

# TRIGONOMETRISTEN FUNKTIONIDEN DERIVAATAT

$$\begin{aligned} D \sin x &= \cos x \\ D \sin f(x) &= \cos f(x) \cdot f'(x) \\ D \cos x &= -\sin x \\ D \cos f(x) &= -\sin f(x) \cdot f'(x) \end{aligned}$$

Huom!  
Sisäf. der.

$$D \tan x = \frac{1}{\cos^2 x} = 1 + \tan^2 x \quad (x \neq \frac{\pi}{2} + n\pi)$$

$$D \tan f(x) = \frac{1}{\cos^2 f(x)} \cdot f'(x) = f'(x)(1 + \tan^2 f(x))$$

esim a)  $D \frac{2}{3} \cos 7x$

b)  $D (\sin^2 x \cos x)$

c)  $D \tan 4x$

Ratk  
4)  $D \left( \frac{2}{3} \cos 7x \right)$

$$= \frac{2}{3} D \cos 7x$$

$$= \frac{2}{3} \cdot 7 \cdot (-\sin 7x)$$

$$= -\frac{14}{3} \sin 7x$$

b)  $D (\sin^2 x \cos x)$

$$\begin{aligned} &= 2 \sin x \cdot \cos x \cdot \cos x + \sin^2 x \cdot (-\sin x) \\ &= 2 \sin x \cos^2 x - \sin^3 x \\ &= 2 \sin x (1 - \sin^2 x) - \sin^3 x \\ &= 2 \sin x - 2 \sin^3 x - \sin^3 x \\ &= 2 \sin x - 3 \sin^3 x \end{aligned}$$

c)  $D \tan 4x$

$$= 4 \cdot \frac{1}{\cos^2 4x} \quad \text{I tyyppi}$$

$$= \frac{4}{\cos^2 4x}$$

II tyyppi

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

$$= (1 + \tan^2 4x) D(4x)$$

Sisäf.  
f(x) = 7x  
f'(x) = 7

Sisäf. der.

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

f(x) = sin<sup>2</sup> x

f'(x) =

g(x) = cos x

g'(x) =

sin<sup>2</sup> x + cos<sup>2</sup> x = 1

cos<sup>2</sup> x = 1 - sin<sup>2</sup> x

f(x) = 4x

f'(x) = 4