4.3.7

a) $\sin(t) = 3\cos(t) \quad | \div \cos(t) \qquad \cos(t) \neq 0$

$\tan(t) = 3$

$t \approx 71{,}57° + k \cdot 180°$

b) $\sin(\alpha)\left[\cos(\alpha) - 2\sin(\alpha)\right] = 0$

1°) $\sin(\alpha) = 0 \Rightarrow \alpha = k \cdot 180°$

2°) $\cos(\alpha) = 2\sin(\alpha) \quad | \div \cos(\alpha) \quad \cos(\alpha) \neq 0$

$\tan(\alpha) = \frac{1}{2} \Rightarrow \alpha = 26{,}57° + k \cdot 180°$

c) $(\sin(t) - \cos(t))(\sin(t) - 3\cos(t)) = 0$

1°) $\sin(t) = \cos(t)$

$\sin(t) = \sin(\frac{\pi}{2} - t) \Rightarrow t = \frac{\pi}{2} - t + 2k\pi$

$t = 45° + k \cdot 180°$

2°) $\sin(t) = 3\cos(t)$

$t \approx 71{,}57° + k \cdot 180°$ (s. a)

4.3.7

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

$\cos^2(x) + \sin^2(x) - 2\sin(x)\cos(x) - 2\cos^2(x)$

$\sin^2(x) - 2\sin(x)\cos(x) - \cos^2(x) = 0 \quad \left| \div \cos^2(x), \cos(x) \neq 0 \right.$

$\tan^2(x) - 2\tan(x) - 1 = 0$

$\Delta = 4 + 4 = 8$

$\tan(x) = \frac{2 \pm 2\sqrt{2}}{2} = 1 \pm \sqrt{2}$

1°) $\tan(x) = 1 - \sqrt{2} \Rightarrow x \approx -22{,}5° + k \cdot 180°$

2°) $\tan(x) = 1 + \sqrt{2} \Rightarrow x \approx 67{,}5° + k \cdot 180°$

e) $\cos^2(x) + 4\sin(x)\cos(x) - 5\sin^2(x) = 0 \quad \left| \div \cos^2(x), \cos(x) \neq 0 \right.$

$1 + 4\tan(x) - 5\tan^2(x) = 0$

$5\tan^2(x) - 4\tan(x) + 1 = 0$

$(5\tan(x) + 1)(\tan(x) - 1) = 0$

1°) $\tan(x) = -\frac{1}{5} \Rightarrow x = -11{,}31° + k \cdot 180°$

2°) $\tan(x) = 1 \Rightarrow x = 45° + k \cdot 180°$

4.37

f) $5\sin^2(2t) + 3\sin(t)\cos(t) - 4 = 0$

$\frac{3}{2}(2\sin(t)\cos(t)) = \frac{3}{2}\sin(2t)$

$5\sin^2(2t) + \frac{3}{2}\sin(2t) - 4 = 0$

$10\sin^2(2t) + 3\sin(2t) - 8 = 0$

$\Delta = 9 + 320 = 329$

$$\sin(2t) = \frac{-3 \pm \sqrt{329}}{2 \cdot 10} \approx \begin{cases} 0{,}75692 \Rightarrow 2t \approx 49{,}19° \\ \text{impossible} \end{cases}$$

$$2t = \begin{cases} 49{,}19° + k \cdot 360° \\ 130{,}81° + k \cdot 360° \end{cases} \Rightarrow t \approx \begin{cases} 24{,}60° + k \cdot 180° \\ 65{,}41° + k \cdot 180° \end{cases}$$