2.59
5

$$\frac{\tan x + \cot x}{\cot x - \tan x} = 6\cos 2x + 4\sin 2x$$

תחום הגדרה

$x \neq \frac{\pi}{2} + \pi k, \pi k$

$\tan x \neq \cot x$

$x \neq \frac{\pi}{4} + \pi k$

$$\frac{\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}}{\frac{\cos x}{\sin x} - \frac{\sin x}{\cos x}} = 6\cos 2x + 4\sin 2x$$

$$\frac{\frac{\sin^2 x + \cos^2 x}{\sin x \cos x}}{\frac{\cos^2 x - \sin^2 x}{\sin x \cos x}} = 6\cos 2x + 4\sin 2x$$

$$\frac{1}{\cos 2x} = 6\cos 2x + 4\sin 2x$$

$$1 = 6\cos^2 2x + 4\sin 2x \cos 2x$$

~~$1 = 6\cos^2 2x + 2\sin 4x$~~

$2\cos^2 x - 1 = \cos 2x$

$$\cos^2 2x + \sin^2 2x = 6\cos^2 2x + 4\sin 2x \cos 2x$$

$$\sin^2 2x - 4\sin 2x \cos 2x - 5\cos^2 2x = 0 \quad / \cdot \cos^2 2x \neq 0$$

$$\tan^2 2x - 4\tan 2x - 5 = 0$$

$\tan 2x = 5 \rightarrow$ $x = \frac{1}{2}\arctan(5) + \pi k$

$\tan 2x = -1 \rightarrow$ $x = -\frac{\pi}{8} + \frac{\pi k}{2}$