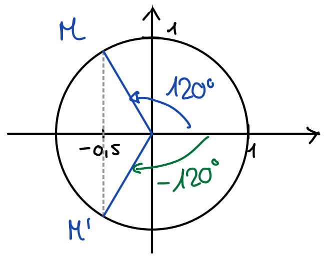
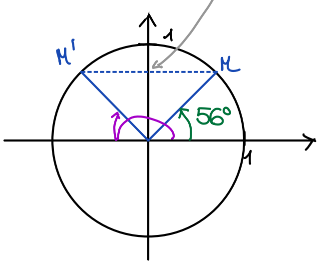
# Ex 6.1

a) $\cos(t) = -\frac{1}{2}$ à la màc. : $\cos^{-1}\left(-\frac{1}{2}\right) = 120°$



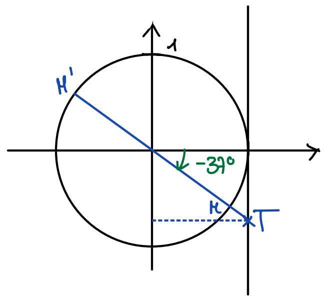

$\Leftrightarrow \quad t = \begin{cases} 120° + k \cdot 360° \\ \underbrace{-120° + k \cdot 360°}_{\text{ou } 210° + k \cdot 360°} \end{cases}, \ k \in \mathbb{Z}$

b) $\sin(t) = 0{,}829$ à la màc : $\sin^{-1}(0{,}829) \cong 55{,}996 \cong 56°$



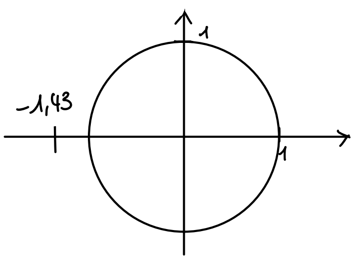

$\Leftrightarrow \quad t \cong \begin{cases} 56° + k \cdot 360° \\ 180° - 56° + k \cdot 360° = 124° + k \cdot 360° \end{cases}, \ k \in \mathbb{Z}$

c) $\tan(t) = -0{,}754$ à la màc : $\tan^{-1}(-0{,}754) \cong -37°$



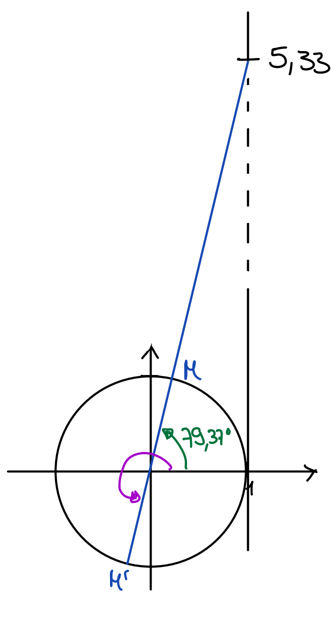

$\Leftrightarrow \quad t \cong -37° + k \cdot 180°, \ k \in \mathbb{Z}$

d) $\cos(t) = -1{,}43$ ↯ impossible car $-1{,}43 < -1$

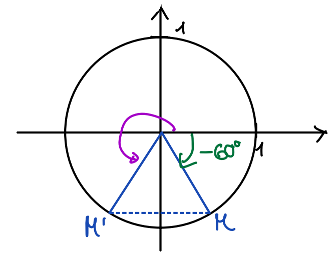



e) $\tan(t) = 5{,}33$ $\tan^{-1}(5{,}33) \cong 79{,}37°$

$\Leftrightarrow \quad t \cong 79{,}37° + k \cdot 180° \quad k \in \mathbb{Z}$



f) $\sin(3t) = -\frac{\sqrt{3}}{2}$ $\qquad$ $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -60°$



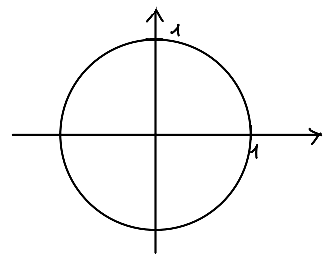

$$\Leftrightarrow \quad 3t = \begin{cases} -60° + k\cdot 360° & \big| \div 3 \\ 180° + 60° + k\cdot 360° = 240° + k\cdot 360° & \big| \div 3 \end{cases}$$

$$\Leftrightarrow \quad t = \begin{cases} -20° + k\cdot 120° \\ 80° + k\cdot 120° \end{cases}, \quad k \in \mathbb{Z}$$

(solutions entre 0 et 360° : $t = \begin{cases} 100° \text{ ou } 220° \\ 80° \text{ ou } 200° \text{ ou } 320° \end{cases}$ )

$k=1$, $k=2$ ; $k=0$, $k=1$, $k=2$

g) $\tan(5t) = 3{,}273$ $\qquad$ $\tan^{-1}(3{,}273) \hat{=} 73{,}01°$




$$5t \hat{=} 73{,}01° + k\cdot 180° \quad \big| \div 5$$

$$t \cong 14{,}6° + k\cdot 36°, \quad k \in \mathbb{Z}$$

(solutions entre 0° et 180° :

$t \cong 14{,}6°$ ou $50{,}6°$ ou $86{,}6°$ ou $122{,}6°$ ou $158{,}6°$ )

$k=0$ $\quad k=1$ $\quad k=2$ $\quad \ldots$

h) $\cos\left(\frac{t}{2}\right) = -\frac{1}{2}$

$$\Leftrightarrow \quad \frac{t}{2} = \begin{cases} 120° + k\cdot 360° & \big| \cdot 2 \\ -120° + k\cdot 360° & \big| \cdot 2 \end{cases}$$

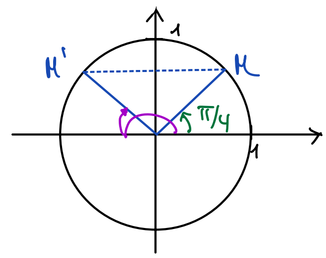
$$\Leftrightarrow \quad t = \begin{cases} 240° + k\cdot 720° \\ -240° + k\cdot 720° \end{cases}, \quad k \in \mathbb{Z}$$

(solution entre 0° et 360° : $t = 240°$ )

$k=0$ ds 1e solution

## Ex 6.2

a) $\sin\left(\frac{2t}{3}+\frac{\pi}{4}\right)=\frac{\sqrt{2}}{2}$ $\qquad \sin^{-1}\left(\frac{\sqrt{2}}{2}\right)=45^\circ=\frac{\pi}{4}$




$$\frac{2t}{3}+\frac{\pi}{4}=\begin{cases}\frac{\pi}{4}+k\cdot 2\pi & ①\\ \pi-\frac{\pi}{4}+k\cdot 2\pi=\frac{3\pi}{4}+k\cdot 2\pi & ②\end{cases}$$

① $\frac{2t}{3}+\frac{\pi}{4}=\frac{\pi}{4}+k\cdot 2\pi \quad \left|-\frac{\pi}{4}\right.$

$\frac{2t}{3}=k\cdot 2\pi \quad \left|\cdot\frac{3}{2}\right.$

$t=k\cdot\cancel{2}\pi\cdot\frac{3}{\cancel{2}}=k\cdot 3\pi$

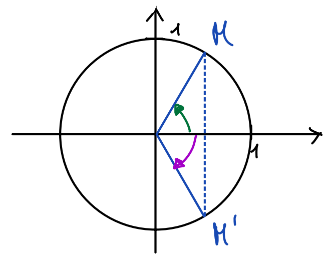
② $\frac{2t}{3}+\frac{\pi}{4}=\frac{3\pi}{4}+k\cdot 2\pi \quad \left|-\frac{\pi}{4}\right.$

$\frac{2t}{3}=\frac{2\pi}{4}+k\cdot 2\pi=\frac{\pi}{2}+k\cdot 2\pi$

$t=\left(\frac{\pi}{2}+k\cdot 2\pi\right)\cdot\frac{3}{2}=\frac{3\pi}{4}+k\cdot 3\pi$

$$\Rightarrow t=\begin{cases}k\cdot 3\pi\\ \frac{3\pi}{4}+k\cdot 3\pi\end{cases}\qquad k\in\mathbb{Z}$$

b) $\cos\left(\frac{t}{2}-\frac{\pi}{6}\right)=\frac{1}{2}$ $\qquad \cos^{-1}\left(\frac{1}{2}\right)=60^\circ=\frac{\pi}{3}$




$$\frac{t}{2}-\frac{\pi}{6}=\begin{cases}\frac{\pi}{3}+k\cdot 2\pi & ①\\ -\frac{\pi}{3}+k\cdot 2\pi & ②\end{cases}$$

① $\frac{t}{2}=\frac{\pi}{3}+\frac{\pi}{6}+k\cdot 2\pi=\frac{\cancel{3}^{1}\pi}{\cancel{6}_{2}}+k\cdot 2\pi$

$\frac{t}{2}=\frac{\pi}{2}+k\cdot 2\pi$

$t=\pi+k\cdot 4\pi$

② $\frac{t}{2}=-\frac{\pi}{3}+\frac{\pi}{6}+k\cdot 2\pi$

$\frac{t}{2}=-\frac{\pi}{6}+k\cdot 2\pi$

$t=-\frac{\pi}{3}+k\cdot 4\pi$

$$\Rightarrow t=\begin{cases}\pi+k\cdot 4\pi\\ -\frac{\pi}{3}+k\cdot 4\pi\end{cases}$$

c) $2\cos(t)+1 = 0$

$2\cos(t) = -1$

$\cos(t) = -\frac{1}{2}$ (idem ex 6.1 a) mais en radians)

$$t = \begin{cases} \frac{2\pi}{3} + k\cdot 2\pi \\ -\frac{2\pi}{3} + k\cdot 2\pi \end{cases}, \quad k \in \mathbb{Z}$$

( solutions entre 0 et $2\pi$ : $t = \begin{cases} \frac{2\pi}{3} \\ \frac{4\pi}{3} \end{cases}$ )

$k=1$

d) $4\sin^2(x) - 3 = 0$

$\Leftrightarrow \quad 4\sin^2(x) = 3$

$\Leftrightarrow \quad \sin^2(x) = \frac{3}{4} \quad \Big|\sqrt{\phantom{x}}$ ⚠ 2 solutions.

$\Leftrightarrow \quad \sin(x) = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$

⊕ : $\sin(x) = \frac{\sqrt{3}}{2}$

$$\Leftrightarrow \quad x = \begin{cases} \frac{\pi}{3} + k\cdot 2\pi \\ \pi - \frac{\pi}{3} + k\cdot 2\pi = \frac{2\pi}{3} + k\cdot 2\pi \end{cases}, \quad k \in \mathbb{Z}$$

⊖ $\sin(x) = -\frac{\sqrt{3}}{2}$

$$\Leftrightarrow \quad x = \begin{cases} -\frac{\pi}{3} + k\cdot 2\pi \\ \pi + \frac{\pi}{3} + k\cdot 2\pi = \frac{4\pi}{3} + k\cdot 2\pi \end{cases}, \quad k \in \mathbb{Z}$$

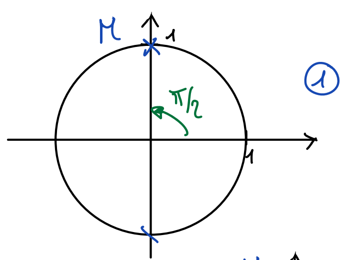
e) $(\sin(x) - 1)\cos(x) = 0$

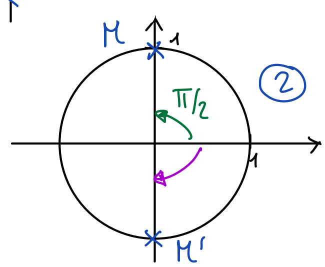
① $\sin(x) - 1 = 0$ ou $\cos(x) = 0$ ②

$\Leftrightarrow \quad \sin(x) = 1$

$\Leftrightarrow \quad x = \frac{\pi}{2} + k\cdot 2\pi$

$$\Leftrightarrow \quad x = \begin{cases} \frac{\pi}{2} + k\cdot 2\pi \\ -\frac{\pi}{2} + k\cdot 2\pi \end{cases}$$




$\Rightarrow \quad x = \frac{\pi}{2} + k\cdot 2\pi$ ou $-\frac{\pi}{2} + k\cdot 2\pi, \quad k \in \mathbb{Z}$

f) $\sqrt{3} + 2\sin(3x) = 0$

$\Leftrightarrow \quad 2\sin(3x) = -\sqrt{3}$

$\Leftrightarrow \quad \sin(3x) = -\frac{\sqrt{3}}{2}$ (idem ex 6.1 f) mais en radians)

$$\Leftrightarrow \quad x = \begin{cases} -\frac{\pi}{9} + k\cdot\frac{2\pi}{3} \\ \frac{4\pi}{9} + k\cdot\frac{2\pi}{3} \end{cases}, k \in \mathbb{Z}$$