

(3) $\sin(2x) = \cos(3x + \pi) \Leftrightarrow \cos(\frac{\pi}{2} - 2x) = \cos(3x + \pi)$

$\Leftrightarrow \frac{\pi}{2} - 2x = \pm(3x + \pi) \text{ modulo } 2\pi$

1^{er} cas: $\frac{\pi}{2} - 2x = 3x + \pi + 2k\pi$ ou $k \in \mathbb{Z}$.

$-5x = \frac{\pi}{2} + 2k\pi \quad x = -\frac{\pi}{10} - \frac{2k\pi}{5} \quad \mathcal{I}_1 = \left\{ -\frac{\pi}{10} - \frac{2k\pi}{5} / k \in \mathbb{Z} \right\}$

2^{es} cas: $\frac{\pi}{2} - 2x = -(3x + \pi) + 2k\pi \Leftrightarrow \frac{\pi}{2} - 2x = -3x - \pi + 2k\pi$

$\Leftrightarrow x = -\frac{3\pi}{2} + 2k\pi \quad \mathcal{I}_2 = \left\{ -\frac{3\pi}{2} + 2k\pi / k \in \mathbb{Z} \right\}$.

$\mathcal{I}_1 = \left\{ \dots, -\frac{\pi}{10}, \frac{3\pi}{10}, \frac{7\pi}{10}, \frac{11\pi}{10}, \frac{15\pi}{10} = \frac{3\pi}{2}, \dots \right\}$.

$\mathcal{I}_2 = \left\{ \dots, -\frac{3\pi}{2}, \frac{\pi}{2}, \frac{5\pi}{2}, \dots \right\}$.

$\mathcal{I} = \mathcal{I}_1 \cup \mathcal{I}_2$

(7) $\frac{\sin x - \cos x}{\sin(3x)} > 0$
 f(x) = $\frac{\sin x - \cos x}{\sin(3x)}$

$\sin(3x) = 0 \Leftrightarrow 3x = k\pi$ ou $k \in \mathbb{Z}$

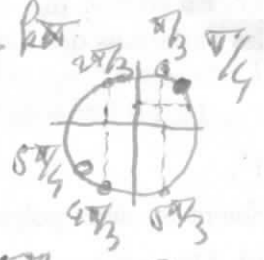
L'ensemble de def de cette equation est donc :

$\mathcal{D} = \mathbb{R} \setminus \left\{ \frac{k\pi}{3} \text{ ou } k \in \mathbb{Z} \right\}$.

$\sin x - \cos x = 0 \Leftrightarrow \sin x = \cos x \Leftrightarrow \cos(\frac{\pi}{2} - x) = \cos x$

1^{er} cas: $\frac{\pi}{2} - x = x + 2k\pi \Leftrightarrow 2x = -\frac{\pi}{2} + 2k\pi \quad x = \frac{\pi}{4} + k\pi$

2^{es} cas: $\frac{\pi}{2} - x = -x + 2k\pi$ impossible.



f est 2π -periodique: Etude sur $[0, 2\pi]$

x	0	$\pi/4$	$\pi/3$	$2\pi/3$	$2\pi/3$	π	$5\pi/4$	$4\pi/3$	$5\pi/3$	2π
f(x)	-	0	+	-	0	+	-	0	+	-

$f(\frac{\pi}{6}) = \frac{\frac{1}{2} - \frac{\sqrt{3}}{2}}{1} < 0$. On garde les x tq $f(x) > 0$:

$\mathcal{I} =]\frac{\pi}{4}, \frac{\pi}{3}[\cup]\frac{2\pi}{3}, \pi[\cup]\frac{5\pi}{4}, \frac{4\pi}{3}[\cup]\frac{5\pi}{3}, 2\pi[\text{ modulo } 2\pi$