

Exercice 1

$$(3) \quad a) \frac{-251\pi}{8} \equiv -32\pi + \frac{5\pi}{8} \equiv \frac{5\pi}{8} \text{ rad}$$

$$b) \frac{23\pi}{3} + \frac{24\pi}{5} + 25\pi \equiv 7\pi + \frac{2\pi}{3} + 4\pi + \frac{4\pi}{5} + 25\pi \equiv \frac{2\pi}{3} + \frac{4\pi}{5} \equiv \frac{22\pi}{15} \equiv -\frac{8\pi}{15} \text{ rad}$$

$$c) 9 \equiv 9 - 2\pi \equiv 2,71681 \text{ rad}$$

Exercice 2

$$(1) \quad \cos\left(\frac{17\pi}{4}\right) - \sin\left(-\frac{19\pi}{6}\right) + \cos^2\left(\frac{22\pi}{3}\right) - \cos(\pi)$$

$$= \cos\left(\frac{\pi}{4}\right) - \sin\left(\frac{5\pi}{6}\right) + \cos^2\left(-\frac{2\pi}{3}\right) - (-1)$$

$$= \frac{\sqrt{2}}{2} - \frac{1}{2} + \left(-\frac{1}{2}\right)^2 + 1 = \frac{\sqrt{2}}{2} + \frac{3}{4}$$

$$(2) \quad \tan\left(\frac{-55\pi}{6}\right) - \cotg\left(\frac{35\pi}{4}\right) + \sin\left(\frac{47\pi}{2}\right) - \tan^2\left(\frac{2\pi}{3}\right)$$

$$= \tan\left(-\frac{\pi}{6}\right) - \cotg\left(-\frac{\pi}{4}\right) + \sin\left(\frac{3\pi}{2}\right) - \tan^2\left(-\frac{\pi}{3}\right)$$

$$= -\frac{\sqrt{3}}{3} + 1 - 1 - (-\sqrt{3})^2 = -\frac{\sqrt{3}}{3} - 3$$

$$(3) \quad \cos\left(\frac{\pi}{8}\right) - \sin\left(\frac{2\pi}{8}\right) + \cos\left(\frac{3\pi}{8}\right) - \sin\left(\frac{5\pi}{8}\right) + \cos\left(\frac{6\pi}{8}\right) - \sin\left(\frac{7\pi}{8}\right) + \tan\left(\frac{8\pi}{8}\right)$$

$$= \cos\left(\frac{\pi}{8}\right) - \sin\left(\frac{\pi}{4}\right) + \cos\left(\frac{\pi}{2} - \frac{\pi}{8}\right) - \sin\left(\frac{\pi}{2} + \frac{\pi}{8}\right) + \cos\left(\frac{3\pi}{4}\right) - \sin\left(\pi - \frac{\pi}{8}\right) + \tan \pi$$

$$= \cos\left(\frac{\pi}{8}\right) - \frac{\sqrt{2}}{2} + \sin\left(\frac{\pi}{8}\right) - \cos\left(\frac{\pi}{8}\right) - \frac{\sqrt{2}}{2} - \sin\left(\frac{\pi}{8}\right) + 0 = -\sqrt{2}$$

$$(4) \quad \cos\left(\frac{5\pi}{2} - \alpha\right) + \sin\left(-\frac{3\pi}{2} + \alpha\right) - \cos\left(\frac{7\pi}{2} + \alpha\right) - \sin(9\pi - \alpha)$$

$$= \cos\left(\frac{\pi}{2} - \alpha\right) + \sin\left(\frac{\pi}{2} + \alpha\right) - \cos\left(-\frac{\pi}{2} + \alpha\right) - \sin(\pi - \alpha)$$

$$= \sin \alpha + \cos \alpha - \cos\left(\frac{\pi}{2} - \alpha\right) - \sin \alpha$$

$$= \sin \alpha + \cos \alpha - \sin \alpha - \sin \alpha$$

$$= \cos \alpha - \sin \alpha$$

Exercice 3

$$4 \sin^2 \left(x - \frac{\pi}{6} \right) = 1$$

$$\Leftrightarrow \sin^2 \left(x - \frac{\pi}{6} \right) = \frac{1}{4}$$

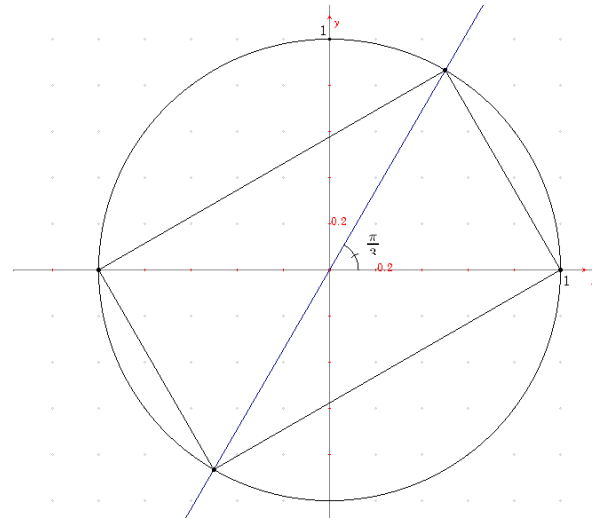
$$\Leftrightarrow \sin \left(x - \frac{\pi}{6} \right) = \frac{1}{2} \text{ ou } \sin \left(x - \frac{\pi}{6} \right) = -\frac{1}{2}$$

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

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

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

$$\text{Solutions dans } [-5\pi, -4\pi] : \begin{cases} -5\pi, \\ -5\pi + \frac{\pi}{3} = -\frac{14\pi}{3}, \\ -4\pi \end{cases}$$



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