

21.03.

## Книжка Ломоно

$$1. \sin 73^\circ \cdot \cos 17^\circ + \cos 73^\circ \cdot \sin 17^\circ =$$

$$= \sin (73^\circ + 17^\circ) = 1$$

$$2. \cos 105^\circ = \cos (60^\circ + 45^\circ) = \cos 60^\circ \cdot \cos 45^\circ -$$

$$- \sin 60^\circ \cdot \sin 45^\circ = \frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} =$$

$$= \frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4} = \frac{\sqrt{2} - \sqrt{6}}{4}$$

$$3. \sin \left( \frac{3\pi}{2} - \alpha \right) = \sin \frac{3\pi}{2} \cos \alpha - \sin \alpha \cos \frac{3\pi}{2} =$$

$$= -\cos \alpha$$

Задача 13 ЕГЭ

$$a) 2 \sin \left( x + \frac{\pi}{3} \right) - 2\sqrt{3} \sin^2 x = \sin x - 2\sqrt{3}$$

$$2 \left( \sin x \cdot \frac{1}{2} + \cos x \frac{\sqrt{3}}{2} \right) - 2\sqrt{3} \sin^2 x - \sin x + 2\sqrt{3} = 0$$

$$\cancel{\sin x} + \cos x \sqrt{3} - 2\sqrt{3} \sin^2 x - \cancel{\sin x} + 2\sqrt{3} = 0$$

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

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

$$\cos x - 2 + 2\cos^2 x + 2 = 0$$

$$2\cos^2 x + \cos x - 0 = 0$$

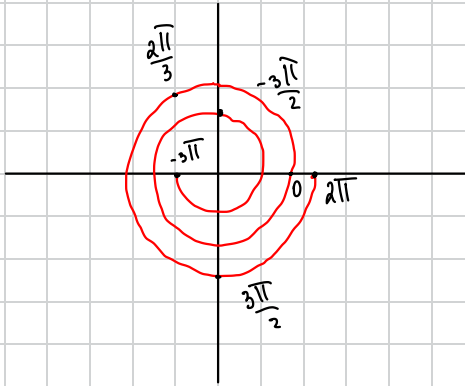
$$\cos x (2\cos x + 1) = 0$$

$$\begin{cases} \cos x = 0 \\ \cos x = -\frac{1}{2} \end{cases}$$

$$x = \frac{\pi}{2} + \pi k, (k \in \mathbb{Z})$$

$$x = \frac{2\pi}{3} + 2\pi k, (k \in \mathbb{Z}); \quad x = \frac{4\pi}{3} + 2\pi k, (k \in \mathbb{Z})$$

$$8) \left[ -3\pi, -\frac{3\pi}{2} \right]$$



$$x_1 = -\frac{2\pi}{3}$$

$$x_2 = -\frac{5\pi}{3}$$

$$x_3 = -\frac{3\pi}{2}$$

Полные выражения из формул косинуса

$$\sin(\alpha + \alpha) = \sin \alpha \cdot \cos \alpha + \sin \alpha \cdot \cos \alpha =$$

$$= \sin 2\alpha = 2 \sin \alpha \cdot \cos \alpha$$

$$\cos(\alpha + \alpha) = \cos \alpha \cos \alpha - \sin \alpha \sin \alpha =$$

$$= \cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha$$

$$\cos 2\alpha = 1 - 2 \sin^2 \alpha$$

$$\cos 2\alpha = 2 \cos^2 \alpha - 1$$

Примеры формул двойного аргумента

$$\begin{aligned} 1. \sin 4x &= \sin(2 \cdot (2x)) = 2 \sin 2x \cdot \cos 2x = \\ &= 4 \sin x \cdot \cos x (\cos^2 x - \sin^2 x) \end{aligned}$$

$$2. \sin 80^\circ = 2 \sin 40^\circ \cdot \cos 40^\circ$$

$$3. \cos \frac{\pi}{18} = \cos^2 \frac{\pi}{36} - \sin^2 \frac{\pi}{36}$$

$$4. \sin \alpha = 2 \sin \frac{\alpha}{2} \cdot \cos \frac{\alpha}{2}$$