CÁLCULO DE FUNCIÓNS DERIVADAS. MATI.

Nome:_____ Grupo:_____

ATENCIÓN!!!
É obrigatorio escribir con bolígrafo. Non se admitirán exames feitos a lapis. Valorarase a claridade, limpeza e correcta utilización da linguaxe simbólica.

Acha a función derivada das seguintes funcións:

1.- $y=\frac{x^3}{5}+2\sqrt{x}+\frac{2}{\sqrt{x}}-\frac{5}{x^2} = \frac{x^3}{5}+2x^{\frac{1}{2}}+2\cdot x^{-\frac{1}{2}}-5x^{-2}$

$y' = \left(\frac{1}{5}x^3\right)' + \left(2x^{\frac{1}{2}}\right)' + \left(2\cdot x^{-1/2}\right)' - \left(5x^{-2}\right)' = \frac{1}{5}(x^3)' + 2(x^{\frac{1}{2}})' + 2(x^{-1/2})' - 5(x^{-2})'$

$y' = \frac{1}{5}\cdot 3x^2 + 2\cdot\frac{1}{2}\cdot x^{-\frac{1}{2}} + 2\cdot\left(-\frac{1}{2}\right)x^{-\frac{3}{2}} - 5\cdot(-2)x^{-3} = \frac{3}{5}x^2 + \frac{1}{\sqrt{x}} - \frac{1}{\sqrt{x^3}} + \frac{10}{x^3}$

2.- $y = 3tgx + \frac{\ln x}{2} - 3\arccos x + sen\frac{2\pi}{3}$

$y' = 3\cdot(\tan x)' + \frac{1}{2}(\ln x)' - 3(\arccos x)' + \left(sen\frac{2\pi}{3}\right)'$

$y' = 3\cdot\frac{1}{\cos^2 x} + \frac{1}{2}\cdot\frac{1}{x} - 3\frac{(-1)}{\sqrt{1-x^2}} + 0 = \frac{3}{\cos^2 x} + \frac{1}{2x} + \frac{3}{\sqrt{1-x^2}}$

3.- $y = 2e^x arctgx$

$y' = (2e^x)'\arctan x + (2e^x)\cdot(\arctan x)'$

$y' = 2e^x\cdot\arctan x + 2e^x\cdot\frac{1}{1+x^2} = 2e^x\left(\arctan x + \frac{1}{1+x^2}\right)$

4.- $y=\frac{\operatorname{sen} x}{1+\cos x}$

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

$y' = \frac{\cos x + \cos^2 x + sen^2 x}{(1+\cos x)^2} = \frac{1+\cos x}{(1+\cos x)^2} = \frac{1}{1+\cos x}$ (1.)

5.- $y=\frac{5x^2-3x+2}{x^2-2x+1}$

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

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

$y' = \frac{10x^3-3x^2-20x^2+6x+10x-3-10x^3+10x^2-6x^2+6x-4x+4}{(x^2-2x+1)^2} = *$

$$* = \frac{-7x^2+6x+1}{(x^2-2x+1)^2} = \frac{(x-1)\cdot(-7x-1)}{(x-1)^4} = \frac{-7x-1}{(x-1)^3}$$

$$(x^2-2x+1)^2 = \left((x-1)^2\right)^2 = (x-1)^4$$

$$-7x^2+6x+1 = (x-1)\cdot(-7x-1)$$

	-7	6	1
1		-7	-1
	-7	-1	0