Resolutions d'équations plus complexes

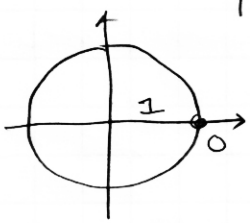
#1

$\cos^2 x + \cos x - 2 = 0$

FACTORISONS directement car c'est simple

$(\cos x - 1)(\cos x + 2) = 0$

$\cos x - 1 = 0$	$\cos x + 2 = 0$
$\cos x = 1$	$\cos x = -2$
	$\emptyset$



$x = 0 + 2\pi n \quad n \in \mathbb{Z}$

#2 $2\sin^2 x - 3\cos x - 3 = 0$

Changeons tout en $\cos x$ grâce à $\sin^2 x + \cos^2 x = 1$ donc $\sin^2 x = 1 - \cos^2 x$

$2(1 - \cos^2 x) - 3\cos x - 3 = 0$

$2 - 2\cos^2 x - 3\cos x - 3 = 0$

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

$-2\cos^2 x - \cos x - 2\cos x - 1 = 0$ ← Factorisons par la méthode Somme-Produit

P: 2

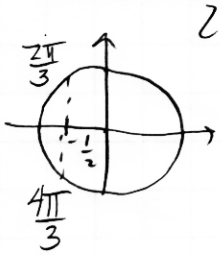
S: -3

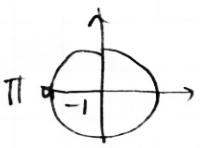
$\boxed{-1}$ $\boxed{-2}$

$-\cos x(2\cos x + 1) - 1(2\cos x + 1) = 0$

$(2\cos x + 1)(-\cos x - 1) = 0$

$2\cos x + 1 = 0$	$-\cos x - 1 = 0$
$\cos x = -\frac{1}{2}$	$\cos x = -1$





$x = \pi + 2\pi n$

$x = \frac{2\pi}{3} + 2\pi n$

$x = \frac{4\pi}{3} + 2\pi n$

$n \in \mathbb{Z}$

#3 $2\sin^2 x = 9\cos x - 3$

$2\sin^2 x - 9\cos x + 3 = 0$

$2(1-\cos^2 x) - 9\cos x + 3 = 0$ car $\sin^2 x = 1 - \cos^2 x$

$2 - 2\cos^2 x - 9\cos x + 3 = 0$

$-2\cos^2 x - 9\cos x + 5 = 0$

$-2\cos^2 x + 1\cos x - 10\cos x + 5 = 0$

$-\cos x\,(2\cos x - 1) - 5(2\cos x - 1) = 0$

Méthode S-P pour factoriser.

P : -10

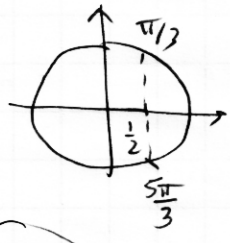
S : -9

$\boxed{1}$ $\boxed{-10}$

$(2\cos x - 1)(-\cos x - 5) = 0$

$2\cos x - 1 = 0$

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



$-\cos x - 5 = 0$

$\cos x = -5$

$\emptyset$

$x = \frac{\pi}{3} + 2\pi n$

$n \in \mathbb{Z}$

$x = \frac{5\pi}{3} + 2\pi n$

#4 $2\cos^2 x - 3\sin x = 3$

$2\cos^2 x - 3\sin x - 3 = 0$

$2(1-\sin^2 x) - 3\sin x - 3 = 0$ car $\cos^2 x = 1 - \sin^2 x$

$2 - 2\sin^2 x - 3\sin x - 3 = 0$

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

$-2\sin^2 x - \sin x - 2\sin x - 1 = 0$

$-\sin x(2\sin x + 1) - 1(2\sin x + 1) = 0$

Factorisons par la méthode S-P.

P : 2

S : -3

$\boxed{-1}$ $\boxed{-2}$

$(2\sin x + 1)(-\sin x - 1) = 0$

$2\sin x + 1 = 0$

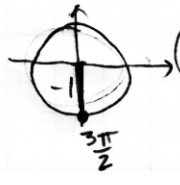
$\sin x = -\frac{1}{2}$

$x = \frac{7\pi}{6} + 2\pi n$

$x = \frac{11\pi}{6} + 2\pi n$

$-\sin x - 1 = 0$

$\sin x = -1$



$x = \frac{3\pi}{2} + 2\pi n$

$n \in \mathbb{Z}$

#5 $4\sin x = 3\csc x$

$4\sin x \cdot \sin x = \frac{3}{\sin x} \cdot \sin x$ car $\csc x = \frac{1}{\sin x}$

$4\sin^2 x = 3$

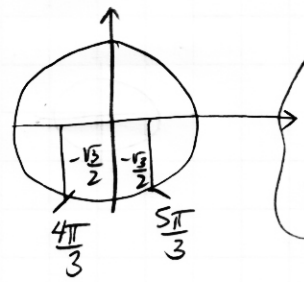
$\sin^2 x = \frac{3}{4}$

$\sin x = \pm\sqrt{\frac{3}{4}}$

$\sin x = \pm\frac{\sqrt{3}}{2}$ donc $\sin x = -\frac{\sqrt{3}}{2}$

ou

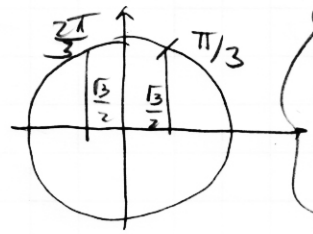
$\sin x = -\frac{\sqrt{3}}{2}$



$x = \frac{4\pi}{3} + 2\pi n$

$n \in \mathbb{Z}$

$x = \frac{5\pi}{3} + 2\pi n$



$x = \frac{\pi}{3} + 2\pi n$

$n \in \mathbb{Z}$

$x = \frac{2\pi}{3} + 2\pi n$