

$$3\cos^2(x) - 2\sqrt{3}\sin(x)\cos(x) - 3\sin^2(x) = 0$$

Solution:

$$3(\cos^2(x) - \sin^2(x)) - 2\sqrt{3}\sin(x)\cos(x) = 0$$

$$3\cos(2x) - \sqrt{3}\sin(2x) = 0$$

$$3\cos(2x) = \sqrt{3}\sin(2x)$$

$$\cos 2x / \sin 2x = \sqrt{3}/3$$

$$\operatorname{ctg} 2x = \sqrt{3}/3$$

$$\sqrt{3}/3 = 1/\sqrt{3} = \pi/3$$

$$\operatorname{ctg} 2x = (\operatorname{ctg}^2(x) - 1)/2\operatorname{ctg}(x), \quad x = \pi n/2, n \in \mathbb{Z}$$

Answer:

$$x = \pi n/2 - \pi/3, n \in \mathbb{Z}$$