Fonctions trigonométriques

1) Résoudre l'équation

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

2) Résoudre l'équation

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

3) Étudier la fonction donnée par

$$f(x) = 3 - \sin x$$

sur $[0; 2\pi]$

1) $3\cos x - 1 = \cos x - 2$

$2\cos x = -1$

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

$\cos^{-1}\left(-\frac{1}{2}\right) = 120^\circ$

$$x = \frac{2\pi}{3} + k \cdot 2\pi$$

$$x = -\frac{2\pi}{3} + k \cdot 2\pi$$

2) $3\tan^2 x = 1 + \tan x$

$3\tan^2 x - 2\tan x - 1 = 0$

$t = \tan x$

$3t^2 - 2t - 1 = 0$

$$t = \frac{2 \pm \sqrt{4 - 4 \cdot 3 \cdot (-1)}}{6} = \frac{2 \pm \sqrt{16}}{6} = \begin{cases} 1 \\ -\frac{1}{3} \end{cases}$$

$\tan x = t$

$\tan x = 1$

$$\boxed{x \simeq \frac{\pi}{4} + k \cdot \pi}$$

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

$$\boxed{x \simeq -0{,}3218 + k \cdot \pi}$$

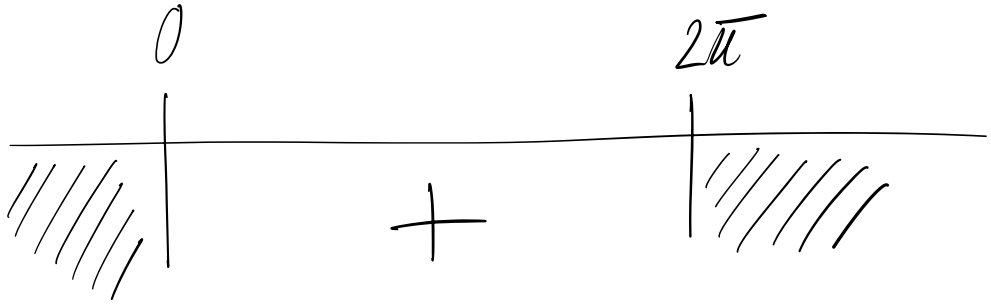
$\text{TAN}^{-1}(1) \simeq \frac{\pi}{4}$

$\text{TAN}^{-1}(-\frac{1}{3}) \simeq -18{,}4349$

3) $f(x) = 3 - \sin x$ sur $[0; 2\pi]$

Bs de nombres à exclure, $\mathcal{D}_f = \mathbb{R}$

$f(x) = 0 \Leftrightarrow 3 = \sin x$, ce qui est impossible



$f(0) = f(2\pi) = 3 > 0$

$(f(\pi) = 3)$

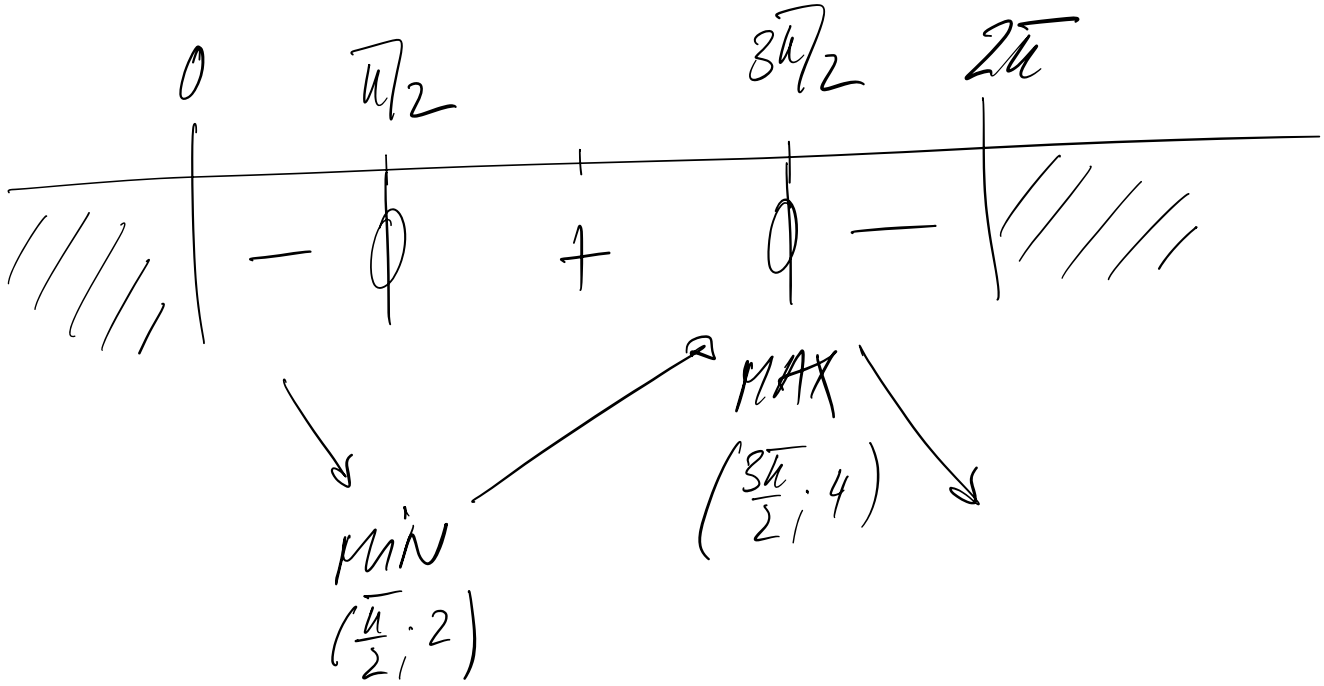
$f'(x) = 0 - \cos x = -\cos x$

$f'(x) = 0 \Leftrightarrow \cos x = 0$

$x = \frac{\pi}{2} + k2\pi \quad / \quad x = -\frac{\pi}{2} + k2\pi$

Les zéros de f' sur $[0;2\pi]$ sont donc

$$x = \frac{\pi}{2} \qquad x = \frac{3\pi}{2}$$

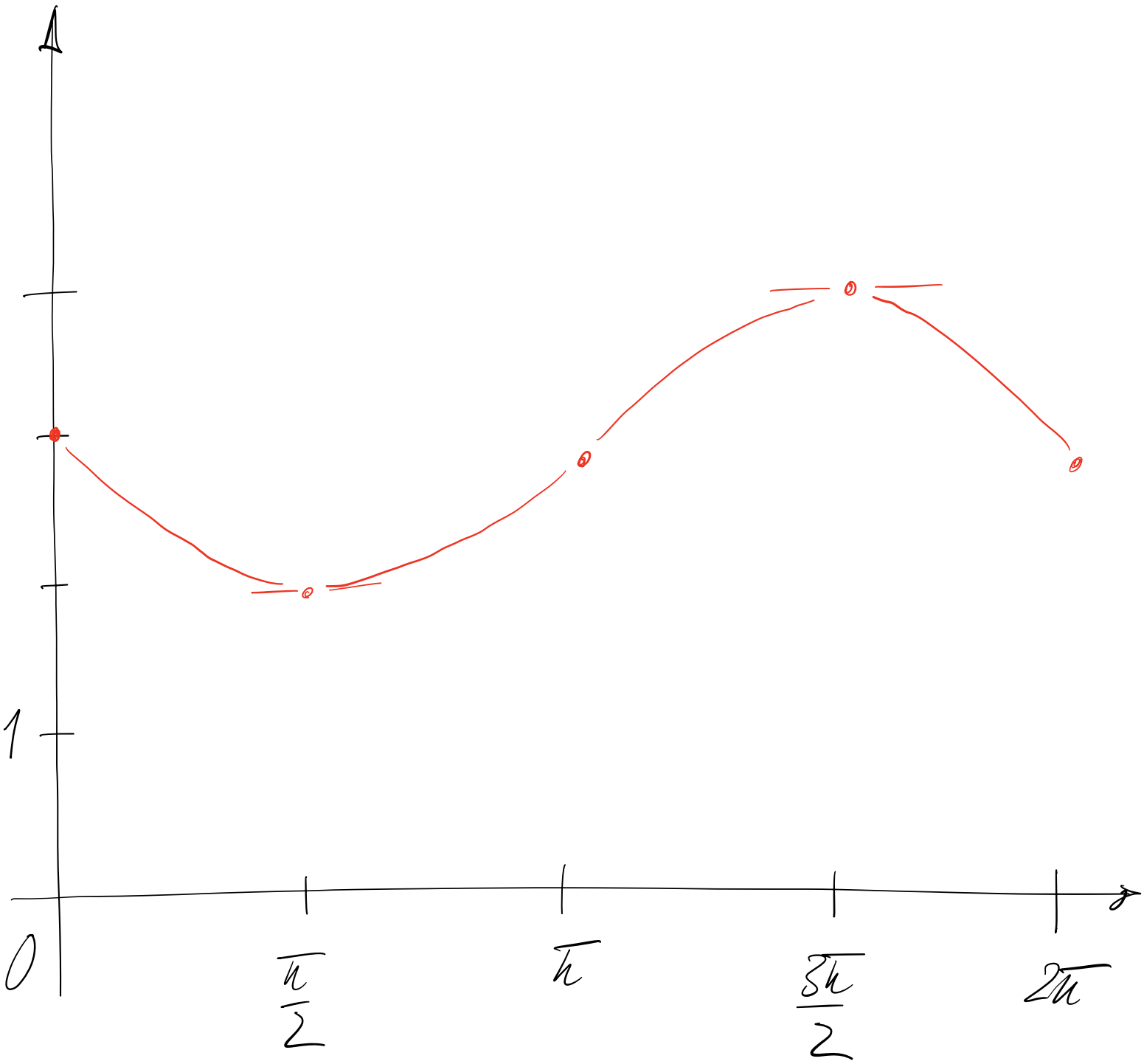


$$f'(0) = -\cos 0 = -1 = f'(2\pi)$$

$$f'(\pi) = -\cos \pi = -(-1) = 1$$

$$f\left(\frac{\pi}{2}\right) = 3 - \sin \frac{\pi}{2} = 3 - 1 = 2$$

$$f\left(\frac{3\pi}{2}\right) = 3 - \sin \frac{3\pi}{2} = 3 - (-1) = 4$$


y
1
0
π/2
π
3π/2
2π
x