

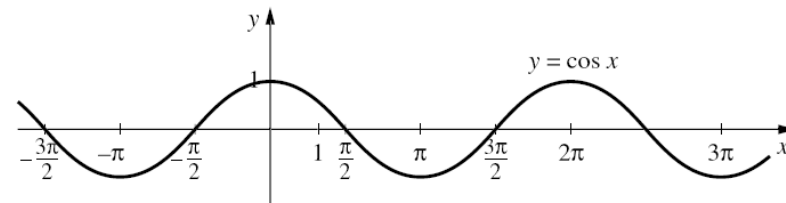
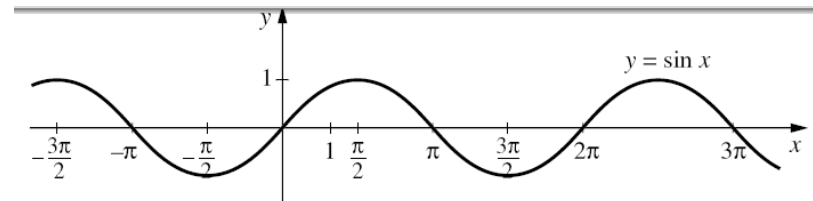
# Trigonometrinen funktioiden derivaatat

$$D \sin x = \cos x$$

$$D \cos x = -\sin x$$

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

$$n \in \mathbb{Z}$$



Esim. t. 170, s. 73

$$a) \quad D \cos \frac{x}{2} = \frac{1}{2} \cdot \left( -\sin \frac{x}{2} \right) = -\frac{1}{2} \sin \frac{x}{2}$$

$\uparrow$   $\uparrow$   
 $f'(x)$   $g'(f(x))$

$x$	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$	$\frac{5\pi}{2}$	
funktio $\sin x$							
derivaatta							
funktio $\cos x$							
arvo							

$$Dg(f(x)) = g'(f(x))f'(x)$$

$$b) \quad D \sin^2 3x = 2 \sin 3x \cdot D \sin 3x = 2 \sin 3x \cdot 3 \cos 3x = 6 \sin 3x \cos 3x$$

$$(\quad = 3 \sin 6x)$$

$$\boxed{g(x) = x^2 \quad g'(x) = 2x}$$

$$\boxed{f(x) = \sin 3x \quad f'(x) = 3 \cos 3x}$$

(kaksinkertaisen kulman sinin kaava)