

Ch 12 Trigonométrie

Série 12-2

Exemple 5

$$\begin{aligned} 2) f_2'(x) &= (\cos x)' \sin 2x + \cos x (\sin 2x)' \\ &= -\sin x \sin 2x + \cos x (2 \cos 2x) \\ &= -\sin x \sin 2x + 2 \cos x \cos 2x. \end{aligned}$$

Exemple 6

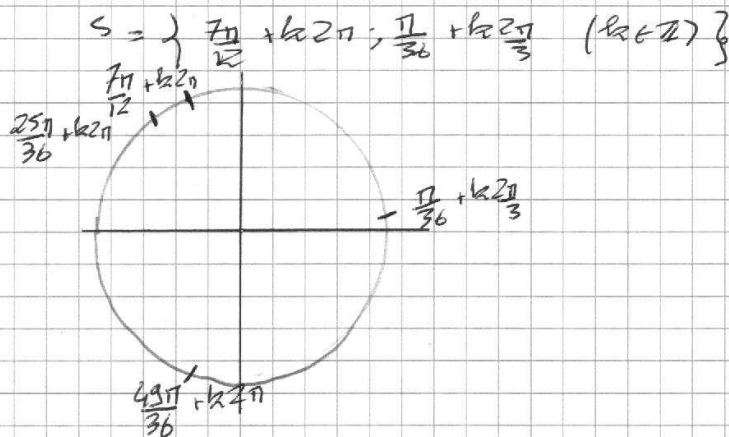
$$3) \text{ soit } (E_3) \text{ l'équation : } \cos(2x - \frac{\pi}{3}) = \cos(x + \frac{\pi}{4})$$

$$(E_3) \Leftrightarrow \begin{cases} 2x - \frac{\pi}{3} = x + \frac{\pi}{4} + k2\pi \\ \text{ou} \\ 2x - \frac{\pi}{3} = -(x + \frac{\pi}{4}) + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} x = \frac{\pi}{3} + \frac{\pi}{4} + k2\pi \\ \text{ou} \\ 3x = +\frac{\pi}{3} - \frac{\pi}{4} + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} x = \frac{7\pi}{12} + k2\pi \\ \text{ou} \\ x = \frac{\pi}{36} + k\frac{2\pi}{3} \end{cases} \quad (k \in \mathbb{Z})$$

L'ensemble des solutions de (E_3) est :



4) Dans $[0; 2\pi]$ l'ensemble des solutions est :

$$S = \left\{ \frac{\pi}{36}; \frac{7\pi}{12}; \frac{25\pi}{36}; \frac{49\pi}{36} \right\}$$

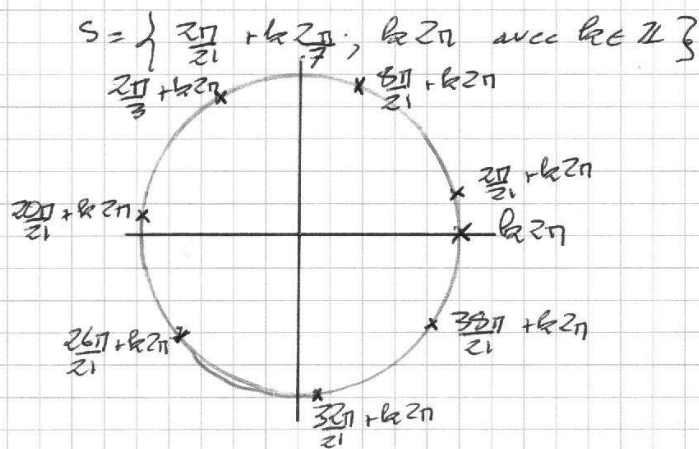
5) Soit (E_5) l'équation: $\cos(3x - \frac{\pi}{3}) = \cos(\frac{\pi}{3} - 4x)$

$$(E_5) \Leftrightarrow \begin{cases} 3x - \frac{\pi}{3} = \frac{\pi}{3} - 4x + k2\pi \\ \text{ou} \\ 3x - \frac{\pi}{3} = -(\frac{\pi}{3} - 4x) + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} 7x = \frac{2\pi}{3} + k2\pi \\ \text{ou} \\ -x = k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} x = \frac{2\pi}{7} + k\frac{2\pi}{7} \\ \text{ou} \\ x = k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

L'ensemble des solutions de (E_5) est:



6) Dans $[0; 2\pi]$ l'ensemble des solutions est:

$$S = \left\{ 0; \frac{2\pi}{7}; \frac{4\pi}{7}; \frac{6\pi}{7}; \frac{8\pi}{7}; \frac{10\pi}{7}; \frac{12\pi}{7}; \frac{14\pi}{7}; 2\pi \right\}$$

Exemple 7

3) Soit (E_3) l'équation: $\sin(x - \frac{\pi}{6}) = \sin(-2x + \frac{\pi}{3})$

$$(E_3) \Leftrightarrow \begin{cases} x - \frac{\pi}{6} = -2x + \frac{\pi}{3} + k2\pi \\ \text{ou} \\ x - \frac{\pi}{6} = \pi - (-2x + \frac{\pi}{3}) + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} 3x = \frac{\pi}{6} + \frac{\pi}{3} + k2\pi \\ \text{ou} \\ x - \frac{\pi}{6} = \pi + 2x - \frac{\pi}{3} + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

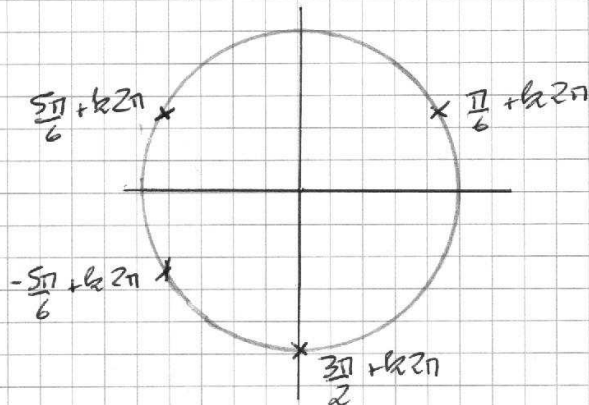
$$\Leftrightarrow \begin{cases} x = \frac{\pi}{6} + k\frac{2\pi}{3} \\ -x = \pi - \frac{\pi}{3} + \frac{\pi}{6} + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} x = \frac{\pi}{6} + k\frac{2\pi}{3} \\ -x = \frac{5\pi}{6} + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} x = \frac{\pi}{6} + k\frac{2\pi}{3} \\ x = -\frac{5\pi}{6} + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

L'ensemble des solutions de (E_3) est:

$$S = \left\{ \frac{\pi}{6} + k\frac{2\pi}{3}; -\frac{5\pi}{6} + k2\pi, \text{ avec } k \in \mathbb{Z} \right\}$$



4) Dans $[0, 2\pi]$, l'ensemble des solutions est:

$$S = \left\{ \frac{\pi}{6}; \frac{5\pi}{6}; \frac{7\pi}{6}; \frac{3\pi}{2} \right\}$$

5) Soit (E_5) l'équation: $\sin(2x + \frac{\pi}{3}) = \sin(3x - \frac{\pi}{2})$

$$(E_5) \Leftrightarrow \begin{cases} 2x + \frac{\pi}{3} = 3x - \frac{\pi}{2} + k2\pi \\ 2x + \frac{\pi}{3} = \pi - (3x - \frac{\pi}{2}) + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

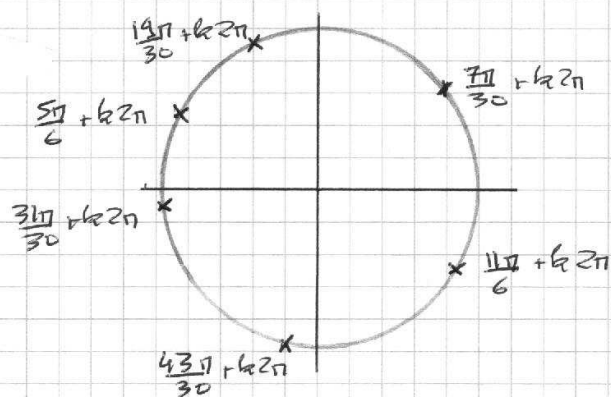
$$\Leftrightarrow \begin{cases} -x = -\frac{\pi}{3} - \frac{\pi}{2} + k2\pi \\ 2x + \frac{\pi}{3} = \pi - 3x + \frac{\pi}{2} + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} x = \frac{5\pi}{6} + k2\pi \\ y = \frac{7\pi}{6} + k2\pi \end{cases} \quad (k \in \mathbb{Z})$$

$$\Leftrightarrow \begin{cases} x = \frac{5\pi}{6} + k2\pi \\ x = \frac{7\pi}{30} + k\frac{2\pi}{5} \end{cases}$$

L'ensemble des solutions de (Es) est :

$$S = \left\{ \frac{5\pi}{6} + k2\pi ; \frac{7\pi}{30} + k\frac{2\pi}{5} \text{ avec } k \in \mathbb{Z} \right\}$$



6) Dans $[0, 2\pi]$, l'ensemble des solutions est :

$$S = \left\{ \frac{7\pi}{30} ; \frac{19\pi}{30} ; \frac{5\pi}{6} ; \frac{31\pi}{30} ; \frac{13\pi}{30} ; \frac{11\pi}{6} \right\}$$