

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

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

$$2\cos x - 2\cos x \sin x - 2 - 2\sin x = 0$$

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

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

$$\cos x - \sin x = t^2$$

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

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

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

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

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

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

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

$$t_1 = -3$$

$$t_2 = 1$$

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

$$\cos x - \sin x = \sqrt{2}[\cos x \cdot 1/\sqrt{2} - \sin x \cdot 1/\sqrt{2}] = \sqrt{2}[\cos x \sin P/4 - \sin x \cos P/4] =$$

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

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

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

$$x - P/4 = P/4 + 2Pk$$

$$x = P/2 + 2Pk$$

$$x = 3P/4 + P/4 + 2Pk$$

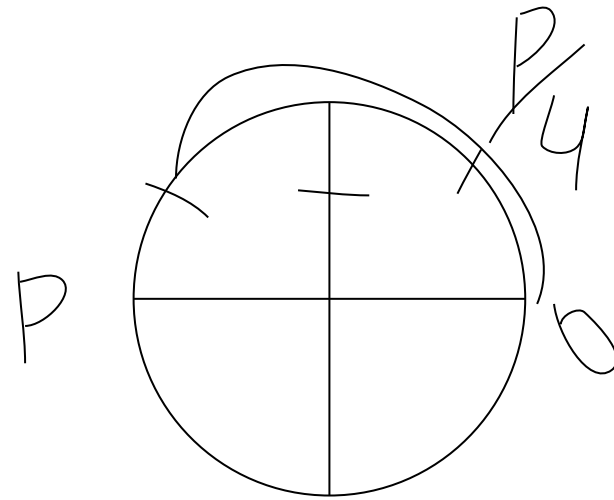
$$x = P + 2Pk$$

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

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

Корней нет

Ответ: $P/2 + 2Pk$; $P + 2Pk$



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

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

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

$$(2\operatorname{tg} x - \operatorname{ctg} x)^2 = t^2$$

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

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

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

$$t^2 + 4 + 3t - 8 = 0$$

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

$$t_1 = -4$$

$$t_2 = 1$$

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

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

$$\operatorname{ctg} x = 1/y$$

$$2y - 1/y = 1$$

$$[2y^2 - y - 1]/y = 0$$

$$2y^2 - y - 1 = 0 \quad y \neq 0$$

$$D = 1 + 8 = 9$$

$$y_1 = (1 + 3)/4 = 1$$

$$y_2 = (1 - 3)/4 = -1/2$$

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

$$x = P/4 + Pk$$

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

$$x = \operatorname{arctg}(-1/2) + Pk$$

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

$$[2y^2 + 4y - 1]/y = 0$$

$$2y^2 + 4y - 1 = 0 \quad y \neq 0$$

$$D = 16 + 8 = 24$$

$$y_1 = (-4 + \sqrt{24})/4 = (-2 + \sqrt{6})/2$$

$$y_2 = (-4 - \sqrt{24})/4 = (-2 - \sqrt{6})/2$$

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

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

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

Ответ: $P/4 + Pk$

$$\operatorname{arctg}(-1/2) + Pk$$

$$\operatorname{arctg}((-2 - \sqrt{6})/2) + Pk$$

$$\operatorname{arctg}((-2 + \sqrt{6})/2) + Pk$$