

## Exercice N°1 :

$$1) \frac{23\pi}{4} = \frac{24\pi - \pi}{4} = 6\pi - \frac{\pi}{4} \text{ la mesure principale est } \left(-\frac{\pi}{4}\right).$$

$$2) \frac{-20\pi}{3} = \frac{-18\pi - 2\pi}{3} = -6\pi - \frac{2\pi}{3} \rightarrow \left(-\frac{2\pi}{3}\right)$$

$$3) \frac{37\pi}{8} = \frac{32\pi + 5\pi}{8} = 4\pi + \frac{5\pi}{8} \rightarrow \left(\frac{5\pi}{8}\right)$$

$$4) \frac{-41\pi}{6} = \frac{-36\pi - 5\pi}{6} = -6\pi - \frac{5\pi}{6} \rightarrow \left(-\frac{5\pi}{6}\right)$$

Correction

## Exercice N°2 :

$$\begin{aligned} A &= \sin\left(x + \pi\right) + \cos\left(x + \frac{\pi}{2}\right) + \sin x - \sin(-x) \\ &= -\sin x - \sin x + \sin x - (-\sin x) = 0 \end{aligned}$$

$$\begin{aligned} B &= \cos x - \cos\left(x - \frac{\pi}{2}\right) - \sin(x - \pi) + \cos(\pi - x) \\ &= \cos x - \sin x - (-\sin x) - \cos x \\ &= -\sin x + \sin x = 0 \end{aligned}$$

$$\begin{aligned} C &= \cos \frac{\pi}{7} + \cos \frac{3\pi}{14} + \cos \frac{8\pi}{7} + \cos \frac{23\pi}{14} \\ &= \cos \frac{\pi}{7} + \cos \frac{9\pi}{14} + \cos\left(\frac{\pi}{7} + \pi\right) + \cos\left(\frac{9\pi}{14} + \pi\right) \\ &= \cos \frac{\pi}{7} + \cos \frac{9\pi}{14} - \cos \frac{\pi}{7} - \cos \frac{9\pi}{14} = 0 \end{aligned}$$

$$\begin{aligned} D &= \sin \frac{\pi}{5} - \sin \frac{4\pi}{5} + \sin \frac{6\pi}{5} + \sin \frac{11\pi}{5} \\ &= \sin \frac{\pi}{5} - \sin\left(\pi - \frac{\pi}{5}\right) + \sin \frac{6\pi}{5} + \sin\left(\frac{6\pi}{5} + \pi\right) \\ &= \sin \frac{\pi}{5} - \sin \frac{\pi}{5} + \sin \frac{6\pi}{5} - \sin \frac{6\pi}{5} = 0 \end{aligned}$$

## Exercice N°3 :

Ex3 : 1)  $\cos x = \cos\left(-\frac{2\pi}{3}\right)$  sur  $[0; 3\pi[$

$$\Leftrightarrow \begin{cases} x = -\frac{2\pi}{3} + 2k\pi \\ \text{ou} \\ x = \frac{2\pi}{3} + 2k\pi \end{cases} \quad k, k \in \mathbb{Z} \quad \left| S = \left\{ \frac{2\pi}{3}; \frac{4\pi}{3}; \frac{8\pi}{3} \right\} \right| \quad (1)$$

$$2) \sin x = -\frac{\sqrt{3}}{2} \text{ sur } ]-\pi; \pi] \quad \left| S = \left\{ -\frac{2\pi}{3}; -\frac{\pi}{3} \right\} \right| \quad (0.5)$$

$$3) \cos\left(x + \frac{\pi}{4}\right) = \cos \frac{\pi}{5} \quad \text{sur } [0; 4\pi[$$

$$\begin{cases} x + \frac{\pi}{4} = \frac{\pi}{5} + 2k\pi \\ \text{ou} \\ x + \frac{\pi}{4} = -\frac{\pi}{5} + 2k'\pi \end{cases} \quad k, k' \in \mathbb{Z} \Leftrightarrow \begin{cases} x = -\frac{\pi}{20} + 2k\pi \\ \text{ou} \\ x = -\frac{9\pi}{20} + 2k'\pi \end{cases}$$

$$S = \left\{ \frac{31\pi}{20}; \frac{39\pi}{20}; \frac{71\pi}{20}; \frac{79\pi}{20} \right\} \quad (1,5)$$

$$4) \sin 2x = \sin \frac{\pi}{4} \quad \text{sur } ]-\pi; \pi]$$

$$\Leftrightarrow \begin{cases} 2x = \frac{\pi}{4} + 2k\pi \\ \text{ou} \\ 2x = \frac{3\pi}{4} + 2k'\pi \end{cases} \quad k, k' \in \mathbb{Z} \Leftrightarrow \begin{cases} x = \frac{\pi}{8} + k\pi \\ \text{ou} \\ x = \frac{3\pi}{8} + k'\pi \end{cases}$$

$$S = \left\{ -\frac{7\pi}{8}; -\frac{5\pi}{8}; \frac{\pi}{8}; \frac{3\pi}{8} \right\} \quad (1,5)$$

$$5) \cos x > -\frac{\sqrt{2}}{2} \quad \text{sur } ]-\pi; \pi] \quad S = ]-\frac{3\pi}{4}; \frac{3\pi}{4}[ \quad (1)$$

$$6) \sin x \geq -\frac{\sqrt{3}}{2} \quad \text{sur } ]-\pi; 2\pi]$$

$$S = ]-\pi; -\frac{2\pi}{3}] \cup \left[-\frac{\pi}{3}; \frac{4\pi}{3}\right] \cup \left[\frac{5\pi}{3}; 2\pi\right] \quad (1)$$

$$7) \sin^2 x = \frac{1}{2} \quad \text{sur } [0; 2\pi[$$

$$\Leftrightarrow \sin x = \frac{\sqrt{2}}{2} \quad \text{ou} \quad \sin x = -\frac{\sqrt{2}}{2}$$

$$S = \left\{ \frac{\pi}{4}; \frac{3\pi}{4}; \frac{5\pi}{4}; \frac{7\pi}{4} \right\}$$

(1)

$$8) 2\cos^2 x + \cos x - 1 = 0 \quad \text{sur } ]-\pi; \pi]$$

$$\Leftrightarrow 2x^2 + x - 1 = 0 \quad x \in [-1; 1]$$

$$\Leftrightarrow (x+1)(2x-1) = 0$$

$$\Leftrightarrow x = -1 \quad \text{ou} \quad x = \frac{1}{2}$$

$$\Leftrightarrow \cos x = -1 \quad \text{ou} \quad \cos x = \frac{1}{2}$$

$$S = \left\{ -\frac{\pi}{3}; \frac{\pi}{3}; \pi \right\} \quad (2)$$