

$$2\cos x - \sin 2x = 2 + 2\sin x$$

$$2\cos x(1 - \sin x) = 2(1 + \sin x)$$

$$\cos x(1 - \sin x) - (1 + \sin x) = 0$$

$$\cos x - \sin x - \sin x \cdot \cos x - 1 = 0$$

$$\cos x - \sin x = t$$

$$-\sin x \cos x = (t^2 - 1)/2$$

$$t + (t^2 - 1)/2 - 1 = 0$$

$$t^2 + 2t - 3 = 0$$

$$t_{1,2} = -3, 1$$

$$\cos x - \sin x = 1$$

$$\sin x - \cos x = -1$$

$$\sqrt{2}(\sin x \cdot \sqrt{2}/2 + \cos x \cdot -\sqrt{2}/2) = \sqrt{2}\sin(x - \pi/4)$$

$$\sqrt{2}\sin(x - \pi/4) = -1$$

$$\sin(x - \pi/4) = -\sqrt{2}/2$$

$$x = +\pi/4 - \pi/4 + 2\pi k = 2\pi k$$

$$x = +\pi/4 + 5\pi/4 + 2\pi k = 3\pi/2 + 2\pi k$$

$$\sqrt{2}\sin(x - \pi/4) = 3$$

$$\sin(x - \pi/4) = 3\sqrt{2}/2 \text{ -- больше единицы}$$

$$4\operatorname{tg}^2 x + \operatorname{ctg}^2 x + 6\operatorname{tg} x - 3\operatorname{ctg} x - 8 = 0$$

подсказка замена $2\operatorname{tg} x - \operatorname{ctg} x = t$

$$4\operatorname{tg}^2 x + \operatorname{ctg}^2 x = t^2 + 4$$

$$t^2 + 3t - 4 = 0$$

$$t_{1,2} = -4, 1$$

$$2\operatorname{tg} x - \operatorname{ctg} x = 1$$

$$\operatorname{tg} x = t$$

$$2t - 1/t = 1$$

$$2t^2 - t - 1 = 0$$

$$D = 1 + 8 = 9$$

$$t = (1 + 3)/4 = 1$$

$$t = (1 - 3)/4 = -\frac{1}{2}$$

$$\operatorname{tg} x = 1$$

$$x = \pi/4 + \pi k$$

$$\operatorname{tg} x = -\frac{1}{2}$$

$$x = \operatorname{arctg} -\frac{1}{2} + \pi k$$

$$2\operatorname{tg} x - \operatorname{ctg} x = -4$$

$$2t^2 + 4t - 1 = 0$$

$$D/4 = 4 + 2 = 6$$

$$t_{1,2} = (-2 \pm \sqrt{6})/2$$

$$\operatorname{tg} x = (-2 \pm \sqrt{6})/2$$

$$x = \operatorname{arctg}(-2 + \sqrt{6})/2 + \pi k$$

$$x = \operatorname{arctg}(-2 - \sqrt{6})/2 + \pi k$$