$TVM[a,b] = \frac{f(b)-f(a)}{b-a}$

$TVM[a,a+h] = \frac{f(a+h)-f(a)}{h}$

$TVI(a) = f'(a)$ $\lim_{x\to a} \frac{f(x)-f(a)}{x-a}$ $\lim_{h\to 0} \frac{f(a+h)-f(a)}{h}$

$f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$

RT en $x=a$ $\quad y-f(a)=f'(a)(x-a)$

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$f(x)=2x^2+3$

a) $TVM[-1,1] = \frac{f(1)-f(-1)}{1-(-1)}$

$= \frac{5-5}{2} = 0$

b) $TVM[1,1+h] = \frac{f(1+h)-f(1)}{h}$

$\frac{[2(1+h)^2+3]-5}{h}$

$\frac{2+4h+2h^2+3-5}{h} = 4+2h$

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c) $TVI(3) = \lim_{x\to 3} \frac{f(x)-f(3)}{x-3}$

$\lim_{x\to 3} \frac{(2x^2+3)-21}{x-3} = \lim_{x\to 3} \frac{2x^2-18}{x-3} = \frac{0}{0}$

$\lim_{x\to 3} \frac{2(x-3)(x+3)}{x-3} = 12$

d) $f'(2) = \lim_{x\to 2} \frac{f(x)-f(2)}{x-2}$

$\lim_{x\to 2} \frac{(2x^2+3)-(11)}{x-2} = \lim_{x\to 2} \frac{2x^2-8}{x-2} = \frac{0}{0}$

$\lim_{x\to 2} \frac{2(x-2)(x+2)}{x-2} = 8$

ene 15-13:28

e) $f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$

$\lim_{h\to 0} \frac{[2(x+h)^2+3]-[2x^2+3]}{h}$

$\lim_{h\to 0} \frac{2x^2+4xh+2h^2+3-2x^2-3}{h} = \frac{0}{0}$

$\lim_{h\to 0} 4x+2h = 4x$

f) RT en $x=0$

$y-f(0)=f'(0)(x-0)$

$f(0)=3$

$f'(0)=4\cdot 0=0$

$y-3=0(x-0)$

$y=3$

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OPERACIONES

$(f+g)'(x) = f'(x)+g'(x)$

$(f-g)'(x) = f'(x)-g'(x)$

$(k\,f)'(x) = k \cdot f'(x)$

$(f \cdot g)'(x) = f'(x)\,g(x) + f(x)\,g'(x)$

$(fgh)' = f'gh + fg'h + fgh'$

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

$[f(g(x))]' = f'(g(x)) \cdot g'(x)$

$[f(g(h(x)))]' = f'(g(h(x))) \cdot g'(h(x)) \cdot h'(x)$

ene 15-13:34

FUNCION	DERIVADA
$y=k$	$y'=0$
$y=x$	$y'=1$
$y=x^n$	$y'=n\,x^{n-1}$
$y=\sqrt{x}$	$y'=\frac{1}{2\sqrt{x}}$
$y=\sqrt[n]{x}$	$y'=\frac{1}{n\sqrt[n]{x^{n-1}}}$
$y=a^x$	$y'=a^x \cdot \ln a$
$y=e^x$	$y'=e^x$
$y=\log_a x$	$y'=\frac{1}{x \ln a}$
$y=\ln x$	$y'=\frac{1}{x}$
$y=\operatorname{sen} x$	$y'=\cos x$
$y=\cos x$	$y'=-\operatorname{sen} x$
$y=\operatorname{tg} x$	$y'=[1+\operatorname{tg}^2 x]=\frac{1}{\cos^2 x}$
$y=\operatorname{arc\,sen} x$	$y'=\frac{1}{\sqrt{1-x^2}}$
$y=\arccos x$	$y'=\frac{-1}{\sqrt{1-x^2}}$
$y=\operatorname{arctg} x$	$y'=\frac{1}{1+x^2}$

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$y=3 \quad y'=0$

$y=x \quad y'=1$

$y=x^7 \quad y'=7x^6$

$y=2^x \quad y'=2^x \cdot \ln 2$

$y=\sqrt[3]{x} \quad y'=\frac{1}{3\sqrt[3]{x^2}}$

$y=e^x \quad y'=e^x$

$y=\log_3 x \quad y'=\frac{1}{x \ln 3}$

$y=\ln x \quad y'=\frac{1}{x}$

$y=\operatorname{sen} x \quad y'=\cos x$

$y=\operatorname{tg} x \quad y'=[1+\operatorname{tg}^2 x]=\frac{1}{\cos^2 x}$

$y=\arccos x \quad y'=\frac{-1}{\sqrt{1-x^2}}$

$y=\operatorname{arctg} x \quad y'=\frac{1}{1+x^2}$

$y=\frac{1}{x^4}$

$y=\frac{1}{\sqrt{x^3}}$

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$y=\frac{1}{x^4}$

$y'=\frac{0 \cdot x^4 - 1 \cdot 4x^3}{(x^4)^2} = \frac{-4}{x^5}$

$y=x^{-4} \quad y'=-4x^{-5}=-\frac{4}{x^5}$

$y=\frac{1}{\sqrt{x^3}}=x^{-3/2} \quad y'=-\frac{3}{2}x^{-5/2}=-\frac{3}{2\sqrt{x^5}}$

y

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$y = 2x^3 + 4x + 3$

$y' = 2.3x^2 + 4.1 + 0 = 6x^2 + 4$

$y = \frac{x^3}{4} = \frac{1}{4}x^3$

$y' = \frac{1}{4}.3x^2 = \frac{3x^2}{4}$

$y = \frac{x^2+2}{2x+3}$

$y' = \frac{(2x+0).(2x+3) - (x^2+2)(2.1+0)}{(2x+3)^2}$

$\frac{4x^2+6x-2x^2-4}{(2x+3)^2} = \boxed{\frac{2x^2+6x-4}{(2x+3)^2}}$

ene 15-13:46

$y = 2^x . \cos x$

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

$2^x \left[\ln 2 . \cos x - \operatorname{sen} x \right]$

ene 15-13:48

$y = 8$

$y = x^{10}$

$y = \sqrt[5]{x}$

$y = \log x$

$y = 5^x$

$y = 3x^3 - 4x + \sqrt{7}$

$y = 2^x + x^2 + 2x + \log_2 x$

$y = \operatorname{sen} x . e^x$

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

$y = 2 \operatorname{arctg} x + \frac{3}{x^3} + \frac{x^3}{3}$

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