

Feuille de travail

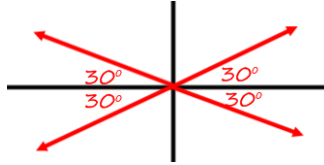
1. Résous les équations trigonométriques suivantes pour l'intervalle indiqué.

a) $1 - 3 \tan^2 x = 0 \quad x \in]-\pi, \pi[$

$$-3 \tan^2 x = -1$$

$$\tan^2 x = \frac{1}{3}$$

$$\tan x = \frac{\pm 1}{\sqrt{3}}$$



$$x = \{-30^\circ, 150^\circ, 30^\circ, 150^\circ\}$$

$$x = \left\{ \frac{-5\pi}{6}, \frac{-\pi}{6}, \frac{\pi}{6}, \frac{5\pi}{6} \right\}$$

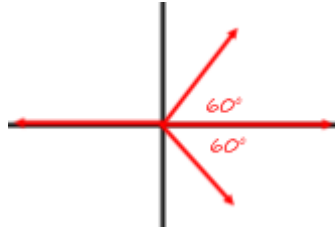
b) $2 \sin x - \sec x \sin x = 0 \quad x \in]-2\pi, \pi[$

$$\sin x (2 - \sec x) = 0$$

$$\sin x = 0 \quad \sec x = 2$$

$$\frac{1}{\cos x} = 2$$

$$\cos x = \frac{1}{2}$$



$$x = \{-300, -180, -60, 0, 60\}$$

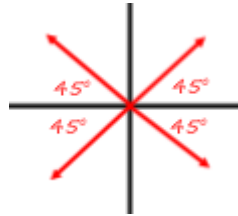
$$x = \left\{ \frac{-5\pi}{3}, -\pi, \frac{-\pi}{3}, 0, \frac{\pi}{3} \right\}$$

c) $2 \cos^2 3x - 1 = 0 \quad x \in \mathbb{R}$

$$2 \cos^2 3x = 1$$

$$\cos^2 3x = \frac{1}{2}$$

$$\cos 3x = \frac{\pm 1}{\sqrt{2}} = \frac{\pm \sqrt{2}}{2}$$



$$3x = 45^\circ + 90^\circ n$$

$$x = 15^\circ + 30^\circ n$$

$$x = \left\{ \frac{\pi}{12} + \frac{\pi n}{6}, n \in \mathbb{Z} \right\}$$

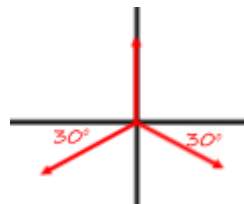
d) $2 \sin^2 5x - \sin 5x = 1 \quad x \in \left[0, \frac{3\pi}{4} \right[$

$$2 \sin^2 5x - \sin 5x - 1 = 0$$

$$(2 \sin 5x - 2)(2 \sin 5x + 1) / 2 = 0$$

$$(\sin 5x - 1)(2 \sin 5x + 1) = 0$$

$$\sin 5x = 1 \quad \sin 5x = \frac{-1}{2}$$



$$5x = 90^\circ + 120^\circ n$$

$$x = 18^\circ + 24^\circ n$$

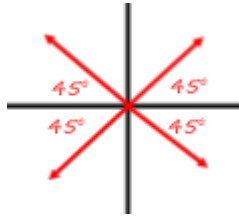
$$x = 18^\circ, 42^\circ, 66^\circ, 90^\circ, 114^\circ$$

$$x = \left\{ \frac{\pi}{10}, \frac{7\pi}{30}, \frac{11\pi}{30}, \frac{\pi}{2}, \frac{19\pi}{30} \right\}$$

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e) $\tan^2 \frac{1}{3}x = 1 \quad x \in]-2\pi, 5\pi[$

$\tan \frac{1}{3}x = \pm 1$



$\frac{1}{3}x = 45^\circ + 90^\circ n$
 $x = 135^\circ + 270^\circ n$
 $x = \{-135^\circ, 135^\circ, 405^\circ, 675^\circ\}$
 $x = \left\{ \frac{-3\pi}{4}, \frac{3\pi}{4}, \frac{9\pi}{4}, \frac{15\pi}{4} \right\}$

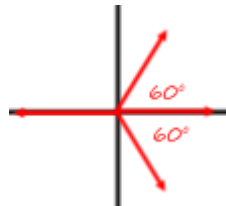
f) $2 \cos 3x \sin \frac{x}{2} = \sin \frac{x}{2} \quad x \in \mathbb{R}$

$2 \cos 3x \sin \frac{x}{2} - \sin \frac{x}{2} = 0$

$\sin \frac{x}{2} (2 \cos 3x - 1) = 0$

$\sin \frac{x}{2} = 0 \quad 2 \cos 3x = 1$

$\cos 3x = \frac{1}{2}$



$\frac{x}{2} = 0^\circ + 180^\circ n \quad \text{ou} \quad 3x = 60^\circ + 360^\circ n, 300^\circ + 360^\circ n$
 $x = 0^\circ + 360^\circ n \quad \text{ou} \quad x = 20^\circ + 120^\circ n, 100^\circ + 120^\circ n$
 $x = \left\{ 2\pi n, \frac{\pi}{9} + \frac{2\pi n}{3}, \frac{5\pi}{9} + \frac{2\pi n}{3}, n \in \mathbb{Z} \right\}$

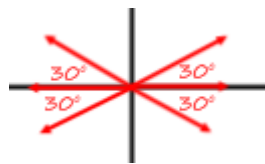
g) $\cos x = \sqrt{3} \quad x \in \mathbb{R}$
 $\{ \}$

h) $3 \tan^3 x - \tan x = 0 \quad x \in \left] -\frac{\pi}{2}, \frac{3\pi}{2} \right[$

$\tan x (3 \tan^2 x - 1) = 0$
 $\tan x = 0 \quad 3 \tan^2 x = 1$

$\tan^2 x = \frac{1}{3}$

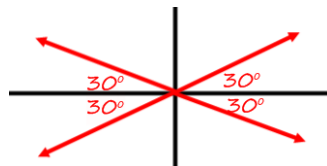
$\tan x = \frac{\pm 1}{\sqrt{3}}$



$x = 0^\circ + 180^\circ n \quad x = 30^\circ + 180^\circ n, 150^\circ + 180^\circ n$
 $x = -30^\circ, 0^\circ, 30^\circ, 150^\circ, 180^\circ, 210^\circ$
 $x = \left\{ \frac{-\pi}{6}, 0, \frac{\pi}{6}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6} \right\}$

i) $\cos^2 6x = \frac{3}{4} \quad x \in \mathbb{R}$

$\cos 6x = \frac{\pm \sqrt{3}}{2}$



$6x = 30^\circ + 180^\circ n, 150^\circ + 180^\circ n$
 $x = 5^\circ + 30^\circ n, 25^\circ + 30^\circ n$
 $\left\{ \frac{\pi}{36} + \frac{\pi n}{6}, \frac{5\pi}{36} + \frac{\pi n}{6}, n \in \mathbb{Z} \right\}$