DERIVADAS INMEDIATAS:

1. $f(x) = 3x^2 - 2x + 2 \longrightarrow f'(x) = 6x - 2$

2. $f(x) = \frac{4}{x} = 4 \cdot x^{-1} \longrightarrow f'(x) = 4 \cdot (-1) x^{-2} = \frac{-4}{x^2}$

3. $f(x) = \frac{3x^4}{5} - \frac{7x^2}{2} + 5x - \frac{3}{2} \longrightarrow f'(x) = \frac{3}{5} 4x^3 - \frac{7}{2} 2x + 5 = \frac{12x^3}{5} - 7x + 5$

4. $f(x) = \frac{2}{3} x^3 + \frac{2}{5} x - 5 \longrightarrow f'(x) = \frac{2}{\cancel{3}} \cancel{3} x^2 + \frac{2}{5} = 2x^2 + \frac{2}{5}$

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

6. $f(x) = 5\sqrt{x} - 8x + 7 = 5x^{\frac{1}{2}} - 8x + 7 \longrightarrow f'(x) = \frac{5}{2\sqrt{x}} - 8$

7. $f(x) = \sqrt{2} \longrightarrow f'(x) = 0$

8. $f(x) = \sqrt{2x} = \sqrt{2} \cdot x^{\frac{1}{2}} \longrightarrow f'(x) = \sqrt{2} \cdot \frac{1}{2\sqrt{x}} = \frac{\sqrt{2}}{2\sqrt{x}}$

9. $f(x) = \sqrt{3x^4} = \sqrt{3} \cdot x^{\frac{4}{2}} = \sqrt{3} \cdot x^2 \longrightarrow f'(x) = \sqrt{3} \cdot 2x = 2\sqrt{3}\, x$

10. $f(x) = \sqrt[4]{5x^3} = \sqrt[4]{5} \cdot x^{3/4} \longrightarrow f'(x) = \sqrt[4]{5} \cdot \frac{3}{4} x^{-\frac{1}{4}} = \frac{3\sqrt[4]{5}}{4\sqrt[4]{x}}$

11. $f(x) = 10 \cdot \log_3 x \longrightarrow f'(x) = 10 \cdot \frac{1}{x \cdot \ln 3} = \frac{10}{x \cdot \ln 3}$

12. $f(x) = x^2 \sqrt{x} = x^2 \cdot x^{1/2} = x^{5/2} \longrightarrow f'(x) = \frac{5}{2} x^{3/2} = \frac{5\sqrt{x^3}}{2}$

13. $f(x) = \sqrt[4]{x^3} + \sqrt{x^5} - x = x^{3/4} + x^{5/2} - x \longrightarrow f'(x) = \frac{3}{4} x^{-\frac{1}{4}} + \frac{5}{2} x^{3/2} - 1 = \frac{3}{4\sqrt[4]{x}} + \frac{5\sqrt{x^3}}{2} - 1$

14. $f(x) = \frac{\sqrt{x}}{x} = \frac{x^{1/2}}{x} = x^{-\frac{1}{2}} \longrightarrow f'(x) = -\frac{1}{2} x^{-\frac{3}{2}} = -\frac{1}{2\sqrt{x^3}}$

15. $f(x) = \frac{4}{x} - \frac{5}{x^2} + \frac{3}{x^3} = 4x^{-1} - 5x^{-2} + 3x^{-3} \longrightarrow f'(x) = -4x^{-2} + 10x^{-3} - 9x^{-4}$

    $f'(x) = -\frac{4}{x^2} + \frac{10}{x^3} - \frac{9}{x^4}$

16. $f(x) = 3 \cdot \operatorname{sen} x \longrightarrow f'(x) = 3 \cdot \cos x$

17. $f(x) = 4 \cdot \log_2 x \longrightarrow f'(x) = 4 \cdot \frac{1}{x \cdot \ln 2} = \frac{4}{x \ln 2}$

(18) $f(x) = 2\cos x \longrightarrow f'(x) = 2\cdot(-\operatorname{sen} x) = -2\operatorname{sen} x$

(19) $f(x) = \ln 2 \cdot e^x \longrightarrow f'(x) = \ln 2 \cdot e^x$

REGLA DEL PRODUCTO

(20) $f(x) = x \cdot 2^x$

$f'(x) = (x)'2^x + x(2^x)' = 1 \cdot 2^x + x \cdot 2^x \cdot \ln 2 = 2^x(1 + x \cdot \ln 2)$

(21) $f(x) = (3x^2-1) \cdot \operatorname{sen} x$

$f'(x) = (3x^2-1)' \operatorname{sen} x + (3x^2-1)(\operatorname{sen} x)'$

$f'(x) = 6x \cdot \operatorname{sen} x + (3x^2-1) \cdot \cos x = 6x \operatorname{sen} x + 3x^2 \cos x - \cos x$

(22) $f(x) = (x^2+1) \cdot 2 \cdot \cos x$

$f'(x) = (x^2+1)'(2\cos x) + (x^2+1) \cdot (2\cos x)'$

$f'(x) = 2x \cdot 2\cos x + (x^2+1) \cdot 2 \cdot (-\operatorname{sen} x) = 4x\cos x - 2 \cdot (x^2+1) \cdot \operatorname{sen} x$

(23) $f(x) = (x^2-1) \cdot \ln x$

$f'(x) = (x^2-1)' \cdot \ln x + (x^2-1) \cdot (\ln x)'$

$f'(x) = 2x \cdot \ln x + (x^2-1) \cdot \frac{1}{x} = 2x \ln x + \frac{x^2-1}{x} = 2x \ln x + x - \frac{1}{x}$

(24) $f(x) = (x^2+x) \cdot \sqrt{2x} = (x^2+x) \cdot \sqrt{2} \cdot x^{1/2}$

$f'(x) = (x^2+x)' \sqrt{2} x^{\frac{1}{2}} + (x^2+x)(\sqrt{2} x^{\frac{1}{2}})'$

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

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

$f'(x) = \frac{4\sqrt{2}x^2 + 2\sqrt{2}x + \sqrt{2}x^2 + \sqrt{2}x}{2\sqrt{x}} = \frac{(4\sqrt{2}+\sqrt{2})x^2 + 3\sqrt{2}x}{2\sqrt{x}} = \frac{5\sqrt{2}x^2 + 3\sqrt{2}x}{2\sqrt{x}}$

(25) $f(x) = 2^x \cos x$

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

$f'(x) = 2^x(\ln 2 \cos x - \operatorname{sen} x)$

(26) $f(x) = (e^x + x^3) \cdot \sqrt{x} = (e^x + x^3) \cdot x^{\frac{1}{2}}$

$f'(x) = (e^x + x^3)' x^{\frac{1}{2}} + (e^x + x^3) \cdot \frac{1}{2\sqrt{x}} = (e^x + 3x^2)\sqrt{x} + \frac{e^x + x^3}{2\sqrt{x}}$

$f'(x) = \frac{2 \cdot (e^x + 3x^2)x + e^x + x^3}{2\sqrt{x}} = \frac{2xe^x + 6x^3 + e^x + x^3}{2\sqrt{x}} = \frac{(2x+1)e^x + 7x^3}{2\sqrt{x}}$

(27) $f(x) = x^2 \cdot e^x \cdot \operatorname{sen} x$

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

$f'(x) = 2x e^x \operatorname{sen} x + x^2 (e^x \operatorname{sen} x + e^x \cos x) = 2x e^x \operatorname{sen} x + x^2 e^x \operatorname{sen} x + x^2 e^x \cos x$

$f'(x) = x e^x (2 \operatorname{sen} x + x \operatorname{sen} x + x \cos x)$

(28) $f(x) = (x^5 - x) \cdot \cos x \cdot \ln x$

$f'(x) = (x^5 - x)' \cdot (\cos x \cdot \ln x) + (x^5 - x) \cdot (\cos x \cdot \ln x)'$

$f'(x) = (5x^4 - 1) \cdot \cos x \ln x + (x^5 - x) \cdot [(\cos x)' \ln x + \cos x \cdot (\ln x)']$

$f'(x) = (5x^4 - 1) \cos x \ln x + (x^5 - x) [- \operatorname{sen} x \cdot \ln x + \frac{\cos x}{x}]$

$f'(x) = 5x^4 \cos x \ln x - \cos x \ln x - x^5 \operatorname{sen} x \ln x + x^4 \cos x + x \operatorname{sen} x \ln x - \cos x$

REGLA DE LA DIVISIÓN

(29) $f(x) = \dfrac{x^3}{x^2+1}$

$f'(x) = \dfrac{(x^3)'(x^2+1) - x^3 \cdot (x^2+1)'}{(x^2+1)^2} = \dfrac{3x^2 \cdot (x^2+1) - x^3 \cdot 2x}{(x^2+1)^2}$

$f'(x) = \dfrac{3x^4 + 3x^2 - 2x^4}{(x^2+1)^2} = \dfrac{x^4 + 3x^2}{(x^2+1)^2}$

(30) $f(x) = \dfrac{1}{x^4 + 5x}$

$f'(x) = \dfrac{(1)' \cdot (x^4+5x) - 1 \cdot (x^4+5x)'}{(x^4+5x)^2} = \dfrac{\cancel{0 \cdot (x^4+5x)} - 1 \cdot (4x^3+5)}{(x^4+5x)^2} = \dfrac{-(4x^3+5)}{(x^4+5x)^2}$

(31) $f(x) = \dfrac{3x-1}{x^5-4x}$

$f'(x) = \dfrac{(3x-1)' \cdot (x^5-4x) - (3x-1) \cdot (x^5-4x)'}{(x^5-4x)^2} = \dfrac{3 \cdot (x^5-4x) - (3x-1) \cdot (5x^4-4)}{(x^5-4x)^2}$

$f'(x) = \dfrac{3x^5 \cancel{-12x} - 15x^5 \cancel{+12x} + 5x^4 - 4}{(x^5-4x)^2} = \dfrac{-12x^5 + 5x^4 - 4}{(x^5-4x)^2}$

(32) $f(x) = \dfrac{1}{\operatorname{sen} x}$

$f'(x) = \dfrac{(1)' \operatorname{sen} x - 1 \cdot (\operatorname{sen} x)'}{(\operatorname{sen} x)^2} = \dfrac{\cancel{0 \cdot \operatorname{sen} x} - \cos x}{(\operatorname{sen} x)^2} = \dfrac{-\cos x}{(\operatorname{sen} x)^2}$

(33) $f(x) = \dfrac{5}{\ln x}$

$f'(x) = \dfrac{(5)' \ln x - 5 \cdot (\ln x)'}{(\ln x)^2} = \dfrac{\cancel{0 \cdot \ln x} - 5 \cdot \frac{1}{x}}{(\ln x)^2} = \dfrac{-\frac{5}{x}}{(\ln x)^2}$

$f'(x) = \dfrac{-5}{x(\ln x)^2}$

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

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

$$f'(x) = \frac{\cancel{2x^3} - 2x + x^2 - 1 - \cancel{2x^3} - 2x^2 - 2x}{(x^2-1)^2} = \frac{-x^2 - 4x - 1}{(x^2-1)^2}$$

35) $$f(x) = \frac{\operatorname{sen} x + 2}{x^2+1}$$

$$f'(x) = \frac{(\operatorname{sen} x + 2)' (x^2+1) - (\operatorname{sen} x + 2) \cdot (x^2+1)'}{(x^2+1)^2}$$

$$f'(x) = \frac{\cos x \cdot (x^2+1) - (\operatorname{sen} x + 2) \cdot 2x}{(x^2+1)^2} = \frac{x^2 \cos x + \cos x - 2x \operatorname{sen} x - 4x}{(x^2+1)^2}$$

36) $$f(x) = \frac{4\cos x - 2x^2}{x^4}$$

$$f'(x) = \frac{(4\cos x - 2x^2)' x^4 - (4\cos x - 2x^2) \cdot (x^4)'}{(x^4)^2}$$

$$f'(x) = \frac{(-4\operatorname{sen} x - 4x)\, x^4 - (4\cos x - 2x^2) \cdot 4x^3}{x^8}$$

$$f'(x) = \frac{-4x^4 \operatorname{sen} x - 4x^5 - 16x^3 \cos x + 8x^5}{x^8}$$

$$f'(x) = \frac{-4x^4 \operatorname{sen} x - 16x^3 \cos x + 4x^5}{x^8} = \frac{4x^3 \cdot (-x \operatorname{sen} x - 4\cos x + x^2)}{x^8}$$

$$f'(x) = \frac{4 \cdot (x^2 - x \operatorname{sen} x - 4\cos x)}{x^5}$$

REGLA PRODUCTO Y DIVISIÓN

(37) $f(x) = \dfrac{(x+1)\sqrt{x}}{x+2}$

$$f'(x) = \frac{[(x+1)\sqrt{x}]'(x+2) - (x+1)\sqrt{x}\,(x+2)'}{(x+2)^2} = \frac{[(x+1)'\cdot\sqrt{x} + (x+1)(\sqrt{x})']\,(x+2) - (x+1)\sqrt{x}\cdot 1}{(x+2)^2}$$

$$f'(x) = \frac{[1\cdot\sqrt{x} + (x+1)\cdot\frac{1}{2\sqrt{x}}](x+2) - (x+1)\cdot\sqrt{x}}{(x+2)^2} = \frac{\frac{[2x+(x+1)](x+2)}{2\sqrt{x}} - \frac{2(x+1)\cdot x}{2\sqrt{x}}}{(x+2)^2}$$

$$f'(x) = \frac{(3x+1)\cdot(x+2) - 2(x+1)\cdot x}{2\sqrt{x}\,(x+2)^2} = \frac{3x^2 + 6x + x + 2 - 2x^2 - 2x}{2\sqrt{x}\,(x+2)^2} = \frac{x^2+5x+2}{2\sqrt{x}\,(x+2)^2}$$

(38) $f(x) = \dfrac{x\cdot \operatorname{sen} x}{x^2}$

$$f'(x) = \frac{(x \operatorname{sen} x)'x^2 - x\cdot\operatorname{sen} x\cdot(x^2)'}{(x^2)^2} = \frac{[(x)'\operatorname{sen} x + x\cdot(\operatorname{sen} x)']\cdot x^2 - x\operatorname{sen} x\cdot 2x}{x^4}$$

$$f'(x) = \frac{(\operatorname{sen} x + x\cos x)\cdot x^2 - 2x^2\operatorname{sen} x}{x^4} = \frac{x^2(\operatorname{sen} x + x\cos x - 2\operatorname{sen} x)}{x^4}$$

$$f'(x) = \frac{x\cos x - \operatorname{sen} x}{x^2}$$

(39) $f(x) = \dfrac{x^3 - 2x^2 + 4}{2x e^x}$

$$f'(x) = \frac{(x^3-2x^2+4)'\cdot 2xe^x - (x^3-2x^2+4)\cdot(2xe^x)'}{(2xe^x)^2}$$

$$f'(x) = \frac{(3x^2-4x)\cdot 2xe^x - (x^3-2x^2+4)\cdot[(2x)'e^x + 2x(e^x)']}{2^2x^2e^{2x}}$$

$$f'(x) = \frac{(3x^2-4x)\cdot 2xe^x - (x^3-2x^2+4)\cdot(2e^x + 2xe^x)}{4x^2e^{2x}}$$

$$f'(x) = \frac{6x^3e^x - 8x^2e^x - 2x^3e^x + 4x^2e^x - 8e^x - 2x^4e^x + 4x^3e^x - 8xe^x}{4x^2e^{2x}}$$

$$f'(x) = \frac{2e^x(3x^3 - 4x^2 - x^3 + 2x^2 - 4 - x^4 + 2x^3 - 4x)}{4x^2e^x\cdot e^x} = \frac{-x^4+4x^3-2x^2-4x-4}{2x^2e^x}$$

(40) $f(x) = \dfrac{3x\cos x}{\ln x}$

$$f'(x) = \frac{(3x\cos x)' \cdot \ln x - 3x\cos x \cdot (\ln x)'}{(\ln x)^2}$$

$$f'(x) = \frac{((3x)'\cos x + 3x \cdot (\cos x)') \cdot \ln x - 3\cancel{x} \cdot \cos x \cdot \frac{1}{\cancel{x}}}{(\ln x)^2}$$

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

$$f'(x) = \frac{3\cos x \ln x - 3x \operatorname{sen} x \ln x - 3\cos x}{(\ln x)^2}$$

REGLA DE LA CADENA

(41) $f(x) = (x^3+3x)^8$

$f'(x) = 8\cdot(x^3+3x)^7\cdot(x^3+3x)' = 8\cdot(x^3+3x)^7\cdot(3x^2+3) = 8\cdot(3x^2+3)\cdot(x^3+3x)^7$

(42) $f(x) = \frac{5}{(x^2+1)^2} = 5\cdot(x^2+1)^{-2}$

$f'(x) = 5\cdot(-2)\cdot(x^2+1)^{-3}\cdot(x^2+1)' = -10\cdot(x^2+1)^{-3}\cdot 2x = \frac{-20x}{(x^2+1)^3}$

(43) $f(x) = \ln(5x+9)$

$f'(x) = \frac{1}{5x+9}\cdot(5x+9)' = \frac{5}{5x+9}$

(44) $f(x) = (x^2+x+1)^4$

$f'(x) = 4\cdot(x^2+x+1)^3\cdot(x^2+x+1)' = 4\cdot(2x+1)\cdot(x^2+x+1)^3$

(45) $f(x) = \log_4(8x+9)$

$f'(x) = \frac{1}{(8x+9)\cdot\ln 4}\cdot(8x+9)' = \frac{8}{(8x+9)\cdot\ln 4}$

(46) $f(x) = e^{x^2+3x}$

$f'(x) = e^{x^2+3x}\cdot(x^2+3x)' = (2x+3)\cdot e^{x^2+3x}$

(47) $f(x) = \operatorname{sen}(x^5-3x)$

$f'(x) = \cos(x^5-3x)\cdot(x^5-3x)'$

$f'(x) = (5x^4-3)\cdot\cos(x^5-3x)$

(48) $f(x) = tg(x^3-3)$

$\boxed{\frac{1}{\cos^2 x} = 1+\tan^2 x}$

$f'(x) = \frac{1}{\cos^2(x^3-3)}\cdot(x^3-3)' = \frac{3x^2}{\cos^2(x^3-3)} \overset{\text{TAMBIÉN pq}}{=} 3x^2\cdot(1+\tan^2(x^3-3))$

(49) $f(x) = \ln(\operatorname{sen} x)$

$$f'(x) = \frac{1}{\operatorname{sen} x} \cdot (\operatorname{sen} x)' = \frac{\cos x}{\operatorname{sen} x}$$

(50) $f(x) = \operatorname{sen}(x^2+2)$

$$f'(x) = \cos(x^2+2) \cdot (x^2+2)' = 2x \cdot \cos(x^2+2)$$

(51) $f(x) = \sqrt{x^2-3x} = (x^2-3x)^{\frac{1}{2}}$

$$f'(x) = \frac{1}{2}(x^2-3x)^{-\frac{1}{2}} \cdot (x^2-3x)' = \frac{2x-3}{2 \cdot \sqrt{x^2-3x}}$$

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

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

(53) $f(x) = \log_5(3x^2+2x-1)$

$$f'(x) = \frac{1}{(3x^2+2x-1) \cdot \ln 5} \cdot (3x^2+2x-1)' = \frac{6x+2}{(3x^2+2x-1) \cdot \ln 5}$$

(54) $f(x) = e^{\operatorname{sen} x}$

$$f'(x) = e^{\operatorname{sen} x} \cdot (\operatorname{sen} x)' = \cos x \cdot e^{\operatorname{sen} x}$$

(55) $f(x) = 3^{x^2-8x}$

$$f'(x) = 3^{x^2-8x} \cdot \ln 3 \cdot (x^2-8x)' = (2x-8) \cdot \ln 3 \cdot 3^{x^2-8x}$$

(56) $f(x) = \sqrt{\operatorname{sen} x} = (\operatorname{sen} x)^{\frac{1}{2}}$

$$f'(x) = \frac{1}{2} \cdot (\operatorname{sen} x)^{-\frac{1}{2}} \cdot (\operatorname{sen} x)' = \frac{\cos x}{2\sqrt{\operatorname{sen} x}}$$

(57) $f(x) = \ln(3x)$

$$f'(x) = \frac{1}{3x} \cdot (3x)' = \frac{3}{3x} = \frac{1}{x}$$

(58) $f(x) = \operatorname{sen}^3 x = (\operatorname{sen} x)^3$

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

(59) $f(x) = \operatorname{sen} x^3 = \operatorname{sen}(x^3)$

$f'(x) = \cos(x^3) \cdot (x^3)' = 3x^2 \cdot \cos(x^3)$

(60) $f(x) = \sqrt[3]{\operatorname{sen} x} = (\operatorname{sen} x)^{\frac{1}{3}}$

$f'(x) = \frac{1}{3} (\operatorname{sen} x)^{-\frac{2}{3}} \cdot (\operatorname{sen} x)' = \dfrac{\cos x}{3 \sqrt[3]{\operatorname{sen}^2 x}}$

(61) $f(x) = \cos(\cos x)$

$f'(x) = -\operatorname{sen}(\cos x) \cdot (\cos x)' = -\operatorname{sen}(\cos x) \cdot (-\operatorname{sen} x)$

$f'(x) = \operatorname{sen} x \cdot \operatorname{sen}(\cos x)$

TODAS LAS REGLAS

(62) $f(x) = x^2 \cdot \cos(2x-1)$

$f'(x) = (x^2)' \cos(2x-1) + x^2 \cdot (\cos(2x-1))'$

$f'(x) = 2x \cos(2x-1) + x^2 \cdot (-\operatorname{sen}(2x-1)) \cdot (2x-1)'$

$f'(x) = 2x \cos(2x-1) - 2x^2 \operatorname{sen}(2x-1) = 2x(\cos(2x-1) - x \operatorname{sen}(2x-1))$

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

$f'(x) = -5 \cdot (x^2+x+1)^{-6} \cdot (x^2+x+1)' = \dfrac{-5 \cdot (2x+1)}{(x^2+x+1)^6}$

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

$f'(x) = \dfrac{(\operatorname{sen}(2x^2+5x-1))' \cdot (x^2+2x-1) - \operatorname{sen}(2x^2+5x-1) \cdot (x^2+2x-1)'}{(x^2+2x-1)^2}$

$f'(x) = \dfrac{(4x+5) \cdot \cos(2x^2+5x-1) \cdot (x^2+2x-1) - \operatorname{sen}(2x^2+5x-1) \cdot (2x+2)}{(x^2+2x-1)^2}$

$f'(x) = \dfrac{(4x+5) \cdot (x^2+2x-1) \cos(2x^2+5x-1) - (2x+2) \cdot \operatorname{sen}(2x^2+5x-1)}{(x^2+2x-1)^2}$

(66) $f(x) = 2^{x^3} \cdot \cos^2 x$ $\qquad (\cos x)^2$

$f'(x) = (2^{x^3})' \cos^2 x + 2^{x^3} \cdot (\cos^2 x)'$

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

$f'(x) = 2^{x^3} \cdot \cos x \left(3x^2 \cdot \ln 2 \cdot \cos x - 2 \operatorname{sen} x \right)$

(67) $f(x) = \dfrac{(3x^2-2x)^2}{\sqrt{x^3-2x}}$

$$f'(x) = \frac{[(3x^2-2x)^2]' \cdot \sqrt{x^3-2x} - (3x^2-2x)^2 \cdot [(x^3-2x)^{\frac{1}{2}}]'}{(\sqrt{x^3-2x})^2}$$

$$f'(x) = \frac{2 \cdot (3x^2-2x)^1 \cdot (6x-2)\sqrt{x^3-2x} - (3x^2-2x)^2 \cdot \frac{1}{2}(x^3-2x)^{-\frac{1}{2}} \cdot (3x^2-2)}{(x^3-2x)}$$

$$f'(x) = \frac{\dfrac{2 \cdot (3x^2-2x) \cdot (6x-2)\sqrt{x^3-2x}}{1} - \dfrac{(3x^2-2x)^2(3x^2-2)}{2\sqrt{x^3-2x}}}{\dfrac{(x^3-2x)}{1}}$$

$$f'(x) = \frac{4(3x^2-2x)(6x-2)(x^3-2x) - (3x^2-2x)^2 \cdot (3x^2-2)}{2\sqrt{x^3-2x}\,(x^3-2x)}$$

$$f'(x) = \frac{(3x^2-2x)\,[4(6x-2)(x^3-2x) - (3x^2-2x) \cdot (3x^2-2)]}{2(x^3-2x)\sqrt{x^3-2x}}$$

$$f'(x) = \frac{(3x^2-2x)\,[24x^4 - 48x^2 - 8x^3 + 16x - 9x^4 + 6x^2 + 6x^3 - 4x]}{2(x^3-2x)\sqrt{x^3-2x}}$$

$$f'(x) = \frac{(3x^2-2x) \cdot (15x^4 - 2x^3 - 42x^2 + 12x)}{2 \cdot (x^3-2x)\sqrt{x^3-2x}}$$

$$f'(x) = \frac{\cancel{x}(3x-2) \cdot (15x^4 - 2x^3 - 42x^2 + 12x)}{2 \cdot \cancel{x} \cdot (x^2-2) \cdot \sqrt{x^3-2x}}$$

$$f'(x) = \frac{(3x-2) \cdot x \cdot (15x^3 - 2x^2 - 42x + 12)}{2 \cdot (x^2-2)\sqrt{x^3-2x}}$$