

Énoncés des exercices « 2s- Équations trigonométriques »

www.deleze.name/marcel/sec2/ex-corriges/2s/2s-eq-trig.pdf

2s- Équations trigonométriques - Corrigés

Corrigé de l'exercice 1 a)

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

$$x = \arcsin\left(-\frac{2}{3}\right) + k2\pi \quad \text{ou} \quad x = \pi - \arcsin\left(-\frac{2}{3}\right) + k2\pi, k \in \mathbb{Z}$$

$$x \simeq -0.729728 + k2\pi \quad \text{ou} \quad x \simeq 3.87132 + k2\pi, k \in \mathbb{Z}$$

$$\begin{aligned} \text{Dans }]-\pi; \pi] : S &= \left\{ \arcsin\left(-\frac{2}{3}\right), \pi - \arcsin\left(-\frac{2}{3}\right) - 2\pi \right\} \\ &= \left\{ \arcsin\left(-\frac{2}{3}\right), -\arcsin\left(-\frac{2}{3}\right) - \pi \right\} \\ &\simeq \{-0.729728, -2.41186\} \end{aligned}$$

Corrigé de l'exercice 1 b)

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

$$x = \frac{5\pi}{6} + k2\pi \quad \text{ou} \quad x = -\frac{5\pi}{6} + k2\pi, k \in \mathbb{Z}$$

$$\text{Dans } [0; 2\pi[: S = \left\{ \frac{5\pi}{6}, -\frac{5\pi}{6} + 2\pi \right\} = \left\{ \frac{5\pi}{6}, \frac{7\pi}{6} \right\} \simeq \{2.61799, 3.66519\}$$

Corrigé de l'exercice 1 c)

$$\tan(x) = 2$$

$$x = \arctan(2) + k\pi, k \in \mathbb{Z}$$

$$\begin{aligned} \text{Dans }]-2\pi; 2\pi[: S &= \{\arctan(2) - 2\pi, \arctan(2) - \pi, \arctan(2), \arctan(2) + \pi\} \\ &\simeq \{-5.17604, -2.03444, 1.10715, 4.24874\} \end{aligned}$$

Corrigé de l'exercice 2 a)

$$\tan(x) = -1$$

$$S : x = -\frac{\pi}{4} + k\pi, k \in \mathbb{Z}$$

$$S \cap]-\pi; \pi] = \left\{ -\frac{\pi}{4}, \frac{3\pi}{4} \right\} \simeq \{-0.7854; 2.3562\}$$

Corrigé de l'exercice 2 b)

$$\sin(x) = 0.3$$

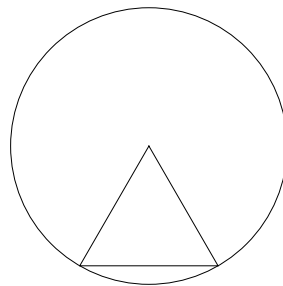
$$S : x = \arcsin(0.3) + k2\pi \quad \text{ou} \quad x = \pi - \arcsin(0.3) + k2\pi, \quad k \in \mathbb{Z}$$

$$S : x \simeq 0.3047 + k2\pi \quad \text{ou} \quad x \simeq 2.8369 + k2\pi, \quad k \in \mathbb{Z}$$

$$S \cap]-\pi; \pi] = \{\arcsin(0.3); \pi - \arcsin(0.3)\} \simeq \{0.3047; 2.8369\}$$

Corrigé de l'exercice 3

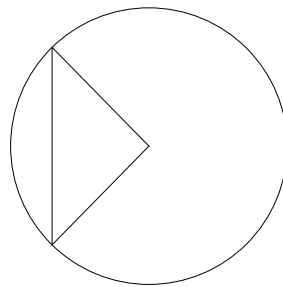
$$\sin(x) = -\frac{\sqrt{3}}{2}$$



$$x = -\frac{\pi}{3} + k2\pi \quad \text{ou} \quad x = -\frac{2\pi}{3} + k2\pi, \quad k \in \mathbb{Z}$$

Corrigé de l'exercice 4

$$\cos(\pi - 2x) = -0.7$$



$$\pi - 2x = \arccos(-0.7) + k2\pi \quad \text{ou} \quad \pi - 2x = -\arccos(-0.7) + k2\pi, \quad k \in \mathbb{Z}$$

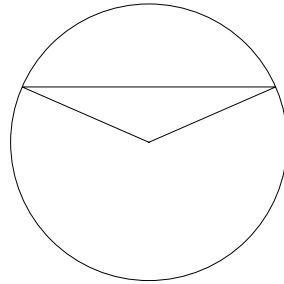
$$-2x = -\pi + \arccos(-0.7) + k2\pi \quad \text{ou} \quad -2x = -\pi - \arccos(-0.7) + k2\pi, \quad k \in \mathbb{Z}$$

$$x = \frac{\pi}{2} - \frac{\arccos(-0.7)}{2} - k\pi \quad \text{ou} \quad x = \frac{\pi}{2} + \frac{\arccos(-0.7)}{2} - k\pi, \quad k \in \mathbb{Z}$$

$$x \simeq 0.397699 - k\pi \quad \text{ou} \quad x \simeq 2.74389 - k\pi, \quad k \in \mathbb{Z}$$

Corrigé de l'exercice 5

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



$$3x = \frac{\pi}{3} - x + k2\pi \quad \text{ou} \quad 3x = \pi - \left(\frac{\pi}{3} - x\right) + k2\pi, \quad k \in \mathbb{Z}$$

$$4x = \frac{\pi}{3} + k2\pi \quad \text{ou} \quad 2x = \frac{2\pi}{3} + k2\pi, \quad k \in \mathbb{Z}$$

$$x = \frac{\pi}{12} + k\frac{\pi}{2} \quad \text{ou} \quad x = \frac{\pi}{3} + k\pi, \quad k \in \mathbb{Z}$$

Corrigé de l'exercice 6

a)

$$\sin\left(3x - \frac{\pi}{6}\right) + \frac{\sqrt{3}}{2} = 0$$

$$\sin\left(3x - \frac{\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

$$3x - \frac{\pi}{6} = -\frac{\pi}{3} + k2\pi \quad \text{ou} \quad 3x - \frac{\pi}{6} = -\frac{2\pi}{3} + k2\pi, \quad k \in \mathbb{Z}$$

$$3x = -\frac{\pi}{6} + k2\pi \quad \text{ou} \quad 3x = -\frac{\pi}{2} + k2\pi, \quad k \in \mathbb{Z}$$

$$x = -\frac{\pi}{18} + k\frac{2\pi}{3} \quad \text{ou} \quad x = -\frac{\pi}{6} + k\frac{2\pi}{3}, \quad k \in \mathbb{Z}$$

b)

$$S = \left\{ -\frac{5\pi}{6}, -\frac{13\pi}{18}, -\frac{\pi}{6}, -\frac{\pi}{18}, \frac{\pi}{2}, \frac{11\pi}{18} \right\}$$

Corrigé de l'exercice 7

$$\cos^2(x) = \frac{1 + \sin(x)}{2}$$

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

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

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

$$0 = 2y^2 + y - 1 \text{ où } y = \sin(x)$$

$$\left(y = -1 \text{ ou } y = \frac{1}{2}\right) \text{ où } y = \sin(x)$$

$$\sin(x) = -1 \text{ ou } \sin(x) = \frac{1}{2}$$

$$x = -\frac{\pi}{2} + k2\pi \text{ ou } x = \frac{\pi}{6} + k2\pi \quad \text{ou} \quad x = \frac{5\pi}{6} + k2\pi, \quad k \in \mathbb{Z}$$

Corrigé de l'exercice 8

a)

$$\tan\left(2x + \frac{\pi}{4}\right) = 2$$

$$2x + \frac{\pi}{4} = \arctan(2) + k\pi, \quad k \in \mathbb{Z}$$

$$2x = \arctan(2) - \frac{\pi}{4} + k\pi, \quad k \in \mathbb{Z}$$

$$x = \frac{1}{2} \arctan(2) - \frac{\pi}{8} + k\frac{\pi}{2}, \quad k \in \mathbb{Z}$$

$$x \simeq 0.160875 + k\frac{\pi}{2}, \quad k \in \mathbb{Z}$$

b)

$$S = \{-2.98072, -1.40992, 0.160875, 1.73167\}$$

Corrigé de l'exercice 9

$$\sin\left(3x - \frac{\pi}{2}\right) = \sin\left(-5x + \frac{\pi}{3}\right)$$

$$3x - \frac{\pi}{2} = -5x + \frac{\pi}{3} + k2\pi \quad \text{ou} \quad 3x - \frac{\pi}{2} = \pi - \left(-5x + \frac{\pi}{3}\right) + k2\pi, \quad k \in \mathbb{Z}$$

$$8x = \frac{5\pi}{6} + k2\pi \quad \text{ou} \quad -2x = \frac{7\pi}{6} + k2\pi, \quad k \in \mathbb{Z}$$

$$x = \frac{5\pi}{48} + k\frac{\pi}{4} \quad \text{ou} \quad x = -\frac{7\pi}{12} - k\pi, \quad k \in \mathbb{Z}$$

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