

Тригонометричні нерівності

1. $2\sin(30^\circ - 3x) \leq 1$

- а) $x \in [2\pi n/3; 4\pi/9 + 2\pi n/3], n \in \mathbb{Z};$
- б) $x \in [4\pi n/9; 2\pi/3 + 2\pi n/3], n \in \mathbb{Z};$
- в) $x \in [4\pi/9 + 2\pi n/3; 2\pi/3 + 2\pi n/4], n \in \mathbb{Z}.$

2. $2\cos(60^\circ - 4x) \leq 1$

- а) $x \in [\pi/6 + \pi n/2; \pi/2 + \pi n/2], n \in \mathbb{Z};$
- б) $x \in [\pi/2 + \pi n/2; 3\pi/2 + \pi n/2], n \in \mathbb{Z};$
- в) $x \in [3\pi/2 + \pi n/2; 5\pi/6 + \pi n/2], n \in \mathbb{Z}.$

3. $2\sin(60^\circ - 2x) \geq -\sqrt{3}$

- а) $x \in [-\pi/3 + \pi n; \pi/2 + \pi n], n \in \mathbb{Z};$
- б) $x \in [\pi/3 + \pi n; \pi/2 + \pi n], n \in \mathbb{Z};$
- в) $x \in [-\pi/2 + \pi n; \pi/3 + \pi n], n \in \mathbb{Z}.$

4. $2\sin(45^\circ - 3x) \geq \sqrt{2}$

- а) $x \in [2\pi/3 + 2\pi n/3; \pi/2 + 2\pi n/3], n \in \mathbb{Z};$
- б) $x \in [-2\pi n/3; 2\pi n/3], n \in \mathbb{Z};$
- в) $x \in [2\pi n/3; \pi/2 + 2\pi n/3], n \in \mathbb{Z}.$

5. $\operatorname{tg}(2x + \pi/6) - (\sqrt{3})/3 \leq 0$

- а) $x \in (-\pi/18 + \pi n/3; \pi/18 + \pi n/3], n \in \mathbb{Z};$
- б) $x \in (-\pi/18 + \pi n/3; 2\pi/9 + \pi n/3], n \in \mathbb{Z};$
- в) $x \in (-\pi/9 + \pi n/9; 2\pi/9 + \pi n/9], n \in \mathbb{Z}.$

6. $\cos(30^\circ - 4x) \geq \cos(-120^\circ)$

- а) $x \in [\pi/8 + \pi n/2; 5\pi/24 + \pi n/2], n \in \mathbb{Z};$
- б) $x \in [5\pi/24 + \pi n/2; 15\pi/16 + \pi n/2], n \in \mathbb{Z};$
- в) $x \in [-\pi/8 + \pi n/2; 5\pi/24 + \pi n/2], n \in \mathbb{Z}.$

7. $4\sin(x/3)\cos(x/3) \leq -1$

- а) $x \in [-5\pi/4 + 3\pi n; -\pi/4 + 3\pi n], n \in \mathbb{Z};$
- б) $x \in [\pi/4 + 3\pi n; 5\pi/4 + 3\pi n], n \in \mathbb{Z};$
- в) $x \in [-5\pi/4 + 3\pi n; \pi/4 + 3\pi n], n \in \mathbb{Z}.$

8. $\sin 3x \cos x - \cos 3x \sin x \leq 1/2$

- a) $x \in [7\pi/12 + \pi n; 11\pi/12 + \pi n], n \in \mathbb{Z};$
- б) $x \in [\pi/12 + \pi n; 5\pi/12 + \pi n], n \in \mathbb{Z};$
- в) $x \in [-7\pi/12 + \pi n; \pi/12 + \pi n], n \in \mathbb{Z}.$

9. $(\operatorname{tg} 3x + \operatorname{tg} x) / (1 - \operatorname{tg} x \operatorname{tg} 3x) \leq 1$

- a) $x \in (-\pi/8 + \pi n; \pi/16 + \pi n] \cup (\pi/8 + \pi n; 5\pi/16 + \pi n] \cup (3\pi/8 + \pi n; 9\pi/16 + \pi n] \cup (5\pi/8 + \pi n; 13\pi/16 + \pi n], n \in \mathbb{Z};$
- б) $x \in (-\pi/8 + \pi n; \pi/16 + \pi n] \cup (\pi/8 + \pi n; \pi/6 + \pi n) \cup (\pi/6 + \pi n; 5\pi/16 + \pi n] \cup (3\pi/8 + \pi n; \pi/2 + \pi n) \cup (\pi/2 + \pi n; 9\pi/16 + \pi n] \cup (5\pi/8 + \pi n; 13\pi/16 + \pi n], n \in \mathbb{Z};$
- в) $x \in [5\pi/16 + \pi n/4; 3\pi/8 + \pi n/4) \cup (3\pi/8 + \pi n/4; 9\pi/16 + \pi n/4], n \in \mathbb{Z}.$

10. $\sin(2x) / \cos x \geq 1$

- a) $x \in [\pi/6 + 2\pi n; 5\pi/6 + 2\pi n], n \in \mathbb{Z};$
- б) $x \in [\pi/6 + 2\pi n; \pi/2 + 2\pi n) \cup (\pi/2 + 2\pi n; 5\pi/6 + 2\pi n], n \in \mathbb{Z};$
- в) $x \in [-5\pi/6 + \pi n; \pi/2 + \pi n) \cup (\pi/2 + \pi n; \pi/6 + \pi n], n \in \mathbb{Z}.$

11. $\sin x \sin 2x \leq 0$

- a) $x \in [\pi/2 + 2\pi n; 3\pi/2 + 2\pi n], n \in \mathbb{Z}, x = 2\pi k, k \in \mathbb{Z};$
- б) $x \in [\pi/2 + 2\pi n; 3\pi/2 + 2\pi n], n \in \mathbb{Z}, x = 2\pi k, k \in \mathbb{Z};$
- в) $x \in [-\pi/2 + 2\pi n; \pi/2 + 2\pi n], n \in \mathbb{Z}, x = 2\pi k, k \in \mathbb{Z}.$

12. $\sin x - \sqrt{3} \cos x \leq \sqrt{3}$

- a) $x \in [-2\pi/3 + 2\pi n; 2\pi n], n \in \mathbb{Z};$
- б) $x \in [2\pi/3 + 2\pi n; 3\pi/2 + 2\pi n], n \in \mathbb{Z};$
- в) $x \in [-\pi + 2\pi n; 2\pi/3 + 2\pi n], n \in \mathbb{Z}.$