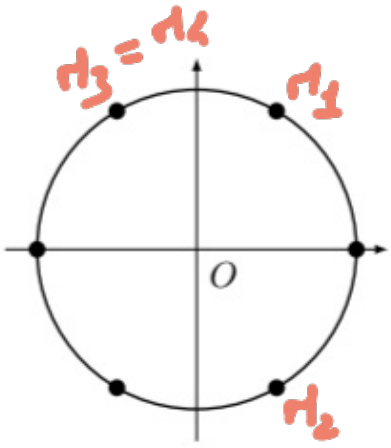
Exercice 1 :



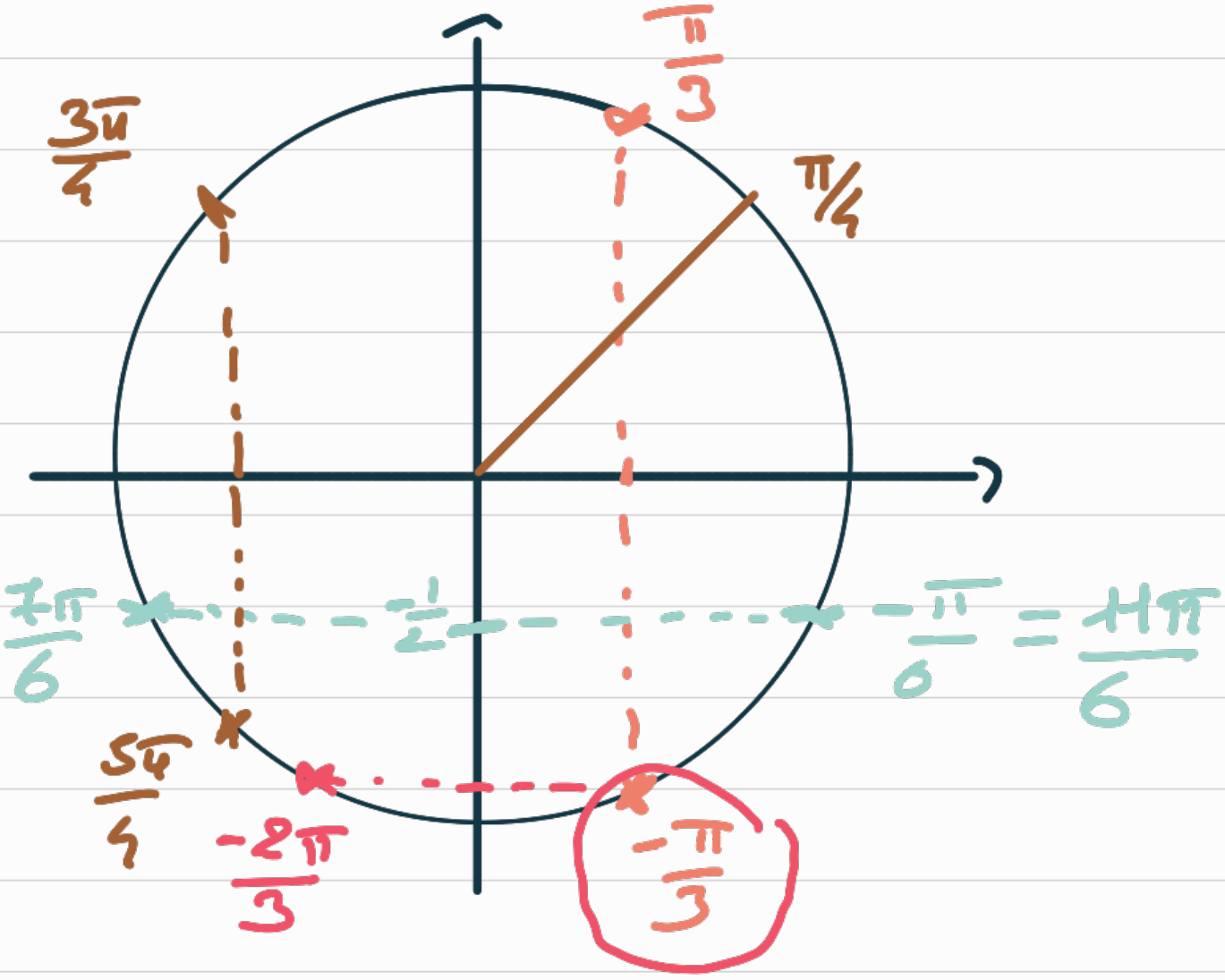
1. Sur le cercle trigonométrique ci-contre, placer les points M_1, M_2, M_3, M_4 repérés respectivement par les angles $\frac{\pi}{3}$, $\frac{17\pi}{3}$, $\frac{38\pi}{3}$, $\frac{50\pi}{3}$.
2. Donner alors sans justification :

a) $\cos\left(\frac{17\pi}{3}\right)$ b) $\sin\left(\frac{38\pi}{3}\right)$ c) $\cos\left(\frac{50\pi}{3}\right)$

Exercice 3 :

Résoudre les équations suivantes sur l'intervalle donné :

1. $\cos(x) = \frac{1}{2}$ sur $]-\pi\,;\,\pi]$
2. $2\sin(x) = -1$ sur $[0\,;\,2\pi[$
3. $\sqrt{2}\cos(x) + 1 = 0$ sur $[0\,;\,2\pi[$
4. $2\sin(x) + \sqrt{3} = 0$ sur $]-\pi\,;\,\pi]$



1) $S = \left\{ \frac{\pi}{3} ; -\frac{\pi}{3} \right\}$.

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

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

$S = \left\{ \frac{7\pi}{6} ; \frac{11\pi}{6} \right\}$.

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

$S = \left\{ \frac{3\pi}{4} ; \frac{5\pi}{4} \right\}$

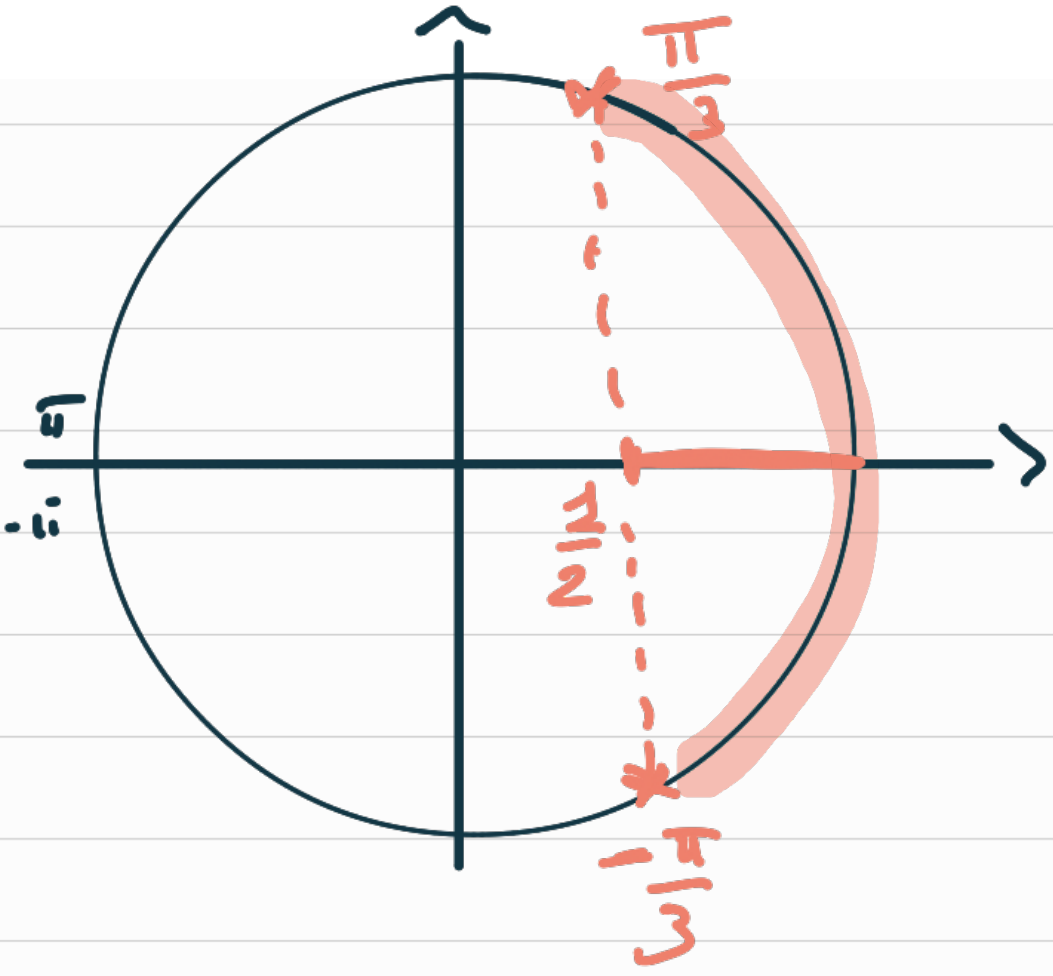
4) $\sin(x) = -\frac{\sqrt{3}}{2}$.

$S = \left\{ -\frac{\pi}{3} ; -\frac{2\pi}{3} \right\}$.

Résoudre les inéquations suivantes sur l'intervalle donné :

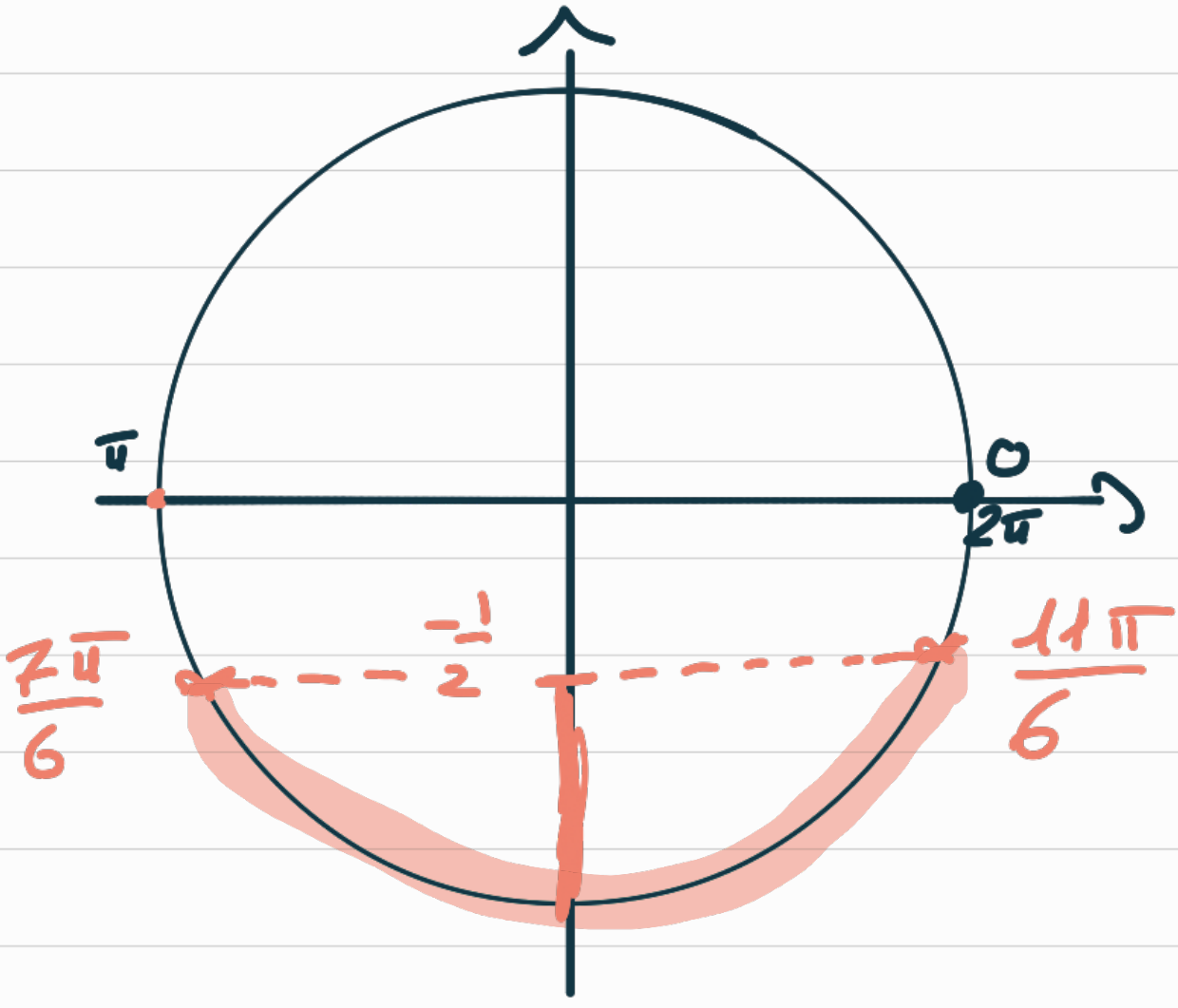
1. $\cos(x) \geq \frac{1}{2}$ sur $]-\pi\,;\,\pi]$
2. $2\sin(x) \leq -1$ sur $[0\,;\,2\pi[$
3. $\sqrt{2}\sin(x) + 1 \geq 0$ sur $[0\,;\,2\pi[$
4. $\sqrt{3}\cos(x) + 1 \geq 0$ sur $]-\pi\,;\,\pi]$

1)



$$S = \left[-\frac{\pi}{3}\,;\,\frac{\pi}{3}\right]$$

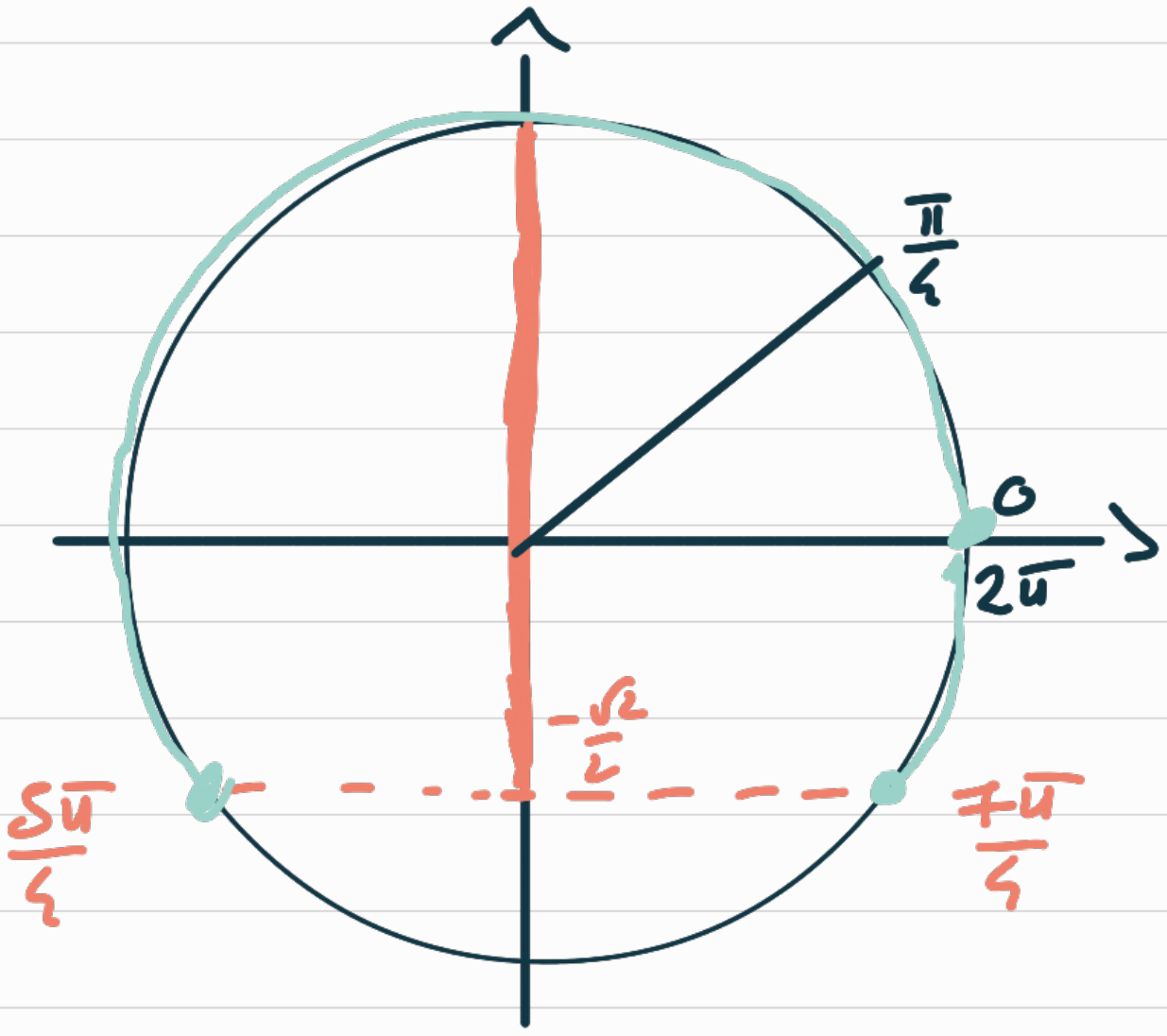
2) $\sin(x) \leq -\frac{1}{2}$, $x \in [0; 2\pi]$



$S = \left[\frac{7\pi}{6}; \frac{11\pi}{6}\right]$.

3) $\sqrt{2}\sin(x) + 1 > 0$, $[0, 2\pi[$

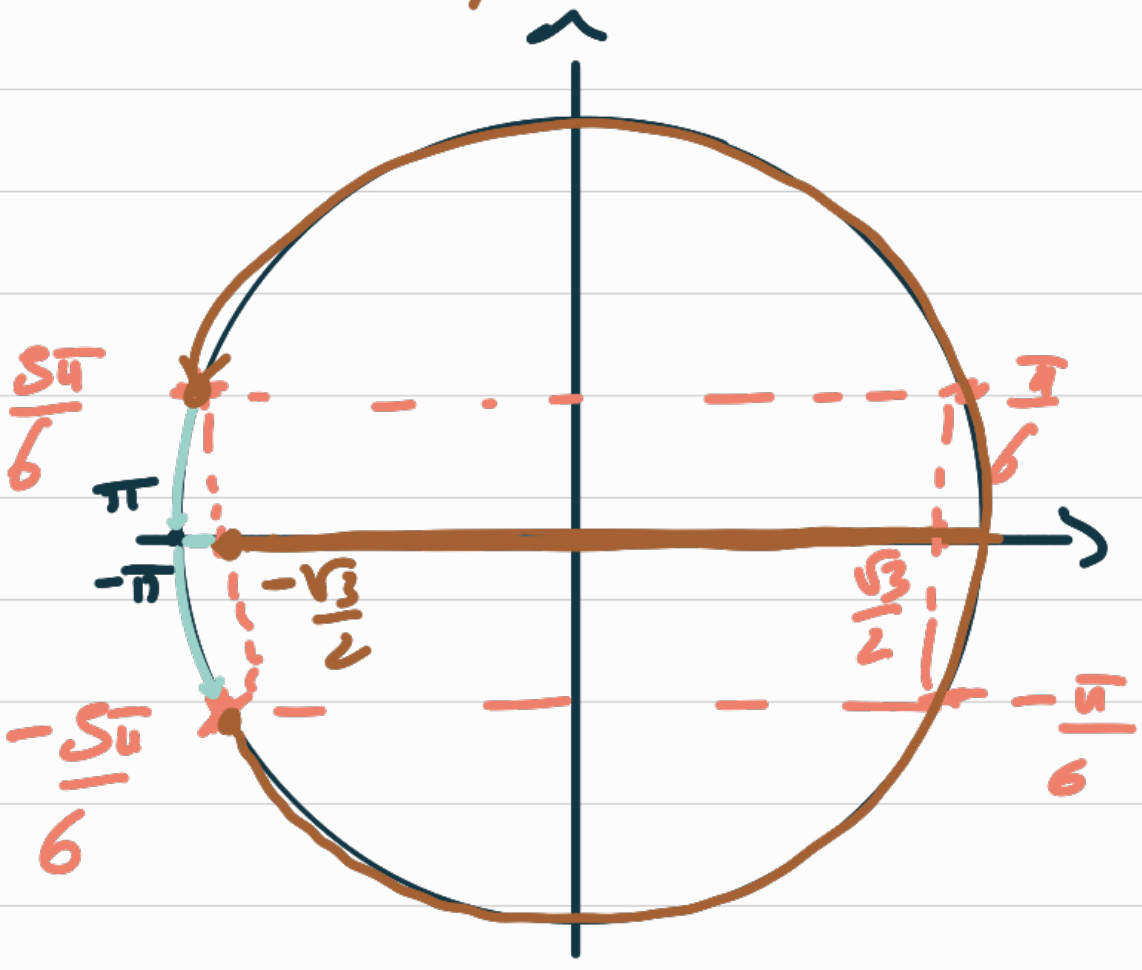
$$\sin(x) > \frac{-1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$



$$S = [0; \frac{5\pi}{4}[\cup]\frac{7\pi}{4}; 2\pi[$$

4) $2\cos(x) + \sqrt{3} \leqslant 0 \quad ,]-\pi ; \pi]$

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



$S =]-\pi ; -\frac{5\pi}{6}] \cup [\frac{5\pi}{6} ; \pi]$

$S = [-\frac{5\pi}{6} ; \frac{5\pi}{6}]$

Exercice 2 :

On considère un angle x en radian tel que $\cos x = \frac{\sqrt{5}}{3}$.

1. Quelles sont les valeurs possibles de $\sin x$?
2. Déterminer $\sin x$ sachant que $x \in \left[-\frac{\pi}{2} ; 0\right]$.

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

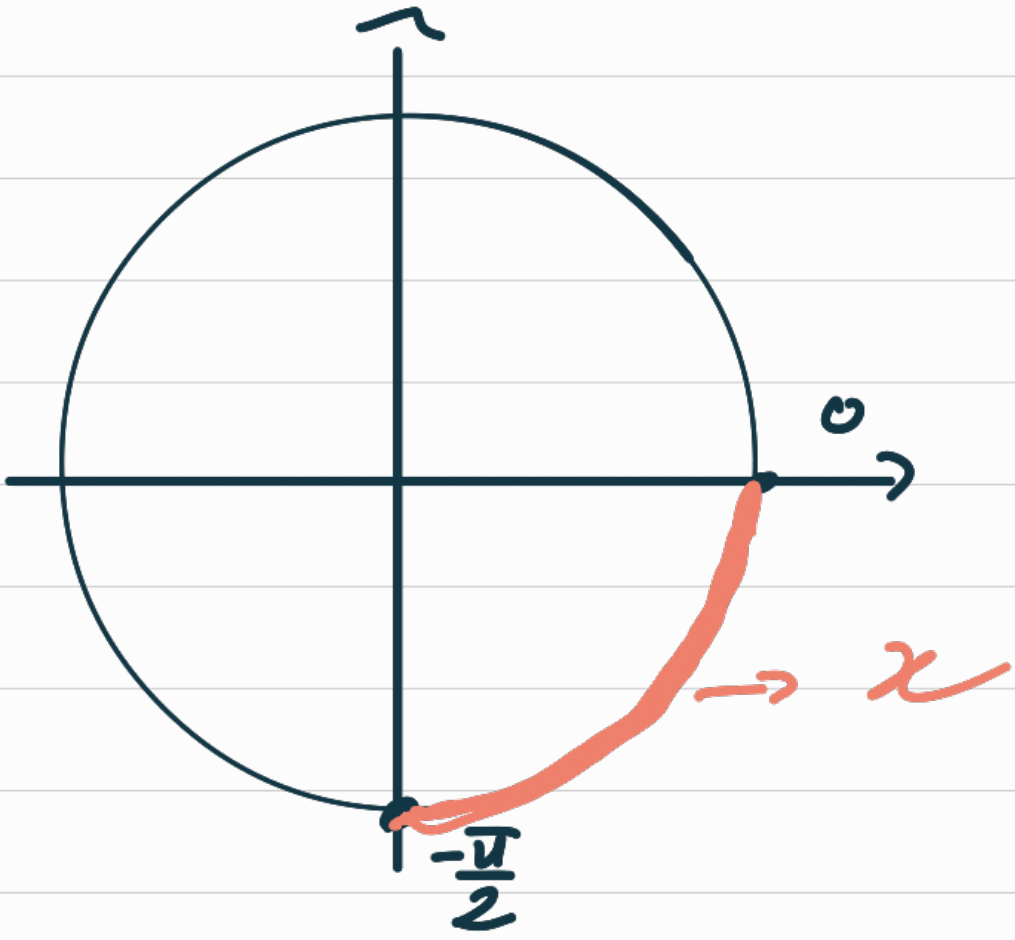
$\left(\frac{\sqrt{5}}{3}\right)^2 + \sin^2(x) = 1$

$\frac{5}{9} + \sin^2(x) = 1$

$\sin^2(x) = 1 - \frac{5}{9} = \frac{4}{9}$

donc $\sin(x) = +\sqrt{\frac{4}{9}} = \frac{2}{3}$ ou $-\sqrt{\frac{4}{9}} = -\frac{2}{3}$

2) $x \in \left[-\frac{4}{2}; 0\right]$



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