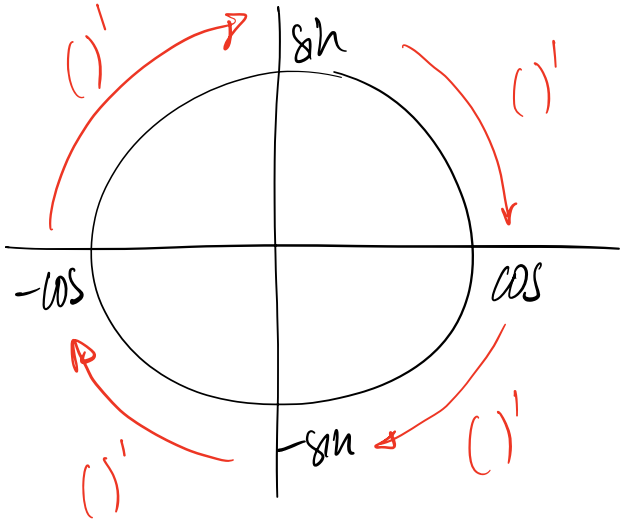
Dérivées

Fonctions trigos



$$(\sin x)' = \cos x$$

$$(\cos x)' = -\sin x$$

$$(-\sin x)' = -\cos x$$

$$(-\cos x)' = \sin x$$

Exemples:

$$(2\cdot\sin x - 3\cdot\cos x)' = 2\cdot(\sin x)' - 3(\cos x)'$$

$$= 2\cos x - 3\cdot(-\sin x)$$

$$= 2\cos x + 3\sin x$$

$$(\sin x\cdot\cos x)' = (\sin x)'\cdot\cos x + \sin x\cdot(\cos x)'$$

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

$$= \cos x\cos x + \sin x(-\sin x)$$

$$= \cos^2 x - \sin^2 x$$

$(x^2)' = 2x$

$(x^5)' = 5x^4$

$(3x^2-2x+1)' = 6x-2$

$3(x^2)' - 2(x)' + (1)' =$

$3 \cdot 2 \cdot x^1 - 2 \cdot 1 + 0 =$

Si on compose:

$$(3x^2-2x+1)^5 = (3x^2-2x+1)\cdot(3x^2-2x+1)\cdot\ldots$$

$$\left((3x^2-2x+1)^5\right)' = 5\cdot(3x^2-2x+1)^4\cdot(3x^2-2x+1)'$$

$$(\,)^5)' = 5\cdot(\,)^4$$

$$= \boxed{5(3x^2-2x+1)^4\cdot(6x-2)}$$

$$\big(f(g(x))\big)' = f'(g(x))\cdot g'(x)$$

p. 104-105 17 à 21 (1 à 4)

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

$$(f\cdot g)' = f'g + fg'$$

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

$$= 4 - 4x^2 - 8x^2 = -12x^2 + 4$$

$$(4x - 4x^3)' = 4 - 12x^2$$

Remarque: $\tan x = \dfrac{\sin x}{\cos x}$

$$(\tan x)' = \left(\frac{\sin x}{\cos x}\right)'$$

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

$$\left(\frac{1}{g}\right)' = -\frac{g'}{g^2} = \frac{1'g - 1g'}{g^2}$$

$= 4 \cdot 1 \cdot (1-x^2) + 4x \cdot (-2x) = 4 - 4x^2 - 8x^2$

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

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

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

$$\left(\frac{f}{3}\right)' = \frac{1}{3} \cdot f' = \frac{f' \cdot 3 - f \cdot \overbrace{3'}^{0}}{3^2} = \frac{3f'}{9} = \frac{f'}{3} \checkmark$$

$$(x^2-1)^4 = (x^2-1)(x^2-1)(x^2-1)(x^2-1)$$

$$= (x^4 - 2x^2 + 1)(x^4 - 2x^2 + 1)$$

$$= (x^8 - 2x^6 + x^4 - 2x^6 + 4x^4 - 2x^2 + x^4 - 2x^2 + 1)$$

$$= \boxed{x^8 - 4x^6 + 6x^4 - 4x^2 + 1}$$

$$\left((x^2-1)^5\right)' = 5(x^2-1)^4 \cdot (x^2-1)'$$

$$= 5(x^2-1)^4 \cdot 2x$$

$$= 10x(x^2-1)^4$$

$$\left(\frac{4-3x}{2x-1}\right)' = \frac{(4-3x)' \cdot (2x-1) - (4-3x)(2x-1)'}{(2x-1)^2}$$

$$\left(\frac{f}{g}\right)' = \frac{f' \cdot g - f \cdot g'}{g^2}$$

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

$$= \frac{-6x+3-(8-6x)}{(2x-1)^2} = \frac{-6x+3-8+6x}{(2x-1)^2}$$

$$= \frac{-5}{(2x-1)^2}$$

$$\left(4x(1-x^2)\right)' = (4x - 4x^3)'$$

$$= 4(x)' - 4(x^3)'$$

$$= 4 \cdot 1 - 4 \cdot (3x^2) = 4 - 12x^2$$