

$$\cos 2x + 2\cos x + 7 = 2\sin\left(\frac{7\pi}{2} + x\right) + 4\sin^2\left(\frac{x}{2}\right)$$

$$2\cos^2 x - 1 + 2\cos x + 7 = 2\sin\left(\frac{3\pi}{2} + x\right) + 2(1 - \cos x)$$

$$2\cos^2 x + 2\cos x + 6 = -2\cos x + 2 - 2\cos x$$

$$2\cos^2 x + 6\cos x + 4 = 0, \quad \cos x = t, \quad |t| > 1,$$

$$2t^2 + 6t + 4 = 0, \quad t^2 + 3t + 2 = 0, \quad t = -2; -1$$

$$t = -2 \text{ не подходит. Тогда } \cos x = -1, \quad x = \pi + 2\pi n, \quad n \in \mathbb{Z}$$