Nº 27

$$D(3x+\operatorname{sen}x-\cos x)=3+\cos x+\operatorname{sen}x$$

Nº 32

$$D(3^x+\log_4 x)=3^x\ln 3+\frac{1}{x}\log_4 e$$

$$D(a^x)=\lim_{h\to 0}\frac{a^{x+h}-a^x}{h}=\lim_{h\to 0}\frac{a^x(a^h-1)}{h}=$$

$a^h-1=t \quad h\to 0 \Rightarrow t\to 0$

$a^h=t+1$

$$=\lim_{t\to 0}\frac{a^x\cdot t}{\log_a(t+1)}=$$

$h=\log_a(t+1)$

$$=\lim_{t\to 0}\frac{a^x}{\log_a(t+1)^{\frac{1}{t}}}=\frac{a^x}{\log_a e}=a^x\ln a$$

Nº 41

$$D\left(\frac{1}{2}x^2+\frac{1}{3}x^3+5x+9\right)=x+x^2+5$$

Nº 43

$$D\left(\frac{x^4+1}{e^4+1}\right)=\frac{4x^3}{e^4+1}$$

Nº 44

$$D\left(\sqrt[4]{x}-\frac{1}{\sqrt[4]{x}}\right)=\frac{1}{4}x^{-\frac{3}{4}}+\frac{1}{4}x^{-\frac{5}{4}}=\frac{1}{4\sqrt[4]{x^3}}+\frac{1}{4\sqrt[4]{x^5}}=\frac{1}{4\sqrt[4]{x^3}}+\frac{1}{4x\sqrt[4]{x}}$$

Nº 70

$$D\left[(1-2x^2)(3x+1)\right]=-4x(3x+1)+3(1-2x^2)=-12x^2-4x+3-6x^2=-18x^2-4x+3$$

Nº 75

$$D\left[5x(5x^3-2)\left(\frac{1}{5}x-1\right)\right]=5(5x^3-2)\left(\frac{1}{5}x-1\right)+5x(15x^2)\left(\frac{1}{5}x-1\right)+$$

$$+5x(5x^3-2)\left(\frac{1}{5}\right)=5x^4-2x-25x^3+10+15x^4-75x^3+5x^4-2x=$$

$$=25x^4-100x^3-4x+10$$

ES N°69

$$D\left[(2x+3)(x^2+3x-1)\right] =$$

$$= D(2x+3)\cdot(x^2+3x-1) + D(x^2+3x-1)\cdot(2x+3) =$$

$$= 2x^2+6x-2+(2x+3)(2x+3) =$$

$$= 2x^2+6x-2+4x^2+9+12x = 6x^2+18x+7$$

N°77

$$D\left(e^x(2-e^x)\right) = D(e^x)\cdot(2-e^x)+D(2-e^x)e^x =$$

$$= e^x(2-e^x)-e^x\cdot e^x = 2e^x-e^{2x}-e^{2x} = 2e^x(1-e^x)$$

N°144

$$D\left(\frac{3-x^2}{x+2}\right) = \frac{D(3-x^2)(x+2)-D(x+2)(3-x^2)}{(x+2)^2} =$$

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

$$y = \frac{3-x^2}{x+2} \qquad D_f: \{x\in\mathbb{R}/x\neq -2\} =$$

$$= (-\infty;-2)\cup(-2;+\infty)$$

$$\frac{3-x^2}{x+2}>0 \qquad N>0 \Rightarrow 3-x^2>0 \Rightarrow x^2<3 \Rightarrow -\sqrt{3}<x<\sqrt{3}$$

$$D>0 \Rightarrow x+2>0 \Rightarrow x>-2$$

	-2		$-\sqrt{3}$		$\sqrt{3}$	
N	−	−	0	+	0	−
D	−	0	+	+	+	+
N/D	+	−	0	+	0	−

$f(x)>0$ per $x<-2 \cup -\sqrt{3}<x<\sqrt{3}$

$f(x)<0$ per $-2<x<-\sqrt{3} \cup x>\sqrt{3}$

INTERS. ASSE X $\Rightarrow y=0 \Rightarrow \frac{3-x^2}{x+2}=0 \Rightarrow x=\pm\sqrt{3}$

$A=(-\sqrt{3};0)$

INTERS. ASSE Y $\Rightarrow x=0$

$$y=\frac{3-0^2}{0+2} \Rightarrow y=\frac{3}{2}$$

$B=(+\sqrt{3};0)$

$C=(0;\frac{3}{2})$

PARI? $f(-x) \Rightarrow y=\frac{3-(-x)^2}{-x+2} \Rightarrow y=\frac{3-x^2}{2-x}$

DISPARI? $-f(-x) \Rightarrow y=-\frac{3-(-x)^2}{-x+2} \Rightarrow y=\frac{x^2-3}{x-2}$

NÉ PARI NÉ DISPARI

$$\lim_{x\to+\infty} \frac{3-x^2}{x+2} = \left[\frac{3+\infty}{\infty+2} = \frac{\infty}{\infty}\right] \text{F.I.}$$

$$\lim_{x\to+\infty} \frac{x^2\left(\frac{3}{x^2}-1\right)}{x\left(1+\frac{2}{x}\right)} = -\infty$$

$\frac{3}{x^2} \to 0$; $\frac{2}{x} \to 0$