4.3.5

I

a) $4\cos^2 t - 4\cos t - 3 = 0$

$(2\cos t - 3)(2\cos t + 1) = 0$

↓ ① $2\cos t = 3$

$\cos t = \frac{3}{2}$ impossible

↘ ② $\cos t = -\frac{1}{2}$

② $\cos t = -\frac{1}{2} \Rightarrow$ TI $t = 120°$

$t = 120° + K\,360°$ ou $t = -120° + K \cdot 360°$

b) $2\sin^2 x - 3\sin x + 1 = 0$

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

① $\sin x = \frac{1}{2} \rightarrow$ TI $x = 30°$

$x = 30° + K \cdot 360°$ ou $x = 150° + K \cdot 360°$

② $\sin x = 1 \Rightarrow$ TI $x = 90°$

$x = 90° + K \cdot 360°$

Finalement

$x = 30° + K \cdot 360°$, $x = 90° + K \cdot 360°$, $x = 150° + K \cdot 360°$

II
4.3.5

c) $3\sin^2 z + 8\cos z + 1 = 0$

$3(1-\cos^2 z) + 8\cos z + 1 = 0$

$-3\cos^2 z + 8\cos z + 4 = 0$

$3\cos^2 z - 8\cos z - 4 = 0$

Posons $\cos z = y$

$3y^2 - 8y - 4 = 0$

$\Delta = 64 - 4\cdot 3\cdot(-4) = 64 + 48 = 112 = 16\cdot 7$

$y = \frac{8 \pm 4\sqrt{7}}{6} \cong$ $3.09 \Rightarrow \cos z \cong 3.09$ impossible

$-0.43050 \Rightarrow \cos z \cong -0.4 \Rightarrow$ TI $z = 115,5°$

$z = \pm 115,5° + k\cdot 360°$

d) $3\sin^2 t + \cos^2 t - 2 = 0$

$3\sin^2 t + (1-\sin^2 t) - 2 = 0$

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

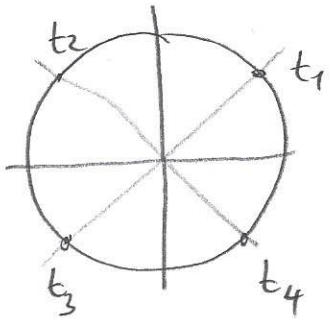
$\sin^2 t - \frac{1}{2} = 0 \Rightarrow (\sin t - \sqrt{\tfrac{1}{2}})(\sin t + \sqrt{\tfrac{1}{2}}) = 0$

1) $\sin t = \frac{\sqrt{2}}{2} \Rightarrow$ Form $t = 45°$

$\Rightarrow t_1 = 45° + k\cdot 360°$ ou $t_2 = 135° + k\cdot 360°$

2) $\sin t = -\frac{\sqrt{2}}{2} \Rightarrow$ TI $t = -45°$

$\Rightarrow t_4 = -45° + k\cdot 360°$ ou $t_3 = 225° + k\cdot 360°$



Finalement, la solution s'écrit

$$t = 45° + k \cdot 90°$$

e) $6\cos^2 x - 5\sin x = 0$

$6 - 6\sin^2 x - 5\sin x = 0$

$6\sin^2 x + 5\sin x - 6 = 0$

$\Delta = 25 + 144 = 169$

$\Rightarrow \sin x = \dfrac{-5 \pm 13}{12} =$ $-18/12$ impossible ; $8/12 = 2/3 \Rightarrow$ TI $x \cong 41,81°$

$x \cong 41,81° + k \cdot 360°$ ou $x \cong 138,19° + k \cdot 360°$

f) $\cos x = \tan x$

$\cos x = \frac{\sin(x)}{\cos(x)}$ avec $x \neq k\pi$

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

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

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

$\Delta = \sqrt{5}$

$\sin x = \frac{-1 \pm \sqrt{5}}{2} \simeq$ $-1{,}61$ impossible ; $0{,}61803 \Rightarrow$ TI $x = 38{,}17°$

$x \simeq 38{,}17° + k \cdot 360°$ ou $x \simeq 141{,}83° + k \cdot 360°$

g) $8\cos^2 t + 5\sin t - 1 = 0$

$8 - 8\sin^2 t + 5\sin t - 1 = 0$

$8\sin^2 t - 5\sin t - 7 = 0$

$\Delta = 25 + 224 = 249$

$t = \frac{5 \pm \sqrt{249}}{16} \simeq$ $1{,}3$ impossible ; $-0{,}67373 \Rightarrow$ TI $t = -42{,}36°$

$t = -42{,}36° + k \cdot 360°$ ou $t = 222{,}36° + k \cdot 360°$

h) $\tan^4 t - 4\tan^2 t + 3 = 0$

$(\tan^2 t - 3)(\tan^2 t - 1) = 0$

① $\tan^2 t = 3$

①.1 $\tan t = \sqrt{3} \Rightarrow t_1 = 60° + k \cdot 180°$

①.2 $\tan t = -\sqrt{3} \Rightarrow t_2 = -60° + k \cdot 180°$

② $\tan^2 t = 1$

②.1 $\tan t = 1 \Rightarrow t_3 = 45° + k \cdot 180°$

②.2 $\tan t = -1 \Rightarrow t_4 = -45° + k \cdot 180°$