\left[g(x)\right]}{g(x)^2}$

$f(x) = 2x+1 \quad y \quad g(x) = 3x-4$

$\frac{3x-4}{2x+1} \cdot \frac{(3x-4)\frac{\partial}{\partial x}\left[2x+1\right] - (2x+1)\frac{\partial}{\partial x}\left[3x-4\right]}{(3x-4)^2}$

$\frac{(3x-4)\left(2(3x-4) - 3(2x+1)\right)}{(2x+1)(3x-4)^2}$

$\frac{2(3x-4) - 3(2x+1)}{(2x+1)(3x-4)}$