

www.freemaths.fr

Spé Maths

Terminale

Trigonométrie :
Généralités



CORRIGÉ DE L'EXERCICE

LECTURE DE COSINUS ET SINUS

2

CORRECTION

1. Rappelons les valeurs du cosinus et du sinus de $0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \pi$ et 2π :

Les valeurs du cosinus et du sinus de $0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \pi$ et 2π sont:

x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	2π
$\cos(x)$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	1
$\sin(x)$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	0

2. Déterminons à quoi sont égaux $\cos(-x)$, $\sin(-x)$, $\cos(\pi - x)$, $\sin(\pi - x)$:

D'après le cours, pour tout $x \in \mathbb{R}$: • $\cos(-x) = \cos(x)$

• $\sin(-x) = -\sin(x)$

• $\cos(\pi - x) = -\cos(x)$

• $\sin(\pi - x) = \sin(x)$

3. Calculons le cosinus et le sinus quand:

a. $\theta = \frac{5\pi}{4}$:

Nous avons: $\frac{5\pi}{4} = \frac{5\pi}{4} - 2\pi = \frac{-3\pi}{4}$ (modulo 2π).

D'où: $\bullet \cos\left(\frac{5\pi}{4}\right) = \cos\left(\frac{-3\pi}{4}\right) = \cos\left(\frac{3\pi}{4}\right) = \cos\left(\pi - \frac{\pi}{4}\right) = -\cos\left(\frac{\pi}{4}\right)$

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

$\bullet \sin\left(\frac{5\pi}{4}\right) = \sin\left(\frac{-3\pi}{4}\right) = -\sin\left(\frac{3\pi}{4}\right) = -\sin\left(\pi - \frac{\pi}{4}\right) = -\sin\left(\frac{\pi}{4}\right)$

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

b. $\theta = \frac{-5\pi}{3}$:

Nous avons: $\frac{-5\pi}{3} = \frac{-5\pi}{3} + 2\pi = \frac{\pi}{3}$ (modulo 2π).

D'où: $\bullet \cos\left(\frac{-5\pi}{3}\right) = \cos\left(\frac{\pi}{3}\right)$ **cad** $\cos\left(\frac{-5\pi}{3}\right) = \frac{1}{2}$.

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

c. $\theta = \frac{29\pi}{6}$:

Nous savons que: $\cos\left(\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$ et $\sin\left(\frac{5\pi}{6}\right) = \frac{1}{2}$.

Or: $\frac{29\pi}{6} = \frac{29\pi}{6} - 4\pi = \frac{5\pi}{6}$ (modulo 2π).

D'où: $\bullet \cos\left(\frac{29\pi}{6}\right) = \cos\left(\frac{5\pi}{6}\right)$ **cad** $\cos\left(\frac{29\pi}{6}\right) = -\frac{\sqrt{3}}{2}$.

$\bullet \sin\left(\frac{29\pi}{6}\right) = \sin\left(\frac{5\pi}{6}\right)$ **cad** $\sin\left(\frac{29\pi}{6}\right) = \frac{1}{2}$.

d. $\theta = \frac{27\pi}{4}$:

Nous avons: $\frac{27\pi}{4} = \frac{3\pi + 24\pi}{4} = \frac{3\pi}{4} + 6\pi = \frac{3\pi}{4}$ (modulo 2π).

D'où: $\bullet \cos\left(\frac{27\pi}{4}\right) = \cos\left(\frac{3\pi}{4}\right) = \cos\left(\pi - \frac{\pi}{4}\right) = -\cos\left(\frac{\pi}{4}\right)$

cad $\cos\left(\frac{27\pi}{4}\right) = -\frac{\sqrt{2}}{2}$.

$\bullet \sin\left(\frac{27\pi}{4}\right) = \sin\left(\frac{3\pi}{4}\right) = \sin\left(\pi - \frac{\pi}{4}\right) = \sin\left(\frac{\pi}{4}\right)$

cad $\sin\left(\frac{27\pi}{4}\right) = \frac{\sqrt{2}}{2}$.

e. $\theta = \frac{-101\pi}{3}$:

Nous avons: $\frac{-101\pi}{3} = \frac{\pi - 102\pi}{3} = \frac{\pi}{3} - 34\pi = \frac{\pi}{3}$ (modulo 2π).

D'où: $\bullet \cos\left(\frac{-101\pi}{3}\right) = \cos\left(\frac{\pi}{3}\right)$ **cad** $\cos\left(\frac{-101\pi}{3}\right) = \frac{1}{2}$.

$\bullet \sin\left(\frac{-101\pi}{3}\right) = \sin\left(\frac{\pi}{3}\right)$ **cad** $\sin\left(\frac{-101\pi}{3}\right) = \frac{\sqrt{3}}{2}$.

f. $\theta = \frac{-11\pi}{6}$:

Nous avons: $\frac{-11\pi}{6} = \frac{\pi - 12\pi}{6} = \frac{\pi}{6} - 2\pi = \frac{\pi}{6}$ (modulo 2π).

D'où: $\bullet \cos\left(\frac{-11\pi}{6}\right) = \cos\left(\frac{\pi}{6}\right)$ cad $\cos\left(\frac{-11\pi}{6}\right) = \frac{\sqrt{3}}{2}$.

$\bullet \sin\left(\frac{-11\pi}{6}\right) = \sin\left(\frac{\pi}{6}\right)$ cad $\sin\left(\frac{-11\pi}{6}\right) = \frac{1}{2}$.

g. $\theta = \frac{-2\pi}{3}$:

Nous avons: $\frac{-2\pi}{3} = \pi - \frac{\pi}{3}$.

D'où: $\bullet \cos\left(\frac{-2\pi}{3}\right) = \cos\left(\pi - \frac{\pi}{3}\right) = -\cos\left(\frac{\pi}{3}\right)$ cad $\cos\left(\frac{-2\pi}{3}\right) = -\frac{1}{2}$.

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

h. $\theta = \frac{9\pi}{6}$:

Nous avons: $\frac{9\pi}{6} = \frac{6\pi + 3\pi}{6} = \pi + \frac{3\pi}{6} = \pi + \frac{\pi}{2} = \pi - \left(\frac{-\pi}{2}\right)$.

D'où: $\bullet \cos\left(\frac{9\pi}{6}\right) = \cos\left(\pi - \left(\frac{-\pi}{2}\right)\right) = -\cos\left(\frac{-\pi}{2}\right)$ cad $\cos\left(\frac{9\pi}{6}\right) = 0$.

$\bullet \sin\left(\frac{9\pi}{6}\right) = \sin\left(\pi - \left(\frac{-\pi}{2}\right)\right) = \sin\left(\frac{-\pi}{2}\right)$ cad $\sin\left(\frac{9\pi}{6}\right) = -1$.