

$$\sin 2x + 2\sin x = 1 + \cos x$$

$$2\sin x \cdot \cos x + 2\sin x - 1 - \cos x = 0$$

$$(2\sin x \cdot \cos x + 2\sin x) - (1 + \cos x) = 0$$

$$2\sin x(\cos x + 1) - (1 + \cos x) = 0$$

$$(\cos x + 1)(2\sin x - 1) = 0$$

$$\cos x = -1 \quad 2\sin x = 1$$

$$x = \pi + 2\pi k \quad \sin x = \frac{1}{2}$$

$$x = \frac{\pi}{6} + 2\pi k$$

$$x = \pi - \frac{\pi}{6} + 2\pi k = \frac{5\pi}{6} + 2\pi k$$

найти решения на промежутке  $[-4; -3]$

$$-4 \leq \pi + 2\pi k \leq -3 - \pi$$

$$-4 - \pi \leq 2\pi k \leq -3 - \pi \quad | : 2\pi$$

$$-\frac{4 + \pi}{2\pi} \leq k \leq -\frac{3 + \pi}{2\pi}$$

$$-4 \leq \frac{\pi}{6} + 2\pi k \leq -3$$

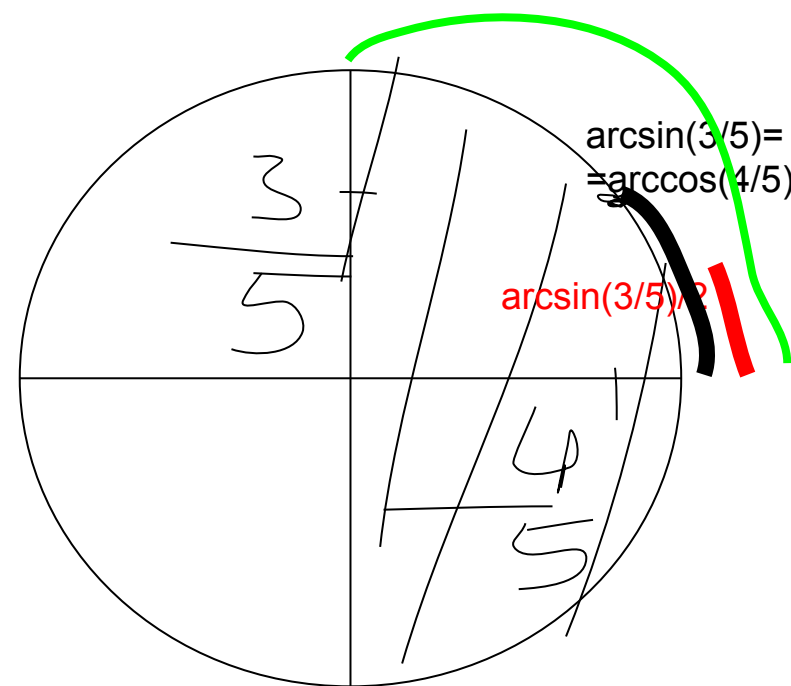
$$-\frac{4 + \pi/6}{2\pi} \leq k \leq -\frac{3 + \pi/6}{2\pi}$$

$$-\frac{4 + 5\pi/6}{2\pi} \leq k \leq -\frac{3 + 5\pi/6}{2\pi}$$

$$k = -1$$

$$x = -\frac{7\pi}{6}$$

Ответ:  $-\frac{7\pi}{6}$



$$\sin x - \sin y = 2\sin\left(\frac{x-y}{2}\right)\cos\left(\frac{x+y}{2}\right)$$

$$3\cos x + 4\sin x = 5\sin 3x$$

найти решения на промежутке  $[0; \pi/2]$

$$3\cos x + 4\sin x - 5\sin 3x = 0$$

$$\sqrt{9+16}(\cos x \cdot \frac{3}{\sqrt{25}} + \sin x \cdot \frac{4}{\sqrt{25}}) = 5(\cos x \cdot \frac{3}{5} + \sin x \cdot \frac{4}{5}) = \\ = 5(\cos x \cdot \sin t + \sin x \cdot \cos t) = 5\sin(x + \arcsin(3/5))$$

$$\sin t = \frac{3}{5}$$

$$\cos t = \frac{4}{5}$$

$$t = \arcsin(3/5)$$

$$5\sin(x + \arcsin(3/5)) - 5\sin 3x = 0$$

$$\sin(x + \arcsin(3/5)) - \sin 3x = 0$$

$$2\sin\left(\frac{(x + \arcsin(3/5)) - 3x}{2}\right)\cos\left(\frac{(x + \arcsin(3/5)) + 3x}{2}\right) = 0$$

$$\sin\left(\frac{(x + \arcsin(3/5)) - 3x}{2}\right) = 0$$

$$\frac{(x + \arcsin(3/5)) - 3x}{2} = \pi k$$

$$\frac{\arcsin(3/5) - 2x}{2} = \pi k$$

$$\arcsin(3/5) - 2x = 2\pi k$$

$$x = \frac{\arcsin(3/5)}{2} - \pi k \quad \Rightarrow \quad x = \frac{\arcsin(3/5)}{2} \text{ на } [0; \pi/2]$$

$$\cos\left(\frac{(x + \arcsin(3/5)) + 3x}{2}\right) = 0$$

$$\frac{(x + \arcsin(3/5)) + 3x}{2} = \frac{\pi}{2} + \pi k$$

$$\frac{(4x + \arcsin(3/5))}{2} = \frac{\pi}{2} + \pi k$$

$$2x + \frac{\arcsin(3/5)}{2} = \frac{\pi}{2} + \pi k$$

$$2x = \frac{\pi}{2} + \pi k - \frac{\arcsin(3/5)}{2}$$

$$x = \frac{\pi}{4} + \frac{\pi k}{2} - \frac{\arcsin(3/5)}{4} \quad \Rightarrow \quad x = \frac{\pi}{4} - \frac{\arcsin(3/5)}{4} \text{ на } [0; \pi/2]$$

Ответ:  $\frac{\arcsin(3/5)}{2}; \frac{\pi}{4} - \frac{\arcsin(3/5)}{4}$