1. $2\operatorname{tg} x - 3\operatorname{cotg} x = 1$

$2\operatorname{tg} x - \dfrac{3}{\operatorname{tg} x} = 1$

Uděláme substituci $a = \operatorname{tg} x$

$2a - \dfrac{3}{a} = 1$

$2a^2 - 3 = a$

$2a^2 - a - 3 = 0$

$a_1 = \dfrac{3}{2}$

$a_1 = -1$

Řešení pro $a_1 = \dfrac{3}{2}$

$\operatorname{tg} x = \dfrac{3}{2}$

$x = 56°11' + k \cdot 180°$

Řešení pro $a_2 = -1$

$\operatorname{tg} x = -1$

$x = 45° + k \cdot 180°$

2. $\dfrac{1-\cos 2x + \sin 2x}{1+\cos 2x + \sin 2x} = \dfrac{1-(\cos^2 x - \sin^2 x) + \sin 2x}{1+(\cos^2 x - \sin^2 x) + \sin 2x} =$

$\dfrac{1-[(1-\sin^2 x) - \sin^2 x] + \sin 2x}{1+[(1-\sin^2 x) - \sin^2 x] + \sin 2x} = \dfrac{2\sin^2 x + \sin 2x}{2 - 2\sin^2 x + \sin 2x} =$

$\dfrac{2\sin^2 x + 2\sin x \cos x}{2 - 2\sin^2 x + 2\sin x \cos x} = \dfrac{2\sin x(\sin x + \cos x)}{2(1-\sin^2 x + \sin x \cos x)} =$

$\dfrac{\sin x(\sin x + \cos x)}{1-\sin^2 x + \sin x \cos x} = \dfrac{\sin x(\sin x + \cos x)}{\cos^2 x + \sin x \cos x} = \dfrac{\sin x(\sin x + \cos x)}{\cos x(\cos x + \sin x)} =$

$$\frac{\sin x}{\cos x} = \operatorname{tg} x$$