G. Equations et inéquations trigonométriques

(6) Exercices

Seuls les exercices accompagnés du symbole ▦ peuvent être réalisés à l'aide d'une calculatrice.

(1) $\sin 2x - \cos x = 0$

$$x = \frac{\pi}{6} + 2k\frac{\pi}{3} \text{ ou } x = \frac{\pi}{2} + 2k\pi$$

$$SP = \left\{ \frac{\pi}{6}; \frac{5\pi}{6}; \frac{3\pi}{2}; \frac{\pi}{2} \right\}$$

(2) $\sin x . \cos \frac{\pi}{7} + \cos x . \sin \frac{\pi}{7} = \frac{1}{2}$

$$x = \frac{\pi}{42} + 2k\pi \text{ ou } x = \frac{29\pi}{42} + 2k\pi$$

$$SP = \left\{ \frac{\pi}{42}; \frac{29\pi}{42} \right\}$$

(3) ▦ $2\sin x + 5\cos x = -3$

$$x = -1,78 + 2k\pi \text{ ou } x = 2,54 + 2k\pi$$

$$SP = \left\{ 4,50; 2,54 \right\}$$

(4) $\sqrt{2}\cos x = \tan x$

$$x = \frac{\pi}{4} + 2k\pi \text{ ou } x = \frac{3\pi}{4} + 2k\pi$$

$$SP = \left\{ \frac{\pi}{4}; \frac{3\pi}{4} \right\}$$

(5) ⌨ $8\sin^2 x - 7\cos x - 8 = 0$

$x = \dfrac{\pi}{2} + k\pi$ ou $x = 2,64 + 2k\pi$ ou $x = -2,64 + 2k\pi$

$SP = \left\{\dfrac{\pi}{2}; \dfrac{3\pi}{2}; 2,64; 3,65\right\}$

(6) $\cos(5x) + \sin x + \sin(7x) - \cos(3x) = 0$

$x = k\dfrac{\pi}{4}$ ou $x = \dfrac{\pi}{8} + k\dfrac{\pi}{2}$ ou $x = -\dfrac{\pi}{4} + k\pi$

$SP = \left\{0; \dfrac{\pi}{4}; \dfrac{\pi}{2}; \dfrac{3\pi}{4}; \pi; \dfrac{5\pi}{4}; \dfrac{3\pi}{2}; \dfrac{7\pi}{4}; \dfrac{\pi}{8}; \dfrac{5\pi}{8}; \dfrac{9\pi}{8}; \dfrac{13\pi}{8}\right\}$

(7) ⌨ $3\cos^2 x + 5\cos x - 2 = 0$

$x = 1,23 + 2k\pi$ ou $x = -1,23 + 2k\pi$

$SP = \{1,23; 5,05\}$

(8) $\cos x.\cos(3x) - \sin x.\sin(3x) = -1$

$x = \dfrac{\pi}{4} + k\dfrac{\pi}{2}$

$SP = \left\{\dfrac{\pi}{4}; \dfrac{3\pi}{4}; \dfrac{5\pi}{4}; \dfrac{7\pi}{4}\right\}$

(9) $\cos^2(2x) - 3.\sin^2 x + 2 = 0$

$x = \dfrac{\pi}{2} + k\pi$ ou $x = \dfrac{\pi}{3} + 2k\pi$ ou $x = -\dfrac{\pi}{3} + 2k\pi$ ou $x = \dfrac{2\pi}{3} + 2k\pi$ ou $x = -\dfrac{2\pi}{3} + 2k\pi$

$SP = \left\{\dfrac{\pi}{2}; \dfrac{3\pi}{2}; \dfrac{\pi}{3}; \dfrac{5\pi}{3}; \dfrac{2\pi}{3}; \dfrac{4\pi}{3}\right\}$

(10) $\cos 4x - \cos 2x + \sin 3x = 0$

$x = k\dfrac{\pi}{3}$ ou $x = \dfrac{\pi}{6} + 2k\pi$ ou $x = \dfrac{5\pi}{6} + 2k\pi$

$SP = \left\{0; \dfrac{\pi}{3}; \dfrac{2\pi}{3}; \pi; \dfrac{4\pi}{3}; \dfrac{5\pi}{3}; \dfrac{\pi}{6}; \dfrac{5\pi}{6}\right\}$

(11) $\sin 2x - \sin 3x = \cos 4x + \cos x$

$$x = \frac{\pi}{5} + 2k\frac{\pi}{5} \text{ ou } x = -\frac{\pi}{4} + k\pi \text{ ou } x = \frac{\pi}{2} + 2k\pi$$

$$SP = \left\{\frac{\pi}{5}; \frac{3\pi}{5}; \pi; \frac{7\pi}{5}; \frac{9\pi}{5}; \frac{3\pi}{4}; \frac{7\pi}{4}; \frac{\pi}{2}\right\}$$

(12) 🖩 $7\tan x - 4\cot x = 12$

$$x = 1{,}11 + k\pi \text{ ou } x = -0{,}28 + k\pi$$

$$SP = \{1{,}11; 4{,}25; 2{,}86; 6\}$$

(13) 🖩 $2\cos x + \sin x = 3\sqrt{2}$

$$S = \varnothing$$

(14) $\cos x . \sin^5 x - \cos^4 x . \sin^2 x = 0$

$$x = k\pi \text{ ou } x = \frac{\pi}{4} + k\pi$$

$$SP = \left\{0; \pi; \frac{\pi}{4}; \frac{5\pi}{4}\right\}$$

(15) 🖩 $2\sin^2 x - 3\sin x . \cos x + \cos^2 x = 0$

$$x = \frac{\pi}{4} + k\pi \text{ ou } x = 0{,}46 + k\pi$$

$$SP = \left\{\frac{\pi}{4}; \frac{5\pi}{4}; 0{,}46; 3{,}61\right\}$$