

Exercice 1

Sachant que $\cos x = -\frac{\sqrt{2}}{2}$ et $x \in \left] -\pi; -\frac{\pi}{2} \right[$; calculer $\sin x$ et $\tan x$

Exercice 2

Sachant que $\sin x = \frac{\sqrt{3}}{2}$ et $x \in \left] \frac{\pi}{2}; \pi \right[$

Calculer $\cos x$ et $\tan x$

Exercice 3

Sachant que $\tan x = -2$ et $x \in \left] -\frac{\pi}{2}; 0 \right[$; calculer $\sin x$ et $\cos x$

Exercice 4

Soit x un réel tel que : $x \neq \frac{\pi}{2} + k\pi$; $k \in \mathbb{Z}$.

Montrer que : $\sin^2 x = \frac{\tan^2 x}{1 + \tan^2 x}$ et que : $\frac{1}{1 - \sin x} + \frac{1}{1 + \sin x} = 2(1 + \tan^2 x)$

Exercice 5

Simplifier les expressions suivantes :

$$A = \cos^2 x - 2\sin^2 x - 1$$

$$B = 1 - (\cos x + \sin x)^2$$

$$C = \cos^2 x + 2\sin^2 x - 1$$

$$D = \cos^4 x + \sin^4 x + 2\cos^2 x \cdot \sin^2 x$$

$$E = \frac{\sin^2 x - \sin^4 x}{\cos^2 x - \cos^4 x}$$

$$F = \cos^6 x + \sin^6 x + \cos^4 x + \sin^4 x + 5\cos^2 x \cdot \sin^2 x$$

Exercice 6

Exprimer les réels donnés en fonction de $\cos x$ et de $\sin x$

$$\blacksquare A = \cos(x + 3\pi)$$

$$\blacksquare B = \cos(x - 5\pi)$$

$$\blacksquare C = \cos(-x - \pi)$$

$$\blacksquare D = \sin(x + 3\pi)$$

$$\blacksquare E = \sin(x - 5\pi)$$

$$\blacksquare F = \sin(-x - \pi)$$

$$\blacksquare G = \cos\left(x - \frac{\pi}{2}\right)$$

$$\blacksquare H = \cos\left(x - \frac{3\pi}{2}\right)$$

$$\blacksquare I = \cos\left(\frac{7\pi}{2} - x\right)$$

$$\blacksquare J = \sin\left(x - \frac{\pi}{2}\right)$$

$$\blacksquare K = \sin\left(x - \frac{3\pi}{2}\right)$$

$$\blacksquare L = \sin\left(\frac{7\pi}{2} - x\right)$$

Exercice 7

Calculer sans utiliser la calculatrice les expressions ci-dessous

$$A = \sin \frac{3\pi}{8} + \sin \frac{5\pi}{8} + \sin \frac{11\pi}{8} + \sin \frac{13\pi}{8}$$

$$B = \cos \frac{\pi}{10} + \cos \frac{2\pi}{5} + \cos \frac{3\pi}{5} + \cos \frac{9\pi}{10}$$

$$C = \cos^2 \frac{\pi}{10} + \cos^2 \frac{4\pi}{10} + \cos^2 \frac{6\pi}{10} + \cos^2 \frac{9\pi}{10}$$

$$C = \cos^2 \frac{\pi}{8} + \cos^2 \frac{3\pi}{8} + \cos^2 \frac{5\pi}{8} + \cos^2 \frac{7\pi}{8}$$

Exercice 8

On pose : $A(x) = \cos x + \sin x - (\cos^3 x + \sin^3 x)$ avec $x \in \mathbb{R}$.

1 - Montrer que : $A(x) = \cos x \sin x (\cos x + \sin x)$

2 - Montrer que : $A\left(x + \frac{\pi}{2}\right) = A(-x)$ et $A(x + \pi) = -A(x)$

3 - Calculer $A\left(\frac{2019\pi}{2}\right)$