Dérivées avec fcts trigo

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

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

$$\left(\tan(x)\right)' = 1+\tan^2(x) = \frac{1}{\cos^2(x)}$$

$$\left(\sin(u)\right)' = \cos(u)\cdot u'$$

$$\left(\cos(u)\right)' = -\sin(u)\cdot u'$$

$$\left(\tan(u)\right)' = \left(1+\tan^2(u)\right)\cdot u' = \frac{u'}{\cos^2(u)}$$

Exples

1) $f(x) = \sin(4x) \Rightarrow f'(x) = \cos(4x)\cdot 4 = 4\cos(4x)$

2) $f(x) = \sin^2(x) = \left(\sin(x)\right)^2$

$f'(x) = 2\sin(x)\cdot\cos(x)$

3) $f(x) = \sin^2(4x) = \left(\sin(4x)\right)^2$

$f'(x) = 2\sin(4x)\cdot\cos(4x)\cdot 4 = 8\sin(4x)\cos(4x)$

Ex

1) $f(x) = \sin(x) + 2\cos(x)$ $\qquad f'(x) = \cos(x) - 2\sin(x)$

2) $f(x) = \tan(x) - x$ $\qquad f'(x) = \frac{1}{\cos^2(x)} - 1 = \tan^2(x)\,(+1-1)$

3) $f(x) = \frac{1}{\sin(x)}$ $\qquad v = \sin(x)$, $v' = \cos(x)$ $\qquad f'(x) = -\frac{\cos(x)}{\sin^2(x)}$

4) $f(x) = \cos\left(\frac{x}{2}\right)$ $\qquad u = \frac{x}{2} = \frac{1}{2}\cdot x$, $u' = \frac{1}{2}$ $\qquad f'(x) = -\frac{1}{2}\sin\left(\frac{x}{2}\right)$

5) $f(x) = \cos^3(x)$ $\qquad u = \cos(x)$, $u' = -\sin(x)$ $\qquad f'(x) = 3\cos^2(x)(-\sin(x)) = -3\cos^2(x)\sin(x)$

$f(x) = (\cos(x))^3$

$= u^3$

$f'(x) = 3u^2 \cdot u'$