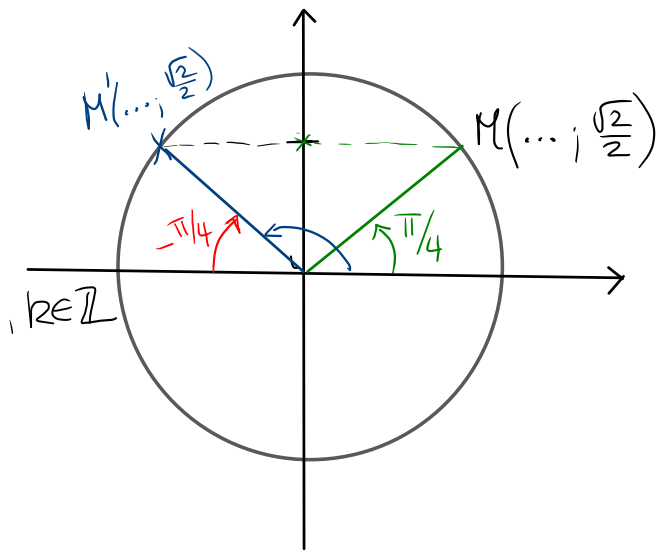
Equations trigo

a) $\sin(t) = \frac{\sqrt{2}}{2}$

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



b) $\sin\left(\frac{2t}{3} + \frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$

$$\Rightarrow \quad \frac{2t}{3} + \frac{\pi}{4} = \begin{cases} \frac{\pi}{4} + k \cdot 2\pi & \text{①} \\ \frac{3\pi}{4} + k \cdot 2\pi & \text{②} \end{cases} \qquad k \in \mathbb{Z}$$

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

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

$t = k \cdot 3\pi$

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

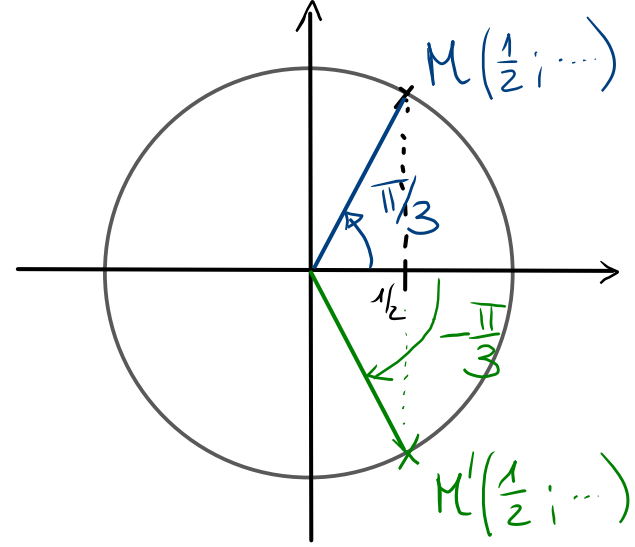
$\frac{2t}{3} = \underbrace{\frac{\pi}{2}}_{\frac{3\pi}{4} - \frac{\pi}{4}} + k \cdot 2\pi \quad \left| \cdot \frac{3}{2} \right.$

$t = \frac{3\pi}{4} + k \cdot 3\pi \quad , k \in \mathbb{Z}$

Ex :

a) $\cos(t) = \frac{1}{2}$

b) $\cos(2t + \pi) = \frac{1}{2}$



c) $\sin\left(\frac{t}{2}\right) = -\frac{1}{2}$

d) $2\sin(t) + 1 = 0$

Corection

a) $\cos(t) = \frac{1}{2} \iff t = \begin{cases} \frac{\pi}{3} + k \cdot 2\pi \\ -\frac{\pi}{3} + k \cdot 2\pi \end{cases} \quad k \in \mathbb{Z}$

b) $\cos(2t+\pi) = \frac{1}{2} \iff 2t + \pi = \begin{cases} \frac{\pi}{3} + k \cdot 2\pi & ① \\ -\frac{\pi}{3} + k \cdot 2\pi & ② \end{cases} \quad k \in \mathbb{Z}$

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

$2t = -\frac{2\pi}{3} + k \cdot 2\pi \quad | \div 2$

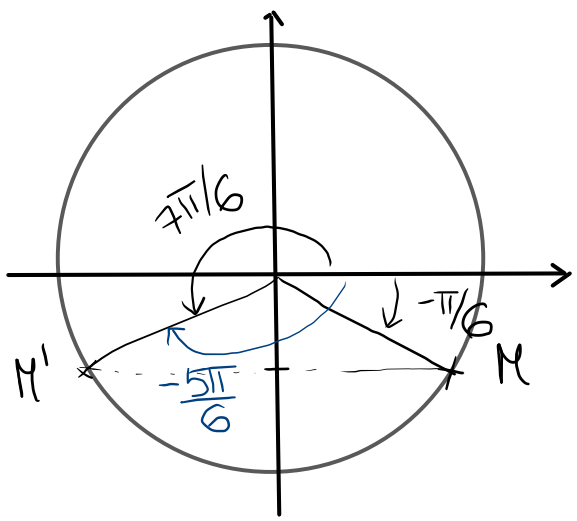
$t = -\frac{\pi}{3} + k \cdot \pi$

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

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

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

c) $\sin\left(\frac{t}{2}\right) = -\frac{1}{2} \iff$



à la mèc. : $-30°$

$$\frac{t}{2} = \begin{cases} -\frac{\pi}{6} + k\cdot 2\pi & 1\cdot 2 \\ \pi - \left(-\frac{\pi}{6}\right) + k\cdot 2\pi & 1\cdot 2 \end{cases}$$

$\pi - \left(-\frac{\pi}{6}\right) = \frac{7\pi}{6}$

$$\iff t = \begin{cases} -\frac{\pi}{3} + k\cdot 4\pi \\ \frac{7\pi}{3} + k\cdot 4\pi \end{cases} \qquad k \in \mathbb{Z}$$

d) $2\sin(t) + 1 = 0 \iff 2\sin(t) = -1 \iff \sin(t) = -\frac{1}{2}$

$$\iff t = \begin{cases} -\frac{\pi}{6} + k\cdot 2\pi \\ \frac{7\pi}{6} + k\cdot 2\pi \end{cases} \qquad k \in \mathbb{Z}$$

Ex 6.1 en degré / sol. générale avec k ... et sol. comprises entre

f) $\sin(3t) = -\frac{\sqrt{3}}{2}$ — 0° et 360°

g) $\tan(5t) = 3,273$ — 0° et 180°

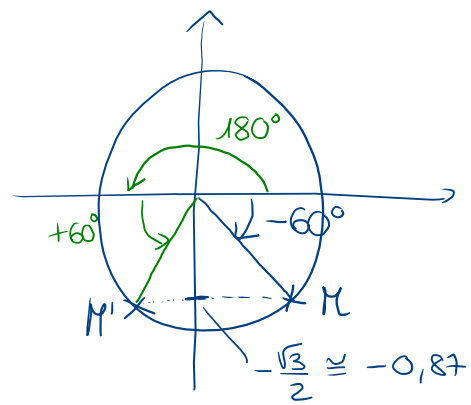
h) $\cos\left(\frac{t}{2}\right) = -\frac{1}{2}$ — 0° et 360°

Ex 6.2 en radian, sol ... + sol. entre 0 et 2π

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

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

f) à la màc. : $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -60°$



$$\Rightarrow \quad 3t = \begin{cases} -60° + k\cdot 360° & | :3 \\ \underbrace{180° + 60°}_{240°} + k\cdot 360° & | :3 \end{cases}$$

$$t = \begin{cases} -20° + k\cdot 120° \\ 80° + k\cdot 120° \end{cases}, \quad k \in \mathbb{Z} \quad \left(\Leftrightarrow \begin{cases} \dots -140° ; -20° ; 100° ; 220° ; 340° ; \dots \\ \dots -40° ; 80° ; 200° ; 320° ; 440° ; \dots \end{cases}\right)$$

solutions entre 0° et 360° :

$$t = \begin{cases} \underset{k=1}{100°} ; \underset{k=2}{220°} ; \underset{k=3}{340°} \\ \underset{k=0}{80°} ; \underset{k=1}{200°} ; 320° \end{cases}$$