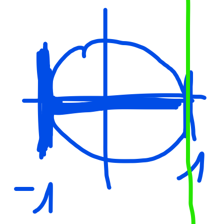
TD 2 exo 7

1) $\cos(5x) = 2$: $S = \emptyset$



$\cos(y) \in [-1, 1]$

$\arccos(c)$ n'a de sens que si $c \in [-1, 1]$

2) $\tan(5x) = 2$

On travaille pour x tel que $5x \in \mathbb{R} \setminus \{\frac{\pi}{2} + k\pi, k \in \mathbb{Z}\}$

Or $5x = \frac{\pi}{2} + k\pi \iff x = \frac{\pi}{10} + \frac{k\pi}{5}$.

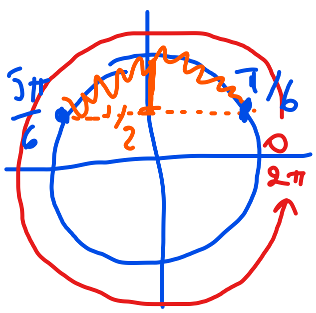
On travaille pour $x \in \mathbb{R} \setminus \{\frac{\pi}{10} + \frac{k\pi}{5}, k \in \mathbb{Z}\}$:

$$\tan(5x) = 2 \iff \tan(5x) = \tan(\arctan(2))$$
$$\iff \exists k \in \mathbb{Z} : 5x = \arctan(2) + k\pi$$
$$\iff \exists k \in \mathbb{Z} : x = \frac{\arctan(2) + k\pi}{5}$$

$$S = \left\{ \frac{\arctan(2) + k\pi}{5}, k \in \mathbb{Z} \right\}$$

3) Pour $x \in [0, 2\pi[$, $1 - 2\sin(x) \leqslant 0 \iff \sin(x) \geqslant \frac{1}{2}$

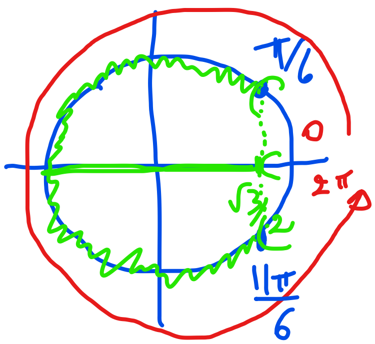
$$\iff \frac{\pi}{6} \leqslant x \leqslant \frac{5\pi}{6}$$



$$S = \left[\frac{\pi}{6}, \frac{5\pi}{6}\right]$$

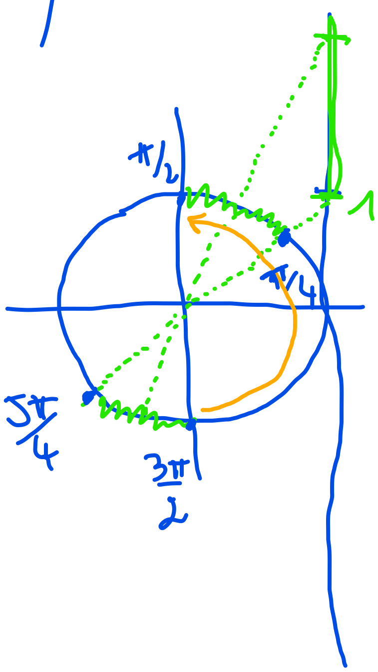
↑ dessin à faire sur la copie

4) Pour $x \in [0, 2\pi[$, $\cos(x) < \frac{\sqrt{3}}{2} \Longleftrightarrow \frac{\pi}{6} < x < \frac{11\pi}{6}$



$S = \left]\frac{\pi}{6}, \frac{11\pi}{6}\right[$

5) $\tan(x) > 1$ sur $\mathbb{R}$



Sur $\left]-\frac{\pi}{2}, \frac{\pi}{2}\right[$, les sol$^{\circ}$ sont les éléments de $\left]\frac{\pi}{4}, \frac{\pi}{2}\right[$

Donc sur $\mathbb{R}$, l'ens. des solutions est $\displaystyle\bigcup_{k \in \mathbb{Z}} \left]\frac{\pi}{4} + k\pi, \frac{\pi}{2} + k\pi\right[$