Equations trigonométriques de base : solutions des exercices.

1. 8. $\sin\left(x+\frac{\pi}{6}\right) - 4 = 0 \iff \sin\left(x+\frac{\pi}{6}\right) = \frac{1}{2}$

$\iff x+\frac{\pi}{6} = \frac{\pi}{6} + k.2\pi$ ou $x+\frac{\pi}{6} = \frac{5\pi}{6} + k.2\pi$

$\iff x = k.2\pi$ ou $x = \frac{2\pi}{3} + k.2\pi$ $(k \in \mathbb{Z})$.

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

$\iff 2x - \frac{\pi}{3} = \frac{\pi}{4} + k.2\pi$ ou $2x - \frac{\pi}{3} = -\frac{\pi}{4} + k.2\pi$

$\iff 2x = \frac{7\pi}{12} + k.2\pi$ ou $2x = \frac{\pi}{12} + k.2\pi$

$\iff x = \frac{7\pi}{24} + k.\pi$ ou $x = \frac{\pi}{24} + k.\pi$ $(k \in \mathbb{Z})$

3. $\sqrt{3}.\tan\left(3x+\frac{\pi}{6}\right) + 1 = 0 \iff \tan\left(3x+\frac{\pi}{6}\right) = -\frac{\sqrt{3}}{3}$

$\iff 3x + \frac{\pi}{6} = -\frac{\pi}{6} + k.\pi$

$\iff 3x = -\frac{\pi}{3} + k.\pi \iff x = -\frac{\pi}{9} + k.\frac{\pi}{3}$ $(k \in \mathbb{Z})$

4. $3.\sin\left(3x - \frac{\pi}{4}\right) + 3 = 0 \iff \sin\left(3x - \frac{\pi}{4}\right) = -1$

$\iff 3x - \frac{\pi}{4} = \frac{3\pi}{2} + k.2\pi$

$\iff 3x = \frac{7\pi}{4} + k.2\pi \iff x = \frac{7\pi}{12} + k.\frac{2\pi}{3}$ $(k \in \mathbb{Z})$

5. $2.\cos(3x+\pi) - \sqrt{3} = 0 \iff -2.\cos 3x - \sqrt{3} = 0$
(angles associés)

$\iff \cos 3x = -\frac{\sqrt{3}}{2}$

$\iff 3x = \frac{5\pi}{6} + k.2\pi$ ou $3x = -\frac{5\pi}{6} + k.2\pi$

$\iff x = \frac{5\pi}{18} + k.\frac{2\pi}{3}$ ou $x = -\frac{5\pi}{18} + k.\frac{2\pi}{3}$ $(k \in \mathbb{Z})$

6. $5.\sin\left(\frac{\pi}{3} - 4x\right) = 0 \iff \sin\left(\frac{\pi}{3} - 4x\right) = 0$

$\iff \frac{\pi}{3} - 4x = k\pi \iff 4x = \frac{\pi}{3} - k\pi \iff x = \frac{\pi}{12} - k\frac{\pi}{4}$

$(k \in \mathbb{Z})$

7. $\cos\left(3x - \frac{\pi}{6}\right) = 0 \iff 3x - \frac{\pi}{6} = \frac{\pi}{2} + k\pi$

$\iff 3x = \frac{2\pi}{3} + k\pi \iff x = \frac{2\pi}{9} + k.\frac{\pi}{3}$ $(k \in \mathbb{Z})$