4.3.8

a) $\sin(2t) = \tan(t)$

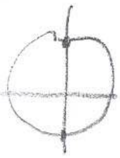
$2\sin(t)\cos(t) = \tan(t)$

$2\tan(t)\cos^2(t) - \tan(t) = 0$

$\tan(t)\left[\underbrace{2\cos^2(t) - 1}_{\cos(2t)}\right] = 0$

1°) $\tan(t) = 0 \Rightarrow t = k \cdot 180°$

2°) $\cos(2t) = 0 \Rightarrow 2t = \pm 90° + k \cdot 360°$



$t = \pm 45° + k \cdot 180°$

b) $\cos(2x) + 2\sin(x)\cos(x) = 0$

$\cos(2x) + \sin(2x) = 0$

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

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

$\cos(2x) = \cos\left(\frac{\pi}{2} + 2x\right)$

1°) $2x = \pm\left(2x + \frac{\pi}{2}\right) + 2k\pi$

$4x = -\frac{\pi}{2} + 2k\pi \Rightarrow x = \frac{-\pi}{8} + k\frac{\pi}{2}$

$x = -22{,}5° + k \cdot 90°$

c) $\sin(x) \cdot \cos\left(2x + \frac{\pi}{3}\right) = \sin^2(x)$

1°) $\sin(x) = 0 \Rightarrow x = k\pi$

2°) $\cos\left(2x + \frac{\pi}{3}\right) = \sin(x)$

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

(i) $2x + \frac{\pi}{3} = \frac{\pi}{2} - x + 2k\pi$

$3x = \frac{\pi}{6} + 2k\pi \Rightarrow x = \frac{\pi}{18} + k\frac{2\pi}{3}$

(ii) $2x + \frac{\pi}{3} = -\frac{\pi}{2} + x + 2k\pi$

$x = -\frac{5\pi}{6} + 2k\pi$

d) $1 + \sin(x) = \cos(2x)$

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

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

$$2\sin^2(x) + \sin(x) = 0$$

$$\sin(x)\left[2\sin(x) + 1\right] = 0$$

1º) $\sin(x) = 0 \Rightarrow x = k.\pi$

2º) $\sin(x) = -\frac{1}{2} \Rightarrow x = -\frac{\pi}{6}$

$$\begin{cases} x = -\frac{\pi}{6} + 2k\pi \\ \text{ou} \\ x = \frac{7\pi}{6} + 2k\pi \end{cases}$$