6.7. (★) $\sqrt{3}\cos^2 x - 9\sin x\cos x - 3\sqrt{3}\overset{\cdot 1}{=} 0$ $\qquad 1 = \sin^2 x + \cos^2 x$

$$\sqrt{3}\cos^2 x - 9\sin x\cos x - 3\sqrt{3}\sin^2 x - 3\sqrt{3}\cos^2 x = 0 \quad \Big| : (-1)$$

$$3\sqrt{3}\sin^2 x + 9\sin x\cos x + 2\sqrt{3}\cos^2 x = 0 \quad \Big| : \ \cos^2 x \neq 0 \ (!!!)$$

$$3\sqrt{3}\,\frac{\sin^2 x}{\cos^2 x} + 9\,\frac{\sin x}{\cos x} + 2\sqrt{3} = 0$$

$$3\sqrt{3}\,tg^2 x + 9\,tg\,x + 2\sqrt{3} = 0$$

$$t = tg\,x$$

$$3\sqrt{3}\,t^2 + 9t + 2\sqrt{3} = 0$$

$$D = 9^2 - 4\cdot 3\sqrt{3}\cdot 2\sqrt{3} = 81 - 72 = 9$$

$$t_{1,2} = \frac{-9 \pm 3}{6\sqrt{3}} \Rightarrow \quad t_1 = \frac{-12}{6\sqrt{3}} = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$$

$$t_2 = \frac{-6}{6\sqrt{3}} = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$$

$$tg\,x = -\frac{2\sqrt{3}}{3} \qquad\qquad tg\,x = -\frac{\sqrt{3}}{3}$$

$$x = -arctg\,\frac{2\sqrt{3}}{3} + \pi k,\ k \in \mathbb{Z} \qquad\qquad x = -\frac{\pi}{6} + \pi k,\ k \in \mathbb{Z}$$

$$\boxed{arctg(-x) = -arctg\,x} \qquad \cos x \neq 0 \Leftrightarrow x \neq \frac{\pi}{2} + \pi k,\ k \in \mathbb{Z}$$