

18.18 Laske asteen tarkkuudella, kuinka suuressa kulmassa käyrät $y = \sin 3x$ ja $y = \cos 3x$ leikkaavat toisensa.

$$\sin x = -\sin(-x) = \cos\left(\frac{\pi}{2} - x\right) = \sin(\pi - x) = \sin(x + n2\pi)$$

leikkauspiste:

$$\sin 3x = \cos 3x, \text{ kun}$$

$$3x = \frac{\pi}{2} - 3x$$

$$6x = \frac{\pi}{2} \quad | :6$$

$$x = \frac{\pi}{12}$$

Selvitetään tangenttien kulmakertoimet kun $x = \frac{\pi}{12}$

$$\text{Vierittäen: } f(x) = \sin 3x \Rightarrow f'(x) = \cos(3x) \cdot 3 = 3 \cos(3x)$$

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

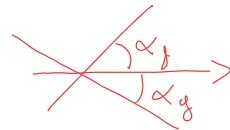
$$k_f = f'\left(\frac{\pi}{12}\right) = 3 \cos \frac{\pi}{4} = \frac{3}{\sqrt{2}}$$

$$k_g = g'\left(\frac{\pi}{12}\right) = -3 \sin \frac{\pi}{4} = -\frac{3}{\sqrt{2}}$$

$$\alpha_f = \arctan\left(\frac{3}{\sqrt{2}}\right) = 64,8^\circ$$

$$\alpha_g = \arctan\left(-\frac{3}{\sqrt{2}}\right) = -64,8^\circ$$

Suuntakulmalle
 $\tan \alpha = k$



$$\text{V: Välimen kulma } \alpha_f + \alpha_g \approx 129,6^\circ$$

$$180^\circ - 129,6^\circ =$$