$$\int f(x)\,dx = \qquad x = \varphi(t)$$

$$dx = \varphi'(t)\,dt$$

$$\int f(\varphi(t)) \cdot \varphi'(t)\,dt$$

$$x = a = \varphi(t)$$

$$\int_a^b f(x)\,dx = \int_{t_0}^{t_1} f(\varphi(t))\varphi'(t)\,dt \qquad t_0 = \varphi^{-1}(a)$$

$$t_1 = \varphi^{-1}(b)$$

$$f(x) = \begin{cases} x & \text{si } x < 2 \\ 2 & \text{si } 2 \le x \le 4 \\ 6 - x & \text{si } x > 4 \end{cases}$$

$$F(x) = \begin{cases} \boxed{\frac{1}{2}x^2 + 1} & \text{si } x < 2 \\ 2x + c & \text{si } 2 \le x \le 4 \\ 6x - \frac{1}{2}x^2 + c' \end{cases} \qquad F(0) = 1$$

$$\lim_{x \to 2^<} F(x) = 3 \Rightarrow 2 \cdot 2 + c = 3 \Leftrightarrow c = -1$$

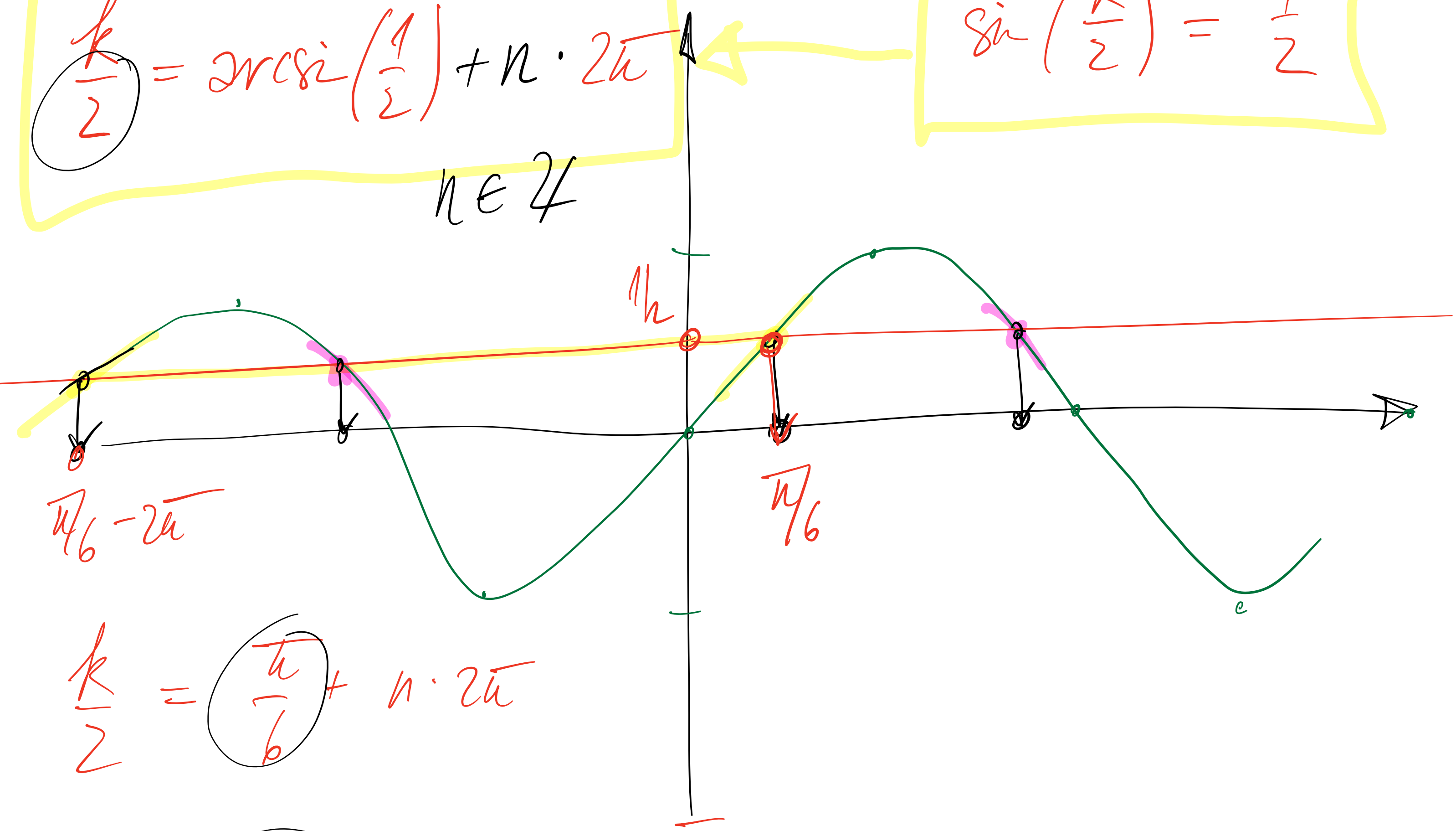
$$F(x) = \begin{cases} \frac{1}{2}x^2+1 & \text{si } x<2 \\ 2x-1 & \text{si } 2\le x\le 4 \\ 6x-\frac{1}{2}x^2+c' & \text{si } x>4 \end{cases}$$

⚠ Exercice 2.7 c) à corriger

Faute de lecture d'énoncé.

$$\boxed{\frac{k}{2} = \arcsin\left(\frac{1}{2}\right) + n\cdot 2\pi} \longleftarrow \boxed{\sin\left(\frac{k}{2}\right) = \frac{1}{2}}$$

$n \in \mathbb{Z}$



$$\frac{k}{2} = \frac{\pi}{6} + n\cdot 2\pi$$

$$k = 2\cdot\frac{\pi}{6} + 2\cdot n\cdot 2\pi = \frac{\pi}{3} + n\cdot 4\pi$$

$$\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx$$

$$\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx$$

$$\int \sqrt{9-x^2}\,dx =$$

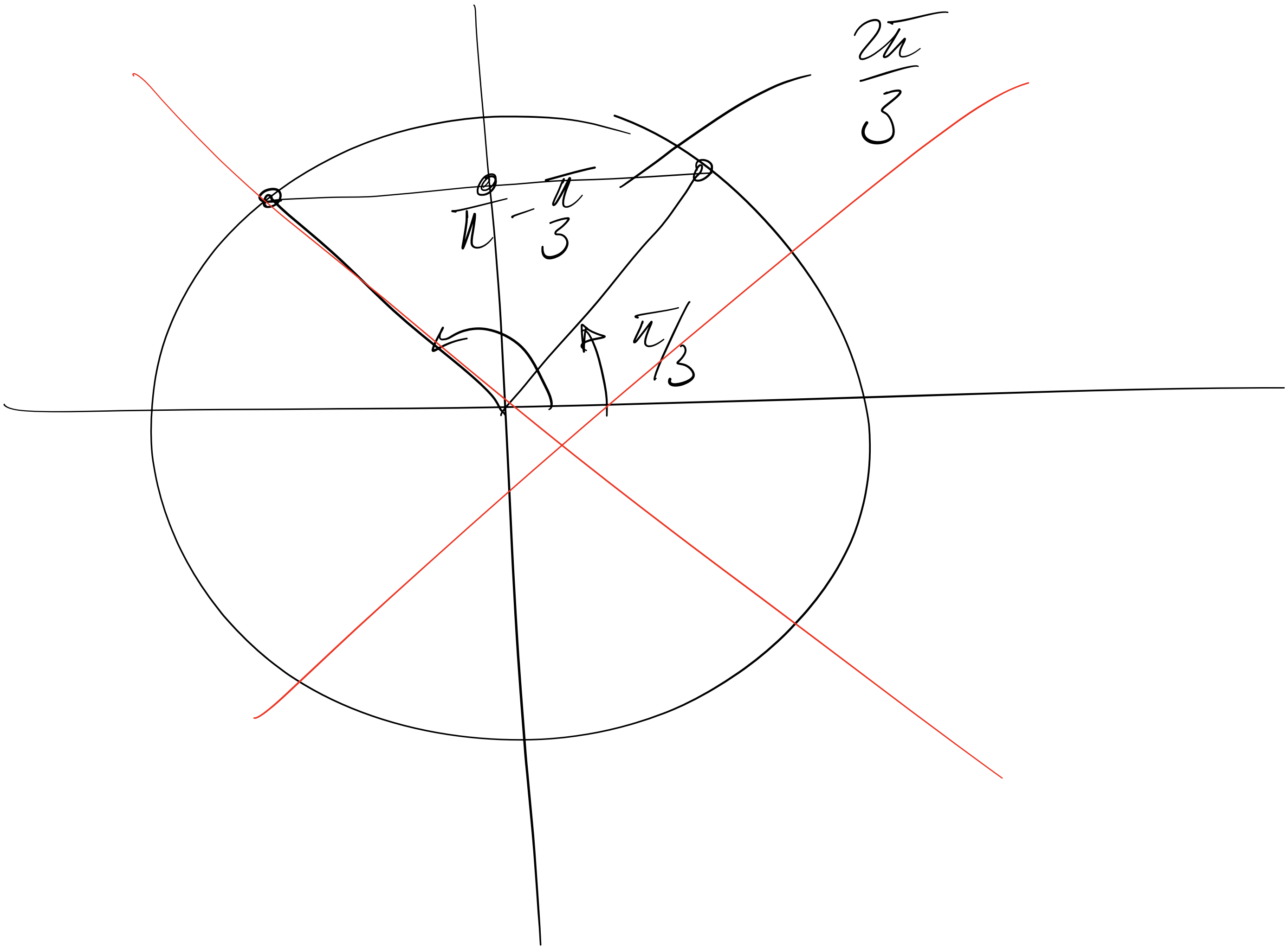
$x = 3\sin t$

$dx = 3\cos t\,dt$

$$\int \sqrt{9-9\sin^2 t}\cdot 3\cdot\cos t\,dt =$$

$$\int \sqrt{9\cdot(1-\sin^2 t)}\cdot 3\cdot\cos t\,dt =$$

$$\int 3\sqrt{\cos^2 t}\cdot 3\cdot\cos t\cdot dt = 9\int \cos^2 t\,dt$$



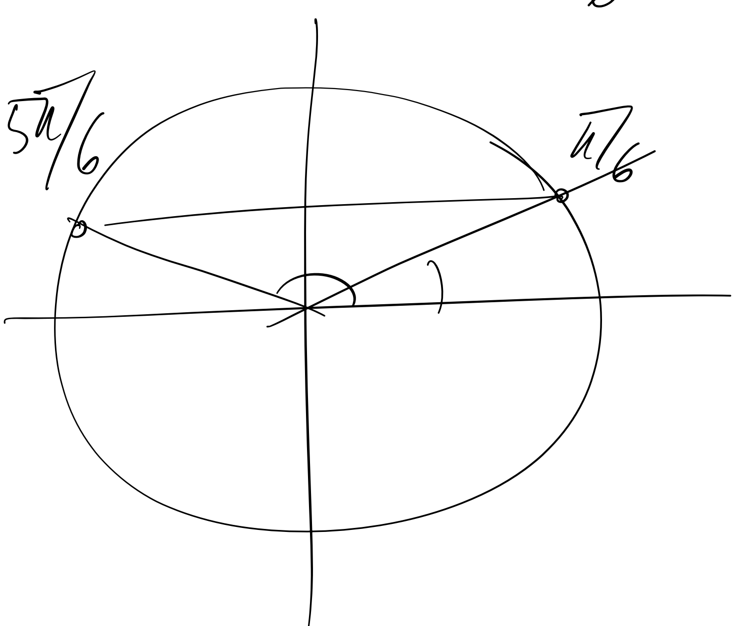
$$\frac{k}{2} = \frac{2\pi}{3} + l \cdot 2\pi$$

$$k = \frac{4\pi}{3} + l \cdot 4\pi$$

$\sin(x) = \frac{1}{2}$ $\qquad\qquad$ $x = \frac{k}{2}$

$$x = \underbrace{\arcsin\left(\frac{1}{2}\right)}_{\frac{\pi}{6}} + l \cdot 2\pi$$

$$x = \underbrace{\left(\pi - \arcsin\left(\frac{1}{2}\right)\right)}_{\pi - \frac{\pi}{6} = \frac{5\pi}{6}} + l \cdot 2\pi$$



$$x = \sqrt{a^2 + t^2}$$

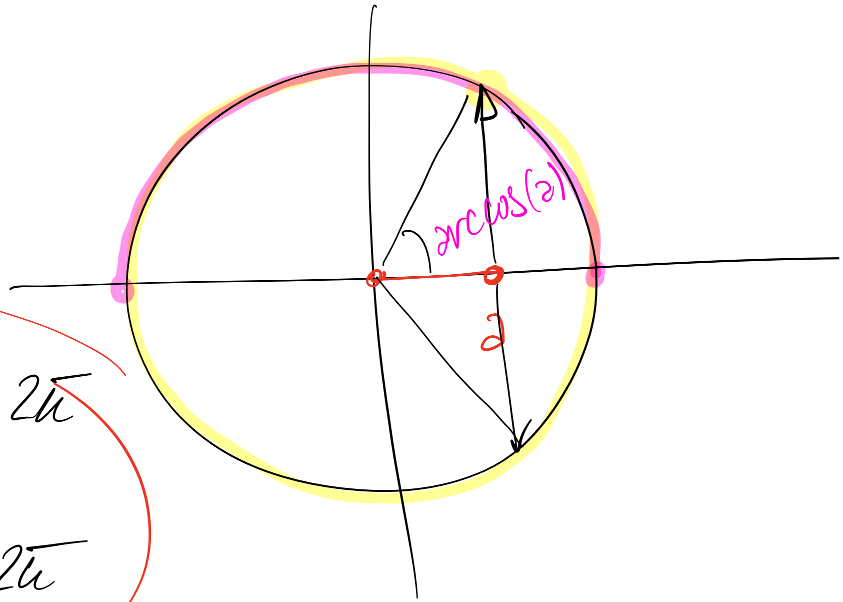
$$dx = \frac{1}{2\sqrt{a^2+t^2}} \cdot 2t \, dt$$

$$dx = \frac{t}{\sqrt{a^2+t^2}} \, dt$$

$$\frac{d}{dt}\left(a^2+t^2\right) = \underbrace{\frac{d}{dt} a^2}_{0} + \frac{d}{dt} t^2$$

$$= 2t$$

$$\boxed{\cos(x) = a}$$



$$x = \arccos(a) + l \cdot 2\pi$$

$$x = -\arccos(a) + l \cdot 2\pi$$

$\arccos : [-1; 1] \longrightarrow [0; \pi]$

$$\int \sqrt{x^2+1}\, dx$$

$$x = \frac{e^t - e^{-t}}{2}$$

$$dx = \frac{e^t + e^{-t}}{2}\, dt$$

$$\sqrt{\left(\frac{e^t - e^{-t}}{2}\right)^2 + 1} =$$

$$(e^y)' = e^y$$

$$\sqrt{\frac{e^{2t} - 2 \cdot e^t \cdot e^{-t} + e^{-2t}}{4} + 1\left(\frac{4}{4}\right)} =$$

$$\sqrt{\frac{e^{2t} + 2 + e^{-2t}}{4}} = \sqrt{\left(\frac{e^t + e^{-t}}{2}\right)^2} = \frac{e^t + e^{-t}}{2}$$

$$\int \sqrt{x^2+1}\,dx = \int \frac{e^t+e^{-t}}{2} \cdot \frac{e^t+e^{-t}}{2}\,dt$$

$$= \int \frac{e^{2t}+2+e^{-2t}}{4}\,dt$$