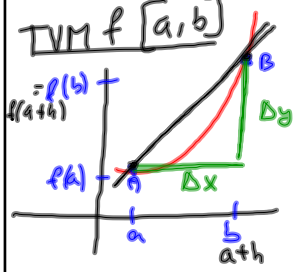
TEMA 9 - DERIVADAS

DERIVADA POR LA DEF

TVM $f[a,b]$

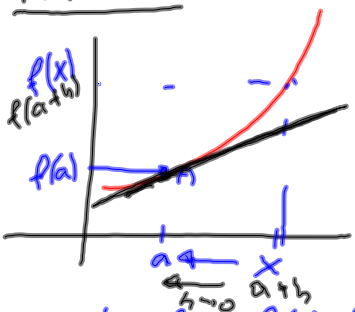


$$TVM\ f[a,b] = \frac{\Delta y}{\Delta x} = \frac{f(b)-f(a)}{b-a} = \frac{f(a+h)-f(a)}{h}$$

TVM $f[a,b]$ es la pte de la recta secante a la curva por los ptos $A(a,f(a)), B(b,f(b))$

ene 14-14:32

TVI $f(a)$



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

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

TVI(a) es la pte de la recta tg a la curva en el pto $A(a,f(a))$

$P(a,f(a))$, $m = f'(a)$

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

ene 14-14:36

Derivada

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

$$f''(x) = [f'(x)]' = D^2 f(x)$$

$$f^{(n)}(x) = [f^{(n-1)}(x)]' = D^n f(x)$$

ene 14-14:40

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

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

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

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

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

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

ene 14-14:41

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

$TVM[0,2] = \frac{f(2)-f(0)}{2-0} = \frac{11-3}{2} = 4 > 0$ (rec

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

$= \frac{[(1+h)^2+2(1+h)+3]-6}{h}$

$= \frac{1+2h+h^2+2+2h+3-6}{h}$

$= \frac{4h+h^2}{h} = \boxed{4+h}$

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

$\lim_{x\to 2}$

ene 14-14:41

$\lim_{x\to 2} \frac{x^2+2x+3-11}{x-2} =$

$\lim_{x\to 2} \frac{x^2+2x-8}{x-2} = \frac{0}{0}$

$\lim_{x\to 2} \frac{(x-2)(x+4)}{x-2} = 6$

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

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

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

$\lim_{h\to 0} \frac{2xh+h^2+2h}{h} = \frac{0}{0}$

$\lim_{h\to 0} \frac{h(2x+h+2)}{h} = 2x+2$

RT en $x=1$ $\quad y-f(1) = f'(1)(x-1)$

$f(1) = 6$

$f'(1) = 4$

$y-6 = 4(x-1)$

$\boxed{y = 4x+2}$

ene 14-14:45

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

$TVM[-1,1]$

$TVM[1,1+h]$

$TVI(3)$

$f'(2)$

$f'(x)$

RT en $x=0$

ene 14-14:50