

Trigonometrische Gleichungen (og ulikheter)

(10.1-10.2, 10.7)
+ Kap. 6

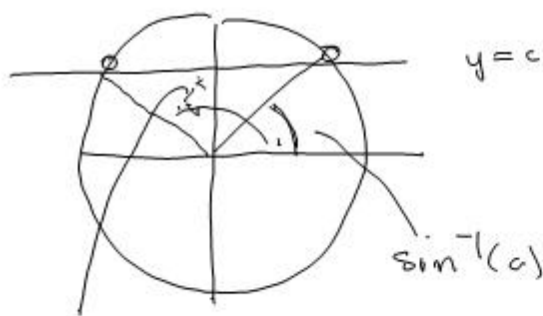
① Grundleggende trigonometriske likninger

$$\sin x = c$$

$$x = \sin^{-1}(c) + n \cdot 2\pi$$

eller

$$x = \pi - \sin^{-1}(c) + n \cdot 2\pi$$



$$\pi - \sin^{-1}(c)$$

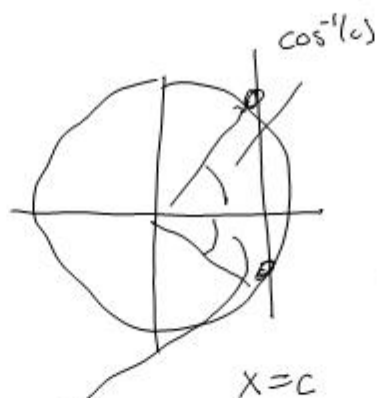
$$\cos x = c$$

$$x = \cos^{-1}(c) + n \cdot 2\pi$$

eller

$$x = -\cos^{-1}(c) + n \cdot 2\pi$$

$$(x = 2\pi - \cos^{-1}(c) + n \cdot 2\pi)$$

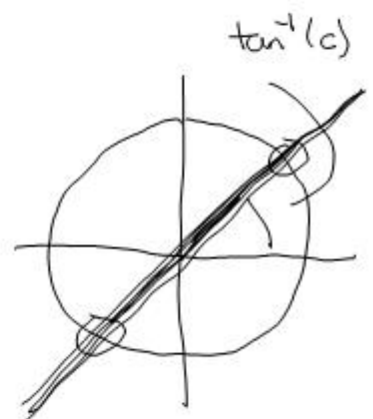


$$x = c$$

$$\begin{cases} -\cos^{-1}(c) \\ 2\pi - \cos^{-1}(c) \end{cases}$$

$$\tan x = c$$

$$x = \tan^{-1}(c) + n \cdot \pi$$



$$y/x = c \Leftrightarrow y = cx$$

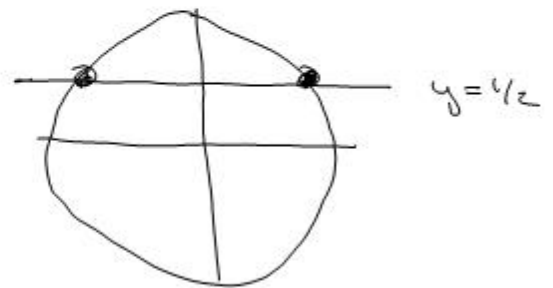
Exo:

$$\sin(x) = 1/2$$

$$x = \sin^{-1}(1/2) + n \cdot 2\pi$$
$$= \underline{\underline{\pi/6 + n \cdot 2\pi}}$$

ou

$$x = \pi - \sin^{-1}(1/2) + n \cdot 2\pi$$
$$= \underline{\underline{\frac{5\pi}{6} + n \cdot 2\pi}}$$



$$\sin(\pi/6) = \frac{1}{2}$$
$$\sin^{-1}(1/2) = \pi/6$$

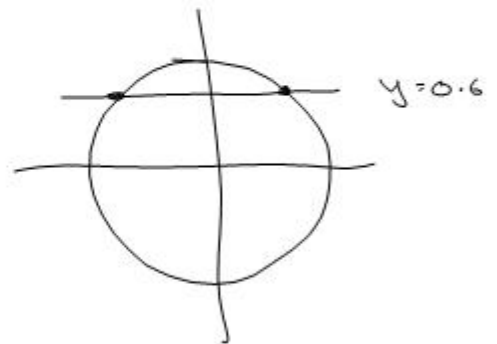
Exo:

$$\sin(x) = 0.6$$

$$x = \sin^{-1}(0.6) + n \cdot 2\pi$$
$$\approx \underline{\underline{0.644 + n \cdot 2\pi}}$$

ou

$$x = \pi - \sin^{-1}(0.6) + n \cdot 2\pi$$
$$\approx \underline{\underline{2.498 + n \cdot 2\pi}}$$



Exo:

$$\tan(x) = 4$$

$$x = \tan^{-1}(4) + n \cdot \pi$$
$$\approx \underline{\underline{1.325 + n \cdot \pi}}$$

② Trigonometrisk likning med en trigonometrisk funktion

Exo: $2 \cos x + 3 = -1$
 $\frac{2 \cos x}{2} = \frac{-1 - 3}{2} = \frac{-4}{2}$
 $\cos x = -2$
ingen lösning

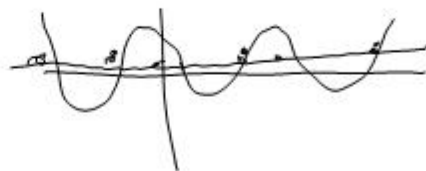
Exo: $\sin(2x - \pi) = 1/2$ $u = 2x - \pi$
 $\sin(u) = 1/2$

① $u = \sin^{-1}(1/2) + n \cdot 2\pi = \pi/6 + n \cdot 2\pi$
eller

② $u = \pi - \sin^{-1}(1/2) + n \cdot 2\pi = 5\pi/6 + n \cdot 2\pi$

① $2x - \pi = \pi/6 + n \cdot 2\pi$
 $\frac{2x}{2} = \frac{\pi/6 + \pi + n \cdot 2\pi}{2} = \frac{7\pi}{6} + n \cdot 2\pi$
 $x = \frac{7\pi}{12} + n \cdot \pi$

$f(x) = \sin(2x - \pi)$
 $\omega = 2 \Rightarrow T = \frac{2\pi}{2} = \pi$



$$\textcircled{2} \quad 2x - \pi = 5\pi/6 + n \cdot 2\pi$$

$$\frac{2x}{2} = \frac{5\pi/6 + \pi + n \cdot 2\pi}{2} = \frac{11/6\pi + n \cdot 2\pi}{2}$$

$$x = \frac{11}{12}\pi + n \cdot \pi$$

Lösung: $x = \frac{7}{12}\pi + n \cdot \pi$ oder $x = \frac{11}{12}\pi + n \cdot \pi$

EW:

$$2 \tan(2x) + 3 = 5$$

$$\frac{2 \tan(2x)}{2} = \frac{5 - 3}{2} = \frac{2}{2}$$

$$\tan(2x) = 1$$

$$\tan(u) = 1$$

$$u = 2x$$

$$u = \tan^{-1}(1) + n \cdot \pi = \pi/4 + n \cdot \pi$$

$$\frac{2x}{2} = \frac{\pi/4 + n \cdot \pi}{2}$$

$$x = \frac{\pi}{8} + n \cdot \frac{\pi}{2} \quad (n \text{ beliebig})$$