

1. Решите тригонометрическое неравенство $2\sin^2 x + \sin x \geq 0$.

- 1) $\bigcup_{k \in \mathbb{Z}} [2\pi k; \pi + 2\pi k] \cup \left[\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right)$.
- 2) $\bigcup_{k \in \mathbb{Z}} [2\pi k; \pi + 2\pi k] \cup \left[\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right]$
- 3) $\bigcup_{k \in \mathbb{Z}} [2\pi k; \pi + 2\pi k] \cup \left(\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right]$.
- 4) $\bigcup_{k \in \mathbb{Z}} [2\pi k; \pi + 2\pi k] \cup \left[\frac{7\pi}{6} + \pi k; \frac{11\pi}{6} + \pi k \right)$.
- 5) $\bigcup_{k \in \mathbb{Z}} [2\pi k; \pi + 2\pi k] \cup \left[\frac{7\pi}{6} + 4\pi k; \frac{11\pi}{6} + 4\pi k \right]$.
- 6) $\bigcup_{k \in \mathbb{Z}} [2\pi k; \pi + 2\pi k] \cup \left(\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right)$.

2. Решите тригонометрическое неравенство $3\cos^2 x < 3$.

- 1) $\bigcup_{k \in \mathbb{Z}} \left(\frac{\pi}{6} + 2\pi k; \frac{5\pi}{6} + 2\pi k \right) \cup \left(\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right]$
- 2) $\bigcup_{k \in \mathbb{Z}} \left(\frac{\pi}{6} + 2\pi k; \frac{5\pi}{6} + 2\pi k \right) \cup \left(\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right)$
- 3) $\bigcup_{k \in \mathbb{Z}} \left(\frac{\pi}{6} + 2\pi k; \frac{5\pi}{6} + 2\pi k \right) \cup \left[\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right)$
- 4) $\bigcup_{k \in \mathbb{Z}} \left(\frac{\pi}{6} + 2\pi k; \frac{5\pi}{6} + 2\pi k \right) \cup \left[\frac{7\pi}{6} + 2\pi k; \frac{11\pi}{6} + 2\pi k \right]$
- 5) $\bigcup_{k \in \mathbb{Z}} \left(\frac{\pi}{6} + \pi k; \frac{5\pi}{6} + \pi k \right) \cup \left(\frac{7\pi}{6} + \pi k; \frac{11\pi}{6} + \pi k \right)$
- 6) $\bigcup_{k \in \mathbb{Z}} \left(\frac{\pi}{6} + 2\pi k; \frac{5\pi}{6} + 2\pi k \right) \cup \left(\frac{7\pi}{6} + \pi k; \frac{11\pi}{6} + \pi k \right)$

3. Решите тригонометрическое неравенство $6\cos^2 x + \cos x - 1 \geq 0$

- 1) $\bigcup_{k \in \mathbb{Z}} \left[-\arccos \frac{1}{3} + 2\pi k; \arccos \frac{1}{3} + 2\pi k \right] \cup \left[\frac{2\pi}{3} + 2\pi k; \frac{4\pi}{3} + 2\pi k \right]$
- 2) $\bigcup_{k \in \mathbb{Z}} \left[-\arccos \frac{1}{3} + 2\pi k; \arccos \frac{1}{3} + 2\pi k \right] \cup \left[\frac{2\pi}{3} + 2\pi k; \frac{4\pi}{3} + 2\pi k \right)$
- 3) $\bigcup_{k \in \mathbb{Z}} \left[-\arccos \frac{1}{3} + 2\pi k; \arccos \frac{1}{3} + 2\pi k \right) \cup \left[\frac{2\pi}{3} + 2\pi k; \frac{4\pi}{3} + 2\pi k \right]$
- 4) $\bigcup_{k \in \mathbb{Z}} \left[-\arccos \frac{1}{3} + 2\pi k; \arccos \frac{1}{3} + 2\pi k \right) \cup \left(\frac{2\pi}{3} + 2\pi k; \frac{4\pi}{3} + 2\pi k \right]$
- 5) $\bigcup_{k \in \mathbb{Z}} \left(-\arccos \frac{1}{3} + 2\pi k; \arccos \frac{1}{3} + 2\pi k \right) \cup \left[\frac{2\pi}{3} + 2\pi k; \frac{4\pi}{3} + 2\pi k \right]$
- 6) $\bigcup_{k \in \mathbb{Z}} \left[-\arccos \frac{1}{3} + \pi k; \arccos \frac{1}{3} + 2\pi k \right] \cup \left[\frac{2\pi}{3} + \pi k; \frac{4\pi}{3} + 2\pi k \right]$

4. Решите тригонометрическое неравенство $6\sin^2 x - \sin x - 1 < 0$.

- 1) $\bigcup_{k \in \mathbb{Z}} \left(-\arcsin \frac{1}{3} + 2\pi k; \frac{\pi}{6} + 2\pi k \right] \cup \left(\frac{5\pi}{6} + 2\pi k; \pi + \arcsin \frac{1}{3} + 2\pi k \right)$

- 2)

$$\bigcup_{k \in \mathbb{Z}} \left(-\arcsin \frac{1}{3} + 2\pi k; \frac{\pi}{6} + 2\pi k \right] \cup \left[\frac{5\pi}{6} + 2\pi k; \pi + \arcsin \frac{1}{3} + 2\pi k \right)$$
- 3)

$$\bigcup_{k \in \mathbb{Z}} \left(-\arcsin \frac{1}{3} + 2\pi k; \frac{\pi}{6} + 2\pi k \right) \cup \left[\frac{5\pi}{6} + 2\pi k; \pi + \arcsin \frac{1}{3} + 2\pi k \right)$$
- 4)

$$\bigcup_{k \in \mathbb{Z}} \left(-\arcsin \frac{1}{3} + 2\pi k; \frac{\pi}{6} + 2\pi k \right) \cup \left(\frac{5\pi}{6} + 2\pi k; \pi + \arcsin \frac{1}{3} + 2\pi k \right]$$
- 5)

$$\bigcup_{k \in \mathbb{Z}} \left(-\arcsin \frac{1}{3} + 2\pi k; \frac{\pi}{6} + \pi k \right) \cup \left(\frac{5\pi}{6} + \pi k; \pi + \arcsin \frac{1}{3} + 2\pi k \right)$$
- 6)

$$\bigcup_{k \in \mathbb{Z}} \left(-\arcsin \frac{1}{3} + 2\pi k; \frac{\pi}{6} + 2\pi k \right) \cup \left(\frac{5\pi}{6} + 2\pi k; \pi + \arcsin \frac{1}{3} + 2\pi k \right)$$

5. Решите тригонометрическое неравенство $\operatorname{tg}^2 x + 3\operatorname{tg} x - 4 \geq 0$.

- 1)
$$\bigcup_{k \in \mathbb{Z}} \left[\frac{\pi}{4} + 2\pi k; \frac{\pi}{2} + 2\pi k \right) \cup \left[-\frac{\pi}{2} + 2\pi k; -\operatorname{arctg} 4 + 2\pi k \right]$$
- 2)
$$\bigcup_{k \in \mathbb{Z}} \left[\frac{\pi}{4} + \pi k; \frac{\pi}{2} + 2\pi k \right) \cup \left(-\frac{\pi}{2} + 2\pi k; -\operatorname{arctg} 4 + \pi k \right]$$
- 3)
$$\bigcup_{k \in \mathbb{Z}} \left[\frac{\pi}{4} + \pi k; \frac{\pi}{2} + \pi k \right) \cup \left(-\frac{\pi}{2} + \pi k; -\operatorname{arctg} 4 + \pi k \right]$$
- 4)
$$\bigcup_{k \in \mathbb{Z}} \left[\frac{\pi}{4} + \pi k; \frac{\pi}{2} + \pi k \right) \cup \left[-\frac{\pi}{2} + \pi k; -\operatorname{arctg} 4 + \pi k \right]$$
- 5)
$$\bigcup_{k \in \mathbb{Z}} \left[\frac{\pi}{4} + \pi k; \frac{\pi}{2} + \pi k \right) \cup \left(-\frac{\pi}{2} + \pi k; -\operatorname{arctg} 4 + \pi k \right)$$
- 6)
$$\bigcup_{k \in \mathbb{Z}} \left[\frac{\pi}{4} + \pi k; \frac{\pi}{2} + \pi k \right) \cup \left[-\frac{\pi}{2} + \pi k; -\operatorname{arctg} 4 + \pi k \right)$$

6. Решите тригонометрическое неравенство $\operatorname{ctg}^2 x - 5\operatorname{ctg} x + 4 \leq 0$.

- 1)
$$\bigcup_{k \in \mathbb{Z}} \left(\operatorname{arccctg} 4 + \pi k; \frac{\pi}{4} + \pi k \right]$$
- 2)
$$\bigcup_{k \in \mathbb{Z}} \left[\operatorname{arccctg} 4 + \pi k; \frac{\pi}{4} + \pi k \right)$$
- 3)
$$\bigcup_{k \in \mathbb{Z}} \left[\operatorname{arccctg} 4 + \pi k; \frac{\pi}{4} + \pi k \right)$$
- 4)
$$\bigcup_{k \in \mathbb{Z}} \left[\operatorname{arccctg} 4 + 2\pi k; \frac{\pi}{4} + 2\pi k \right)$$
- 5)
$$\bigcup_{k \in \mathbb{Z}} \left(\operatorname{arccctg} 4 + \pi k; \frac{\pi}{4} + \pi k \right)$$
- 6)
$$\bigcup_{k \in \mathbb{Z}} \left[\operatorname{arccctg} 4 + 4\pi k; \frac{\pi}{4} + 4\pi k \right)$$