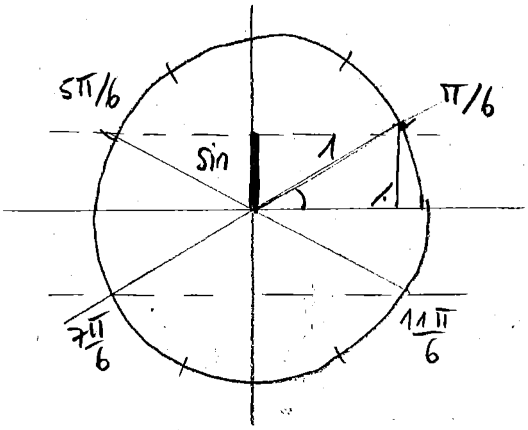
Act 7)

$x = \frac{\pi}{6}$



cf 1re : $\sin(30°) = \frac{1}{2}$

donc $\sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$

Par symétrie : $\sin\left(\frac{5\pi}{6}\right) = \frac{1}{2}$

$\sin\left(\frac{7\pi}{6}\right) = \sin\left(\frac{11\pi}{6}\right) = -1$

$x = \frac{\pi}{4}$: idem $\sin\left(\frac{\pi}{4}\right) = \sin\left(\frac{3\pi}{4}\right) = \frac{\sqrt{2}}{2}$

$\sin\left(\frac{5\pi}{4}\right) = \sin\left(\frac{7\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

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

$\sin\left(\frac{4\pi}{3}\right) = \sin\left(\frac{5\pi}{3}\right) = -\frac{\sqrt{3}}{2}$

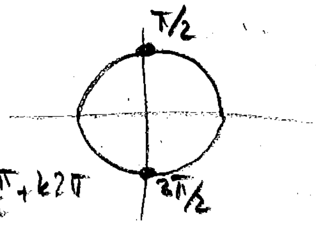
$\sin(0) = \sin(\pi) = 0$

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

Même raisonnement pour cos et tan [cf tables]

Act 12

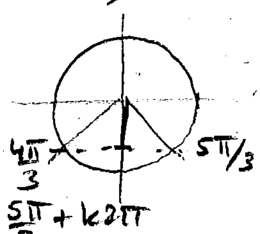
1 a) $\cos(x) = 0$



$x = \frac{\pi}{2} + k2\pi$ ou $x = \frac{3\pi}{2} + k2\pi$

$S_{\mathbb{R}} = \left\{ \frac{\pi}{2} + k2\pi \mid k \in \mathbb{Z} \right\}$ $S_{[0;2\pi[} = \left\{ \frac{\pi}{2} ; \frac{3\pi}{2} \right\}$

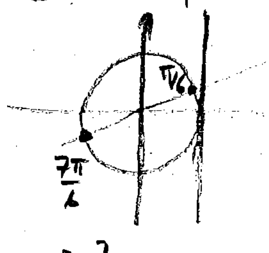
b) $\sin(x) = -\frac{\sqrt{3}}{2}$



$x = \frac{4\pi}{3} + k2\pi$ ou $x = \frac{5\pi}{3} + k2\pi$

$S_{\mathbb{R}} = \left\{ \frac{4\pi}{3} + k2\pi ; \frac{5\pi}{3} + k2\pi \mid k \in \mathbb{Z} \right\}$ $S_{[0;2\pi[} = \left\{ \frac{4\pi}{3} ; \frac{5\pi}{3} \right\}$

c) $\tan(x) = \frac{\sqrt{3}}{3}$

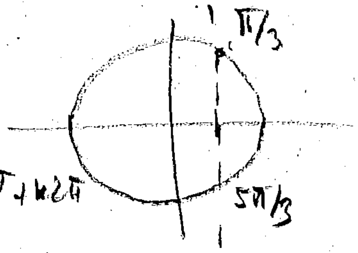


$x = \frac{\pi}{6} + k\pi$

$S_{\mathbb{R}} = \left\{ \frac{\pi}{6} + k\pi \mid k \in \mathbb{Z} \right\}$ $S_{[0;2\pi[} = \left\{ \frac{\pi}{6} ; \frac{7\pi}{6} \right\}$

Act 12]

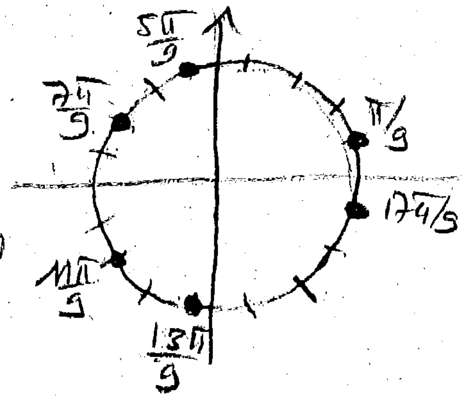
c) $\cos(3x) = \frac{1}{2}$



$3x = \frac{\pi}{3} + k2\pi$ ou $3x = \frac{5\pi}{3} + k2\pi$

$x = \frac{\pi}{9} + k\frac{2\pi}{3}$ | $x = \frac{5\pi}{9} + k\frac{2\pi}{3}$

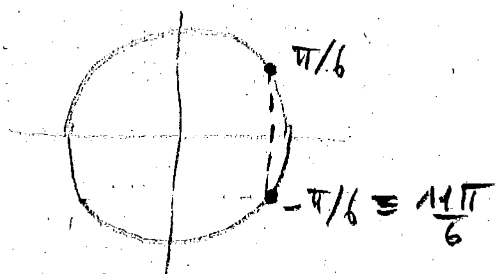
$\left(= \frac{\pi}{9} + k\frac{6\pi}{9}\right)$ $\left(= \frac{5\pi}{9} + k\frac{6\pi}{9}\right)$



$S_{\mathbb{R}} = \left\{ \frac{\pi}{9} + k\frac{2\pi}{3} ; \frac{5\pi}{9} + k\frac{2\pi}{3} \mid k \in \mathbb{Z} \right\}$

$S_{[0;2\pi[} = \left\{ \frac{\pi}{9}, \frac{5\pi}{9}, \frac{7\pi}{9}, \frac{11\pi}{9}, \frac{13\pi}{9}, \frac{17\pi}{9} \right\}$

d) $\cos\left(x - \frac{3\pi}{4}\right) = \frac{\sqrt{3}}{2}$



$x - \frac{3\pi}{4} = \frac{\pi}{6} + k2\pi$ ou $x - \frac{3\pi}{4} = \frac{11\pi}{6} + k2\pi$

$x = \frac{3\pi}{4} + \frac{\pi}{6} + k2\pi$ | $x = \frac{3\pi}{4} + \frac{11\pi}{6} + k2\pi$

$x = \frac{11\pi}{12} + k2\pi$ | $x = \frac{31\pi}{12} + k2\pi$

$S_{\mathbb{R}} = \left\{ \frac{11\pi}{12} + k2\pi ; \frac{31\pi}{12} + k2\pi \mid k \in \mathbb{Z} \right\}$

⚠ $\frac{31\pi}{12} \notin [0;2\pi[$: $\frac{31\pi}{12} + k2\pi$

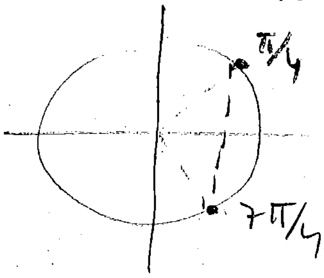
$= \frac{31\pi}{12} + k\frac{24\pi}{12}$

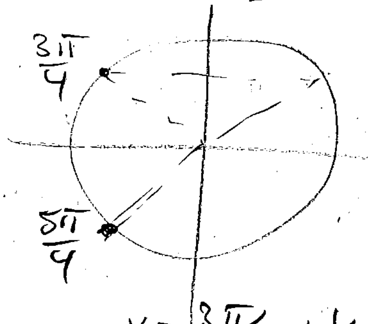
pour $k = -1$: $\frac{31\pi}{12} - \frac{24\pi}{12} = \frac{7\pi}{12} \in [0;2\pi[$

d'où $S_{[0;2\pi[} = \left\{ \frac{7\pi}{12}, \frac{11\pi}{12} \right\}$

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

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





$x = \frac{\pi}{4} + k2\pi$ ou $x = \frac{7\pi}{4} + k2\pi$

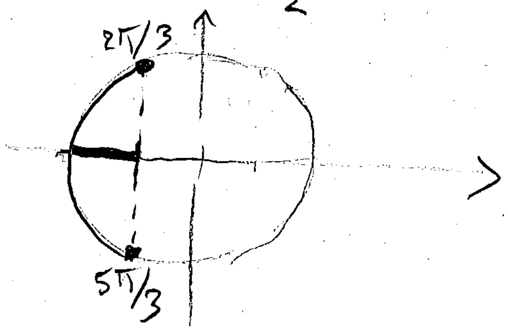
$x = 3\pi/4 + k2\pi$ ou $x = 5\pi/4 + k2\pi$

$S_{\mathbb{R}} = \left\{ \frac{\pi}{4} + k\cdot\frac{\pi}{2} \mid k \in \mathbb{Z} \right\}$

$S_{[0;2\pi[} = \left\{ \frac{\pi}{4}; \frac{3\pi}{4}; \frac{5\pi}{4}; \frac{7\pi}{4} \right\}$

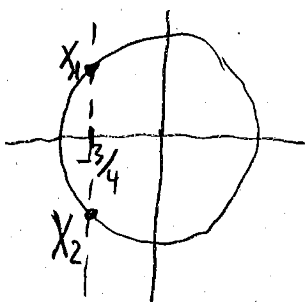
Act 12

13 c) $\cos(x) \leq -\frac{1}{2}$



$S = \left[\frac{2\pi}{3}; \frac{5\pi}{3} \right]$

14



pour $\cos(x) = -\frac{3}{4}$

$\to$ puis $\pi < x < \frac{3\pi}{2}$; donc $\sin(x) < 0$

enfin, on sait $\sin^2(x) + \cos^2(x) = 1$

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

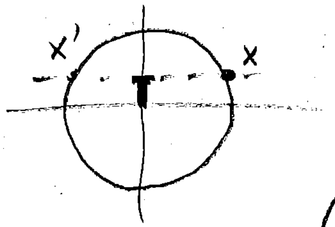
$= 1 - \left(-\frac{3}{4}\right)^2 = 1 - \frac{9}{16} = \frac{7}{16}$

$\Rightarrow \sin(x) = \pm\sqrt{\frac{7}{16}} = \pm\frac{\sqrt{7}}{4}$

comme $\sin(x) < 0$, on a : $\sin(x) = -\frac{\sqrt{7}}{4}$

(Act 12 suite)

$\boxed{2}$ a) $\sin(x) = 0,21705$

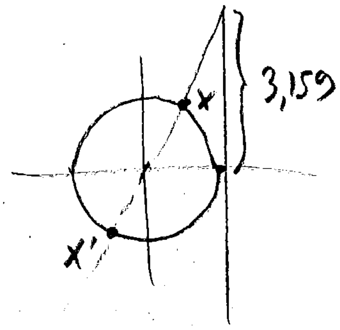


calc : $x = \sin^{-1}(0,21705) \cong 12,54°$

2e solution : $x' = 180 - x \cong 167,46°$

(ou en radians : $x \cong 0,22$ [rad]
$x' \cong 2,92$ [rad])

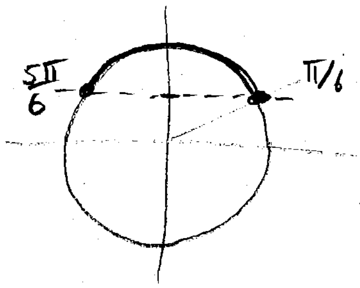
b) $\tan(x) = 3,159$



calc : $x = \tan^{-1}(3,159) \cong 1,26$ [rad]
$\cong 72,43°$

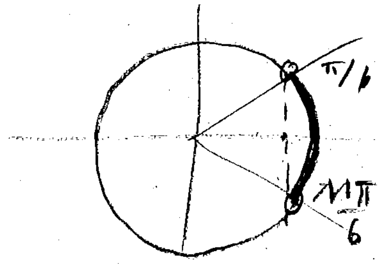
$x' = 180 + x \cong 252,43°$

$\boxed{3}$ a) $\sin(x) \geq \frac{1}{2}$



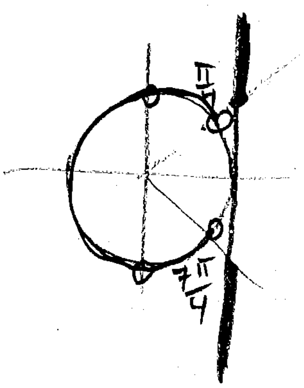
$S = \left[\frac{\pi}{6} ; \frac{5\pi}{6}\right]$

b) $2\cos(x) > \sqrt{3}$
$\Leftrightarrow \cos(x) > \frac{\sqrt{3}}{2}$



$S = \left[0 ; \frac{\pi}{6}\right[\cup \left]\frac{11}{6}\pi ; 2\pi\right[$

d) $\tan^2(x) > 1$
$\Leftrightarrow \tan(x) > 1$ ou $\tan(x) < -1$



$S = \left]\frac{\pi}{4} ; \frac{7\pi}{4}\right[\setminus \left\{\frac{\pi}{2} ; \frac{3\pi}{2}\right\}$

$= \left]-\frac{\pi}{4} ; \frac{\pi}{2}\right[\cup \left]\frac{\pi}{2} ; \frac{3\pi}{2}\right[\cup \left]\frac{3\pi}{2} ; \frac{7\pi}{4}\right[$