

Dérivée des fonctions trigonométriques

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

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

Exemples

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

$$b) (\sin(x) \cdot \cos(x))' = \cos(x)\cos(x) + \sin(x)(-\sin(x)) \\ = (\cos(x))^2 - (\sin(x))^2 = \cos^2(x) - \sin^2(x)$$

$$c) \left(\frac{\sin(x)}{\cos(x)}\right)' = \frac{\cos(x)\cos(x) - \sin(x)(-\sin(x))}{\cos^2(x)} = \frac{\cos^2(x) + \sin^2(x)}{\cos^2(x)}$$

Rappel de trigo: $\frac{\sin(x)}{\cos(x)} = \tan(x)$

$$\cos^2(x) + \sin^2(x) = 1 \quad (*)$$

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

$$d) (\sin^3(x))' = ((\sin(x))^3)' \\ = 3 \cdot (\sin(x))^2 \cdot \underbrace{\cos(x)}_{\text{dérivée interne}} \\ = 3 \sin^2(x) \cos(x)$$

$$(u^k)' = k \cdot u^{k-1} \cdot u' \\ \text{avec } u = \sin(x) \\ u' = \cos(x)$$

$$e) (\cos(3x))' = -\sin(3x) \cdot \underbrace{3}_{\text{dérivée interne}} \\ = -3 \sin(3x)$$

$$u = 3x \\ u' = 3$$

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

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