(4)

b) $\sin(45^\circ-\alpha)+\sqrt{2}\sin\alpha=0 \to \sin45^\circ\cos\alpha-\cos45^\circ\sin\alpha+\sqrt{2}\sin\alpha=0$

$\to \frac{\sqrt{2}}{2}\cos\alpha-\frac{\sqrt{2}}{2}\sin\alpha+\sqrt{2}\sin\alpha=0 \to \frac{\sqrt{2}}{2}\cos\alpha-\frac{\sqrt{2}}{2}\sin\alpha=0 \xrightarrow{\cdot 2}$

$\sqrt{2}\cos\alpha-\sqrt{2}\sin\alpha=0 \to \sqrt{2}\cos\alpha=\sqrt{2}\sin\alpha \to \frac{\sqrt{2}}{\sqrt{2}}=\frac{\sin\alpha}{\cos\alpha} \to$

$\tan\alpha=1 \Rightarrow \alpha=\arctan 1=45^\circ \Rightarrow \begin{cases}\alpha_1=45^\circ+K360^\circ\\ \alpha_2=225^\circ+K360^\circ\end{cases}$ $K\in\mathbb{Z}$

$180^\circ+45^\circ=225^\circ$

c) $2\cos x=3\tan x \to 2\cos x=3\frac{\sin x}{\cos x} \to 2\cos^2 x=3\sin x \to 2(1-\sin^2 x)=3\sin x$

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

$$\sin x=\frac{-(-3)\pm\sqrt{(-3)^2-4\cdot(-2)\cdot 2}}{2\cdot(-2)}=\frac{3\pm\sqrt{25}}{-4}=\frac{3\pm 5}{-4}$$

$\sin\alpha=\frac{-2}{-4}=\frac{1}{2}$ (1)

$\sin\alpha=-2$ ✗ Solución pues $-1\le\sin\alpha\le 1$

CASO 1 $\sin\alpha=\frac{1}{2} \Rightarrow \alpha=\arcsin\frac{1}{2}=30^\circ \Rightarrow \begin{cases}\alpha_1=30^\circ+K360^\circ\\ \alpha_2=150^\circ+K360^\circ\end{cases}$ $K\in\mathbb{Z}$

$180^\circ-30^\circ=150^\circ$

d) $4\cos(2\alpha)+3\cos\alpha=1 \to 4(\cos^2\alpha-\sin^2\alpha)+3\cos\alpha=1 \to 4\cos^2\alpha-4\sin^2\alpha+3\cos\alpha=1$

$\to 4\cos^2\alpha-4(1-\cos^2\alpha)+3\cos\alpha=1 \to 4\cos^2\alpha-4+4\cos^2\alpha+3\cos\alpha-1=0$

$\to 8\cos^2\alpha+3\cos\alpha-5=0$

$$\cos\alpha=\frac{-3\pm\sqrt{3^2-4\cdot 8\cdot(-5)}}{2\cdot 8}=\frac{-3\pm\sqrt{169}}{16}=\frac{-3\pm 13}{16}$$

$\cos\alpha=-1$ (1)

$\cos\alpha=\frac{5}{8}$ (2)

CASO 1 $\cos\alpha=-1 \Rightarrow \alpha=\arccos(-1)=180^\circ \to \begin{cases}\alpha_1=180^\circ+K360^\circ\\ \alpha_2=180^\circ+K360^\circ\end{cases}$

$360^\circ-180^\circ=180^\circ$

CASO 2 $\cos\alpha=\frac{5}{8} \Rightarrow \alpha=\arccos\frac{5}{8}\simeq 51^\circ \Rightarrow \begin{cases}\alpha_1=51^\circ+K360^\circ\\ \alpha_2=309^\circ+K360^\circ\end{cases}$

$360^\circ-51^\circ=309^\circ$

SOLUCIONES $\alpha_1=51^\circ+K360^\circ$
$\alpha_2=180^\circ+K360^\circ$
$\alpha_3=309+K360^\circ$ $K\in\mathbb{Z}$