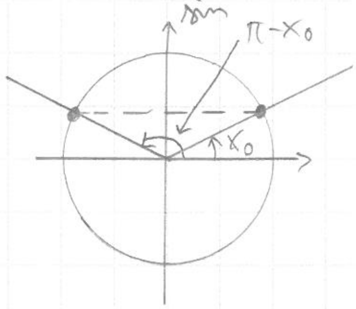
Vast. $x = \frac{\pi}{6} + m2\pi$ tai $x = \frac{5\pi}{6} + m2\pi$, $m \in \mathbb{Z} = \{0, \pm 1, \pm 2, \dots\}$

Huom. Jos trigonometrisellä yhtälöllä on ratkaisu, niin ratkaisuja on ääretön määrä.

Yleisesti $\boxed{\sin x = a = \sin x_0}$ SINIYHTÄLÖ

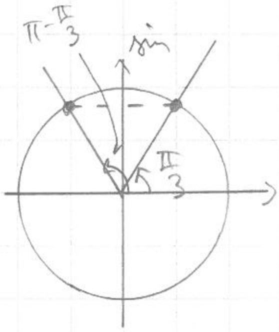


$\Leftrightarrow$ $x = x_0 + m2\pi$ tai $x = \pi - x_0 + m2\pi$, $m \in \mathbb{Z}$

Esim. $2\sin 5x - \sqrt{3} = 0$

$\Leftrightarrow$ $2\sin 5x = \sqrt{3}$ $\quad | : 2$

$\Leftrightarrow$ $\sin 5x = \frac{\sqrt{3}}{2}$ $\quad \Leftrightarrow$ $\sin 5x = \sin\frac{\pi}{3}$



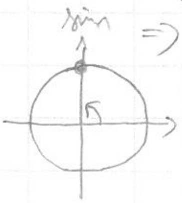
$\Leftrightarrow$ $5x = \frac{\pi}{3} + m2\pi \;|:5$ tai $5x = \underbrace{\pi - \frac{\pi}{3}}_{\frac{2\pi}{3}} + m2\pi \quad |:5$

$\Leftrightarrow$ $x = \frac{\pi}{15} + m\frac{2\pi}{5}$ tai $x = \frac{2\pi}{15} + m\frac{2\pi}{5}$, $m \in \mathbb{Z}$

Esim. $\sin^2 x + \sin x - 2 = 0$

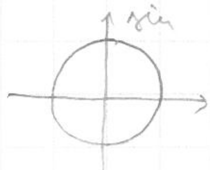
Mm. $t = \sin x$: $t^2 + t - 2 = 0$ $\Leftrightarrow$ $t = \begin{cases} 1 \\ -2 \end{cases}$ (ratk. kaava)

(apumuuttuja)



$\Rightarrow$ $\sin x = 1$ tai $\underbrace{\sin x}_{-1 \le \cdot \le 1} = -2$ ↯

$\Leftrightarrow$ $x = \frac{\pi}{2} + m \cdot 2\pi$, $m \in \mathbb{Z}$



5.8 a) $\sin x = 0$

$\Leftrightarrow$ $x = m\pi$, $m \in \mathbb{Z}$

[$x = 0 + m2\pi$ tai $x = \pi - 0 + m2\pi$]

b) $\sin x - 1 = 0$ $\Leftrightarrow$ $\sin x = 1$ $\Leftrightarrow$ $x = \frac{\pi}{2} + m2\pi$, $m \in \mathbb{Z}$

c) $\sin x \cdot (\sin x - 1) = 0$

$\Leftrightarrow$ $\sin x = 0$ tai $\sin x - 1 = 0$

$\Leftrightarrow$ $x = m\pi$ tai $x = \frac{\pi}{2} + m2\pi$, $m \in \mathbb{Z}$ (a- ja b-kohdat)