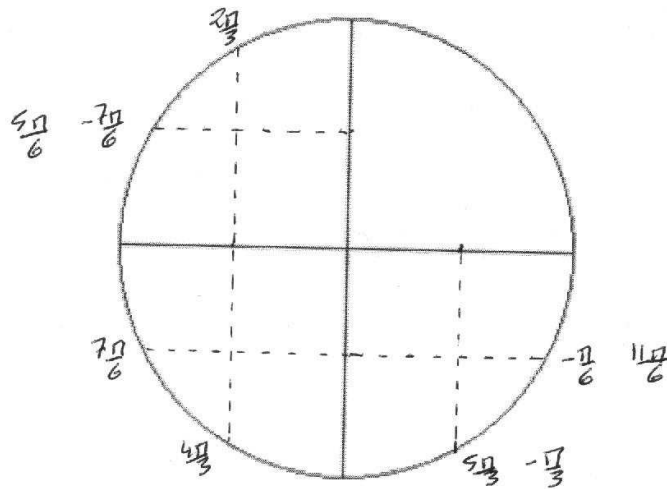


TD n°12 Trigonometric

Exercice 3



$$\cos\left(\frac{2\pi}{3}\right) = -\frac{1}{2}$$

$$\cos\left(-\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$$

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

$$\cos\left(\frac{7\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

$$\sin\left(\frac{5\pi}{3}\right) = -\frac{\sqrt{3}}{2}$$

$$\cos\left(-\frac{\pi}{3}\right) = \frac{1}{2}$$

$$\sin\left(-\frac{\pi}{3}\right) = -\frac{\sqrt{3}}{2}$$

$$\sin\left(-\frac{7\pi}{6}\right) = \frac{1}{2}$$

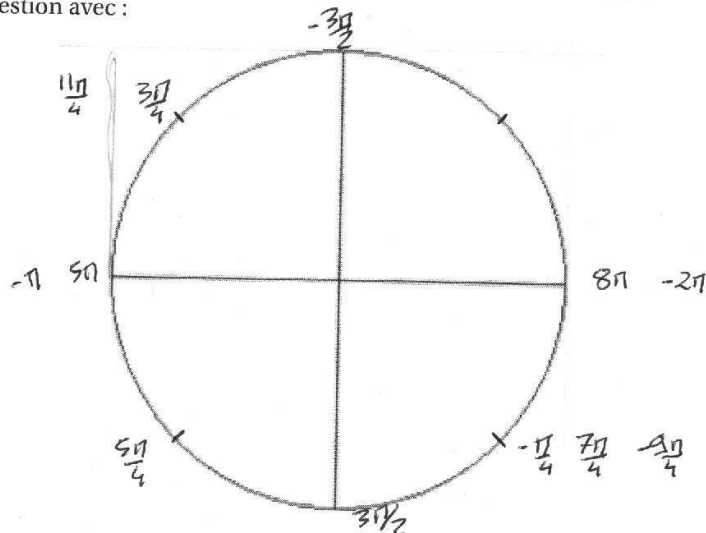
$$\cos\left(\frac{11\pi}{6}\right) = \frac{\sqrt{3}}{2}$$

$$\cos\left(\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

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

$$\cos\left(\frac{5\pi}{3}\right) = \frac{1}{2}$$

2. Même question avec :



$$\cos\left(\frac{3\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\sin\left(-\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\cos\left(\frac{3\pi}{2}\right) = 0$$

$$\sin(8\pi) = 0$$

$$\sin\left(\frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2}$$

$$\sin\left(-\frac{3\pi}{2}\right) = 1$$

$$\sin(5\pi) = 0$$

$$\cos(-2\pi) = 1$$

$$\cos\left(\frac{7\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

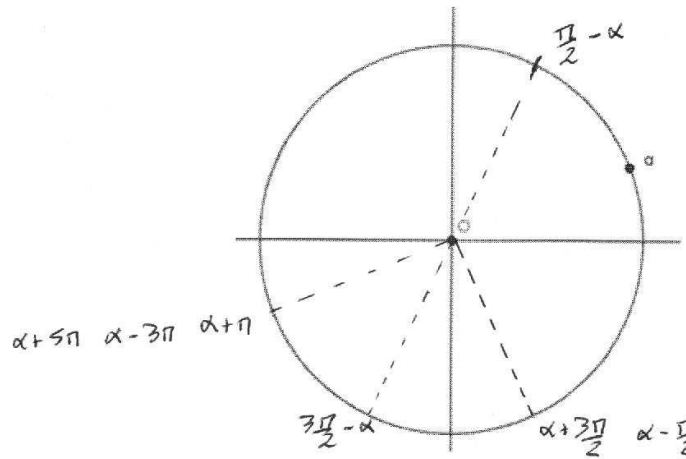
$$\sin\left(\frac{11\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\cos\left(-\frac{9\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\cos(-\pi) = -1$$

Exercice 4

Placer sur le cercle trigonométrique : $\alpha + \pi, \alpha + \frac{3\pi}{2}, \alpha - 3\pi, \alpha - \frac{\pi}{2}; \alpha + 5\pi; \frac{\pi}{2} - \alpha$ et $\frac{3\pi}{2} - \alpha$.



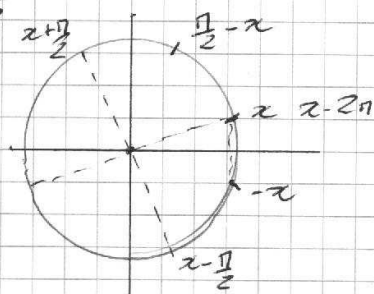
$$\begin{cases} \cos(\alpha + \pi) = \cos(\alpha - 3\pi) = \cos(\alpha + 5\pi) = -\cos \alpha \\ \sin(\alpha + \pi) = \sin(\alpha - 3\pi) = \sin(\alpha + 5\pi) = -\sin \alpha \\ \tan(\alpha + \pi) = \tan(\alpha - 3\pi) = \tan(\alpha + 5\pi) = \tan \alpha \end{cases}$$

$$\begin{cases} \cos(\alpha + \frac{3\pi}{2}) = \cos(\alpha - \frac{\pi}{2}) = \sin \alpha \\ \sin(\alpha + \frac{3\pi}{2}) = \sin(\alpha - \frac{\pi}{2}) = -\cos \alpha \\ \tan(\alpha + \frac{3\pi}{2}) = \tan(\alpha - \frac{\pi}{2}) = -\frac{1}{\tan \alpha} \end{cases}$$

$$\begin{cases} \cos(\frac{\pi}{2} - \alpha) = \sin \alpha \\ \sin(\frac{\pi}{2} - \alpha) = \cos \alpha \\ \tan(\frac{\pi}{2} - \alpha) = \frac{1}{\tan \alpha} \end{cases}$$

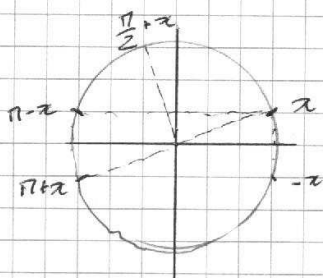
$$\begin{cases} \cos(\frac{3\pi}{2} - \alpha) = -\sin \alpha \\ \sin(\frac{3\pi}{2} - \alpha) = -\cos \alpha \\ \tan(\frac{3\pi}{2} - \alpha) = -\frac{1}{\tan \alpha} \end{cases}$$

Exercice 5



$$A = \cos x + \cos x - (-\sin x) - \sin x$$

$$A = 2\cos x$$



$$B = \sin x - \cos x - (-\sin x) + \cos x$$

$$B = 2\sin x$$

Exercice 7

1) On a: $\cos^2 x + \sin^2 x = 1$

$$\Leftrightarrow \cos^2 x = 1 - \left(\frac{\sqrt{2}}{12}\right)^2$$

$$\Leftrightarrow \cos^2 x = \frac{144 - 2}{144}$$

$$\Leftrightarrow \cos^2 x = \frac{142}{144}$$

$$\Leftrightarrow \cos x = \frac{\sqrt{142}}{12} \quad \text{ou} \quad \cos x = -\frac{\sqrt{142}}{12}$$

Or $x \in \left[\frac{\pi}{2}; \pi\right]$ donc $\cos x \leq 0$.

$$\text{Ainsi } \cos x = -\frac{\sqrt{142}}{12}$$

$$\begin{aligned}
 2) \text{ On a: } \cos^2 \frac{\pi}{12} &= 1 - \sin^2 \frac{\pi}{12} \\
 &= 1 - \left(\frac{\sqrt{6} - \sqrt{2}}{4} \right)^2 \\
 &= 1 - \frac{6 - 2\sqrt{12} + 2}{16} \\
 &= \frac{16 - 6 + 2\sqrt{12} - 2}{16} \\
 &= \frac{8 + 2\sqrt{12}}{16} \\
 &= \frac{6 + 2\sqrt{12} + 2}{16} \\
 &= \left(\frac{\sqrt{6} + \sqrt{2}}{4} \right)^2
 \end{aligned}$$

$$\text{Donc } \cos \frac{\pi}{12} = \frac{\sqrt{6} + \sqrt{2}}{4} \text{ ou } \cos \frac{\pi}{12} = -\frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\text{Or } \frac{\pi}{12} \in [0; \frac{\pi}{2}] \text{ donc } \cos \frac{\pi}{12} > 0.$$

$$\text{Ainsi } \cos \frac{\pi}{12} = \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\begin{aligned}
 \sin \frac{5\pi}{12} &= \sin \left(\frac{\pi}{2} - \frac{\pi}{12} \right) = \cos \frac{\pi}{12} \quad \text{car } \sin \left(\frac{\pi}{2} - \alpha \right) = \cos \alpha \\
 &= \frac{\sqrt{6} + \sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 \cos \frac{5\pi}{12} &= \cos \left(\frac{\pi}{2} - \frac{\pi}{12} \right) = \sin \frac{\pi}{12} \quad \text{car } \cos \left(\frac{\pi}{2} - \alpha \right) = \sin \alpha \\
 &= \frac{\sqrt{6} - \sqrt{2}}{4}
 \end{aligned}$$