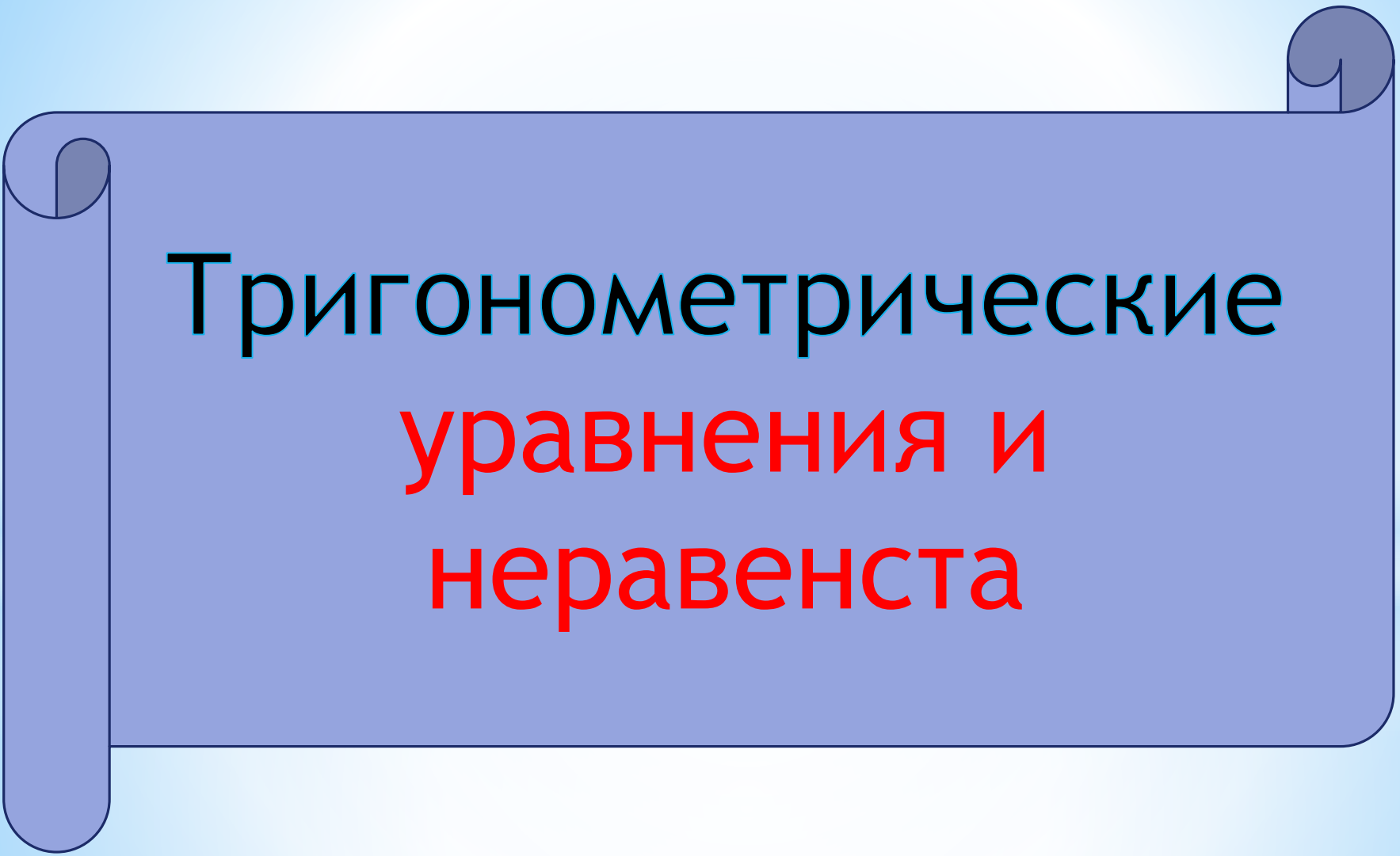


The background of the slide is a light blue gradient. Overlaid on this is a large, light purple rectangular area with rounded corners, which has a dark purple border. This purple area is designed to look like a scroll, with a vertical strip on the left side that has a circular end at the top and bottom, and a small circular tab at the top right corner.

Тригонометрические уравнения и неравенства

Устная разминка

Вычисли и запиши в столбик

ответы в тетради:

1. $\arcsin \frac{\sqrt{3}}{2}$
2. $\arccos \frac{\sqrt{2}}{2}$
3. $\operatorname{arctg} \sqrt{3}$
4. $\operatorname{arctg} \left(\frac{\sqrt{3}}{3} \right)$
5. $\arcsin \left(-\frac{1}{2} \right)$
6. $\arccos (-1)$
7. $\arccos \left(\frac{\sqrt{3}}{2} \right)$

Проверь ответы:

$$\frac{\pi}{3}$$

$$\frac{\pi}{4}$$

$$\frac{\pi}{3}$$

$$\frac{\pi}{6}$$

$$\frac{\pi}{6}$$

$$\pi$$

$$\frac{5\pi}{6}$$

формулы для решения тригонометрических уравнений:

1. $\cos x = a, a \in [-1, 1]$

$x = \pm \arccos a + 2\pi k, k \in \mathbb{Z}$

2. $\cos x = -a, a \in [-1, 1]$

$x = \pm (\pi - \arccos a) + 2\pi k, k \in \mathbb{Z}$

5. $\operatorname{tg} x = a$

$x = \operatorname{arctg} a + \pi k, k \in \mathbb{Z}$

6. $\operatorname{tg} x = -a$

$x = -\operatorname{arctg} a + \pi k, k \in \mathbb{Z}$

3. $\sin x = a, a \in [-1, 1]$

$x = (-1)^k \cdot \arcsin a + \pi k, k \in \mathbb{Z}$

4. $\sin x = -a, a \in [-1, 1]$

$x = (-1)^{k+1} \cdot \arcsin a + \pi k, k \in \mathbb{Z}$

7. $\operatorname{ctg} x = a$

$x = \operatorname{arcctg} a + \pi k, k \in \mathbb{Z}$

8. $\operatorname{ctg} x = -a$

$x = (\pi - \operatorname{arcctg} a) + \pi k, k \in \mathbb{Z}$

Реши уравнения базового уровня

Проверь ответы:

1) $2\cos x \cdot \sqrt{3} = 0$

2) $\sin 2x = -\frac{\sqrt{3}}{2}$

3) $2\cos\left(x \cdot \frac{\pi}{4}\right) = -1$

4) $\operatorname{tg}^2 x - 6\operatorname{tg} x + 5 = 0$

5) $(2\sin x - 1)(\cos x - 1) = 0$

1) $x = \pm \pi/6 + 2\pi k.$

2) $x = (-1)^n \cdot (-\pi/6) + \pi n/2.$

3) $x = \frac{11\pi}{12} + 2\pi k, x = -\frac{5\pi}{12} + 2\pi k.$

4) $x = \pi/4 + \pi k, x = \operatorname{arctg} 5 + \pi k.$

5) $x = (-1)^n \cdot \pi/6 + \pi n, x = 2\pi k.$

Частные случаи

$$\sin x = -1, \quad x = -\frac{\pi}{2} + 2\pi k, \quad k \in \mathbb{Z}$$

$$\sin x = 1, \quad x = \frac{\pi}{2} + 2\pi k, \quad k \in \mathbb{Z}$$

$$\sin x = 0, \quad x = \pi k, \quad k \in \mathbb{Z}$$

$$\cos x = 0, \quad x = \frac{\pi}{2} + \pi k, \quad k \in \mathbb{Z}$$

$$\cos x = 1, \quad x = 2\pi k, \quad k \in \mathbb{Z}$$

$$\cos x = -1, \quad x = \pi + 2\pi k, \quad k \in \mathbb{Z}$$

$$\operatorname{tg} x = 0, \quad x = \pi k, \quad k \in \mathbb{Z}$$

$$\operatorname{tg} x = 1, \quad x = \frac{\pi}{4} + \pi k, \quad k \in \mathbb{Z}$$

$$\operatorname{tg} x = -1, \quad x = -\frac{\pi}{4} + \pi k, \quad k \in \mathbb{Z}$$

$$\operatorname{ctg} x = 0, \quad x = \frac{\pi}{2} + \pi k, \quad k \in \mathbb{Z}$$

$$\operatorname{ctg} x = 1, \quad x = \frac{\pi}{4} + \pi k, \quad k \in \mathbb{Z}$$

$$\operatorname{ctg} x = -1, \quad x = -\frac{\pi}{4} + \pi k, \quad k \in \mathbb{Z}$$

Тригонометрические неравенства

$$\sin x < \alpha$$

$$\begin{aligned} -1 < \alpha \leq 1, & \quad -\pi - \arcsin \alpha + 2\pi k < x < \arcsin \alpha + 2\pi k, k \in \mathbb{Z} \\ \alpha > 1, & \quad x \in \mathbb{R} \\ \alpha \leq -1 & \quad \emptyset \end{aligned}$$

$$\sin x > \alpha$$

$$\begin{aligned} -1 < \alpha \leq 1 & \quad \arcsin \alpha + 2\pi k < x < \pi - \arcsin \alpha + 2\pi k, k \in \mathbb{Z} \\ \alpha < -1 & \quad x \in \mathbb{R} \\ \alpha \geq 1 & \quad \emptyset \end{aligned}$$

$$\cos x < \alpha$$

$$\begin{aligned} -1 < \alpha \leq 1, & \quad \arccos \alpha + 2\pi k < x < 2\pi - \arccos \alpha + 2\pi k, k \in \mathbb{Z} \\ \alpha > 1, & \quad x \in \mathbb{R} \\ \alpha \leq -1 & \quad \emptyset \end{aligned}$$

$$\cos x > \alpha$$

$$\begin{aligned} -1 < \alpha \leq 1, & \quad -\arccos \alpha + 2\pi k < x < \arccos \alpha + 2\pi k, k \in \mathbb{Z} \\ \alpha < -1, & \quad x \in \mathbb{R} \\ \alpha \geq 1 & \quad \emptyset \end{aligned}$$

$$\mathbf{tg} x < \alpha \quad -\frac{\pi}{2} + \pi k < x < \arctg \alpha + \pi k, k \in \mathbb{Z}$$

$$\mathbf{tg} x > \alpha \quad \arctg \alpha + \pi k < x < \frac{\pi}{2} + \pi k, k \in \mathbb{Z}$$

$$\mathbf{ctg} x < \alpha \quad \arctg \alpha + \pi k < x < \pi + \pi k, k \in \mathbb{Z}$$

$$\mathbf{ctg} x > \alpha \quad \pi k < x < \arctg \alpha + \pi k, k \in \mathbb{Z}$$