

## 35-Mavzu. Trigonometrik tengsizliklar

1. Tenglamalar sistemasini yeching: 
$$\begin{cases} \sin x \cos y = -\frac{1}{2} \\ \cos x \sin y = \frac{1}{2} \end{cases}$$

A)  $x = -\frac{\pi}{4} + \frac{k\pi}{2} + \frac{n\pi}{2}, y = \frac{\pi}{4} + \frac{k\pi}{2} - \frac{n\pi}{2}, k, n \in Z$

B)  $x = -\frac{\pi}{3} + \frac{k\pi}{2} + \frac{n\pi}{2}, y = \frac{\pi}{3} + \frac{k\pi}{2} - \frac{n\pi}{2}, k, n \in Z$

C)  $x = -\frac{\pi}{2} + \frac{k\pi}{2} + \frac{n\pi}{2}, y = \frac{\pi}{2} + \frac{k\pi}{2} - \frac{n\pi}{2}, k, n \in Z$

D)  $x = -\frac{\pi}{6} + \frac{k\pi}{2} + \frac{n\pi}{2}, y = \frac{\pi}{6} + \frac{k\pi}{2} - \frac{n\pi}{2}, k, n \in Z$

2. Tenglamalar sistemasini yeching: 
$$\begin{cases} \sin y = 5 \sin x \\ \cos y = 2 - 3 \cos x \end{cases}$$

A)  $x = \pi n, y = \pi + 2k\pi, k, n \in Z$

B)  $x = 2\pi n, y = \pi + k\pi, k, n \in Z$

C)  $x = 2\pi n, y = \pi + 2k\pi, k, n \in Z$

D)  $x = \pi n, y = \pi + k\pi, k, n \in Z$

3. Ushbu 
$$\begin{cases} \sin x \cos 2y = a^2 + 1 \\ \cos x \sin 2y = a \end{cases}$$
 tenglamalar sistemasi yechimga ega bo'ladigan  $a$  ning qiymatlarini toping.

A)  $a = 0$  yoki  $a = 1$  B)  $a = -1$  yoki  $a = 0$  C)  $a = 0$  D)  $a = 1$  yoki  $a = -1$

4. Tenglamalar sistemasini yeching:

$$\begin{cases} \frac{1}{2} \cos y (\cos x - \cos y) = \cos \frac{x+y}{2} \sin y \sin \frac{y-x}{2} \\ 2y - x = \frac{\pi}{2} \end{cases}$$

A)  $x = \frac{\pi}{2} + 2\pi n, y = \frac{\pi}{2} + 2\pi n, n \in Z$  B)  $x = \frac{\pi}{2} + 4\pi n, y = \frac{\pi}{2} + 4\pi n, n \in Z$

C)  $x = \frac{\pi}{2} + 2\pi n, y = \frac{\pi}{2} + 4\pi n, n \in Z$  D)  $x = \frac{\pi}{2} + 4\pi n, y = \frac{\pi}{2} + 2\pi n, n \in Z$

5. Tenglamalar sistemasini yeching: 
$$\begin{cases} \sqrt{\sin x \cos y} = 0 \\ 2 \sin^2 x - \cos 2y - 2 = 0 \end{cases}$$

A)  $x = (-1)^n \frac{\pi}{4} + n\pi, n \in Z, y = \frac{\pi}{2} + 2k\pi, k \in Z$

B)  $x = (-1)^n \frac{\pi}{4} + n\pi, n \in Z, y = \frac{\pi}{2} + k\pi, k \in Z$

C)  $x = (-1)^n \frac{\pi}{4} + 2\pi n, n \in Z, y = \frac{\pi}{2} + k\pi, k \in Z$

D)  $x = (-1)^n \frac{\pi}{6} + n\pi, n \in Z, y = \frac{\pi}{2} + 2k\pi, k \in Z$

6. Tenglamalar sistemasini yeching: 
$$\begin{cases} \sin x + \cos y = 0 \\ \sin^2 x + \cos^2 y = \frac{1}{2} \end{cases}$$

A)  $x = (-1)^n \frac{\pi}{6} + \pi n, y = \pm \frac{2\pi}{3} + 2k\pi$  yoki  $x = (-1)^{n+1} \frac{\pi}{6} + \pi n, y = \pm \frac{\pi}{3} + 2k\pi$

B)  $x = (-1)^n \frac{\pi}{3} + \pi n, y = \pm \frac{2\pi}{3} + 2k\pi$  yoki  $x = (-1)^{n+1} \frac{\pi}{4} + \pi n, y = \pm \frac{\pi}{3} + 2k\pi$

C)  $x = (-1)^n \frac{\pi}{4} + \pi n, y = \pm \frac{2\pi}{3} + 2k\pi$  yoki  $x = (-1)^{n+1} \frac{\pi}{6} + \pi n, y = \pm \frac{\pi}{3} + 2k\pi$

D)  $x = (-1)^n \frac{\pi}{6} + \pi n, y = \pm \frac{2\pi}{3} + 2k\pi$  yoki  $x = (-1)^{n+1} \frac{\pi}{3} + \pi n, y = \pm \frac{\pi}{3} + 2k\pi$

(barcha javoblarda  $k, n \in Z$ )

7. Tenglamalar sistemasini yeching: 
$$\begin{cases} \cos x \sin y = \frac{3}{4} \\ \operatorname{ctg} x \operatorname{tg} y = 3 \end{cases}$$

A)  $x = \frac{\pi}{4} - (-1)^{n+1} \frac{\pi}{12} + k\pi - \frac{n\pi}{2}, y = \frac{\pi}{4} + (-1)^n \frac{\pi}{12} + k\pi + \frac{n\pi}{2}, k, n \in Z$

B)  $x = \frac{\pi}{4} - (-1)^n \frac{\pi}{6} + k\pi - \frac{n\pi}{2}, y = \frac{\pi}{4} + (-1)^n \frac{\pi}{6} + k\pi + \frac{n\pi}{2}, k, n \in Z$

C)  $x = \frac{\pi}{4} - (-1)^n \frac{\pi}{12} + k\pi - \frac{n\pi}{2}, y = \frac{\pi}{4} + (-1)^n \frac{\pi}{12} + k\pi + \frac{n\pi}{2}, k, n \in Z$

D)  $x = \frac{\pi}{2} - (-1)^n \frac{\pi}{12} + k\pi - \frac{n\pi}{2}, y = \frac{\pi}{2} + (-1)^n \frac{\pi}{12} + k\pi + \frac{n\pi}{2}, k, n \in Z$

8. Tenglamalar sistemasini yeching: 
$$\begin{cases} \sqrt{\operatorname{tg} x - 1} \cos y = 0 \\ \operatorname{tg}^2 x + \cos 2y - 3 = 0 \end{cases}$$

A)  $x = \operatorname{arctg} 2 + n\pi, n \in Z; y = \frac{\pi}{2} + k\pi, k \in Z$

B)  $x = \operatorname{arcctg} 2 + n\pi, n \in Z; y = \frac{\pi}{2} + k\pi, k \in Z$

C)  $x = \operatorname{arctg} 2 + n\pi, n \in Z; y = \frac{\pi}{2} + 2k\pi, k \in Z$

D)  $x = \operatorname{arctg} 2 + 2n\pi, n \in Z; y = \frac{\pi}{2} + k\pi, k \in Z$

9. Ushbu  $y = \sqrt{2\sin x - 1}$  funksiyaning aniqlanish sohasini toping.

A)  $(-\frac{\pi}{6} + 2\pi n; \frac{\pi}{6} + 2\pi n), n \in Z$  B)  $[\frac{\pi}{6} + 2\pi n; \frac{5\pi}{6} + 2\pi n], n \in Z$

C)  $(\frac{\pi}{6} + 2\pi n; \frac{5\pi}{6} + 2\pi n), n \in Z$  D)  $[-\frac{\pi}{6} + 2\pi n; \frac{\pi}{6} + 2\pi n], n \in Z$

10. Tengsizlikni yeching:  $\sin 5x \cdot \cos 4x + \cos 5x \cdot \sin 4x > \frac{1}{2}$

A)  $\frac{\pi}{54} + \frac{2\pi n}{9} < x < \frac{5\pi}{54} + \frac{2\pi n}{9}, n \in Z$  B)  $\frac{\pi}{54} + 2\pi n < x < \frac{5\pi}{54} + 2\pi n, n \in Z$

C)  $\frac{\pi}{36} + \frac{2\pi n}{9} < x < \frac{5\pi}{36} + \frac{2\pi n}{9}, n \in Z$  D)  $\frac{\pi}{36} + \frac{2\pi n}{9} < x < \frac{5\pi}{54} + \frac{2\pi n}{9}, n \in Z$

11. Tengsizlikni yeching:  $1 - 2\sin 4x < \cos^2 4x$

A)  $(\pi k; \frac{\pi}{2} + \pi k), k \in Z$  B)  $(-\frac{\pi}{2} + 2\pi k; \frac{\pi}{2} + 2\pi k), k \in Z$

C)  $(\frac{\pi k}{2}; \frac{\pi}{4} + \frac{\pi k}{2}), k \in Z$  D)  $(-\frac{\pi}{4} + 2\pi k; \frac{\pi}{4} + 2\pi k), k \in Z$

12. Tengsizlikni yeching:  $2\sin x \geq \sqrt{2}$

- A)  $\frac{\pi}{4} + 2\pi n \leq x \leq \frac{3\pi}{4} + 2\pi n, n \in Z$  B)  $-\frac{5\pi}{4} + 2\pi n \leq x \leq \frac{\pi}{4} + 2\pi n, n \in Z$   
 C)  $\frac{\pi}{4} + 2\pi n \leq x \leq \frac{3\pi}{4} + 2\pi n, n \in Z$  D)  $\frac{\pi}{4} + \pi n \leq x \leq \frac{3\pi}{4} + \pi n, n \in Z$

13. Ushbu  $|1 + \cos x| \leq \frac{1}{2}$  tengsizlikning  $[0; 2\pi]$  oraliqdagi eng katta va eng kichik yechimlari ayirmasini toping.

- A)  $\pi$  B)  $1,5\pi$  C)  $\frac{2\pi}{3}$  D)  $1,2\pi$

14.  $x$  ning qaysi qiymatlarida tengsizlik to‘g‘ri? ( $x \in [0; 2\pi]$ )

$$\cos^2 x - \frac{5}{2} \cos x + 1 > 0$$

- A)  $[0; \frac{\pi}{3}] \cup (\frac{5\pi}{3}; 2\pi]$  B)  $(\frac{\pi}{3}; \frac{\pi}{2}] \cup [\frac{3\pi}{2}; \frac{5\pi}{3})$  C)  $(\frac{\pi}{3}; \frac{5\pi}{3})$  D)  $(\frac{\pi}{3}; \frac{\pi}{2}]$

15. Ushbu  $\cos^2 x - \frac{5}{2} \cos x + 1 \leq 0$  tengsizlik  $x$  ( $x \in [0; 2\pi]$ ) ning qanday qiymatlarida o‘rinli?

- A)  $[0; \frac{\pi}{3}] \cup [\frac{5\pi}{3}; 2\pi]$  B)  $[\frac{\pi}{3}; \frac{5\pi}{3}]$  C)  $[\frac{5\pi}{3}; 2\pi]$  D)  $[\frac{\pi}{3}; \frac{\pi}{2}] \cup [\frac{3\pi}{2}; \frac{5\pi}{3}]$

16. Tengsizlikni yeching:  $\cos^2 x < \frac{\sqrt{2}}{2} + \sin^2 x$

- A)  $\frac{\pi}{8} + 2\pi n < x < \frac{7\pi}{8} + 2\pi n, n \in Z$  B)  $\frac{\pi}{8} + \pi n < x < \frac{7\pi}{8} + \pi n, n \in Z$   
 C)  $-\frac{\pi}{8} + 2\pi n < x < \frac{\pi}{8} + 2\pi n, n \in Z$  D)  $\frac{\pi}{4} + 2\pi n < x < \frac{7\pi}{4} + 2\pi n, n \in Z$

17. Tengsizlikni yeching:  $1 - 2\cos 2x > \sin^2 2x$

- A)  $(\frac{\pi}{2} + \pi k; \pi + \pi k), k \in Z$  B)  $(\frac{\pi}{3} + 2\pi k; \frac{2\pi}{3} + 2\pi k), k \in Z$   
 C)  $(\frac{\pi}{4} + \pi k; \frac{3\pi}{4} + \pi k), k \in Z$  D)  $(-\frac{\pi}{2} + \pi k; \frac{\pi}{2} + \pi k), k \in Z$

18. Ushbu  $\cos 2x \leq -\frac{1}{2}$  tengsizlikning  $[0; \pi]$  kesmadagi barcha yechimlarini toping.

- A)  $[\frac{\pi}{3}; \frac{2\pi}{3}]$  B)  $[0; \frac{2\pi}{3}]$  C)  $[\frac{2\pi}{3}; \frac{4\pi}{3}]$  D)  $[\frac{4\pi}{3}; 2\pi]$

19. Tengsizlikni yeching:  $tg(x + \frac{\pi}{4}) \geq 1$

- A)  $[-\frac{\pi}{4} + \pi k; \frac{\pi}{2} + \pi k], k \in Z$  B)  $[\frac{\pi}{4} + \pi k; \frac{\pi}{2} + \pi k), k \in Z$   
 C)  $[\frac{\pi}{4} + 2\pi k; \frac{\pi}{2} + 2\pi k], k \in Z$  D)  $[\pi k; \frac{\pi}{4} + \pi k), k \in Z$

20. Ushbu  $y = \sqrt{tgx + 1}$  funksiyaning aniqlanish sohasini toping.

- A)  $[-\frac{\pi}{4} + \pi n; \frac{\pi}{2} + \pi n], n \in Z$  B)  $[\frac{\pi}{4} + \pi n; \frac{\pi}{2} + \pi n], n \in Z$   
 C)  $[-\frac{\pi}{4} + \pi n; \frac{\pi}{2} + \pi n), n \in Z$  D)  $(-\frac{\pi}{2} + \pi n; \frac{\pi}{4} + \pi n], n \in Z$

21. Tengsizlikni yeching:  $\sin x > \cos x$

- A)  $(\pi n; \frac{\pi}{2} + \pi n), n \in Z$  B)  $(\frac{\pi}{4} + 2\pi n; \frac{5\pi}{4} + 2\pi n), n \in Z$   
 C)  $(\frac{\pi}{4} + \pi n; \frac{5}{4}\pi + \pi n), n \in Z$  D)  $(\frac{3\pi}{4} + 2\pi n; \frac{7\pi}{4} + 2\pi n), n \in Z$

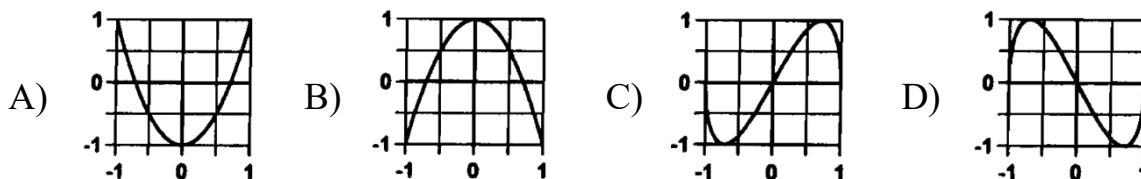
22. Agar  $4\arcsin x + \arccos x = \pi$  bo'lsa,  $3x^2$  ning qiymatini hisoblang.

- A) 0 B) 0,75 C) 1 D) 1,5

23. Tenglamaning ildizlari yig'indisini toping:  $2(\arccos x)^2 + \pi^2 = 3\pi \arccos x$

- A)  $\frac{\sqrt{2}}{2}$  B) -1 C)  $-\frac{1}{2}$  D)  $-\frac{\sqrt{2}}{2}$

24.  $y = \cos(\pi - 2 \arccos x)$  funksiya grafigi tasvirlangan javobni toping.



25. Tengsizlikni yeching:  $\arcsin x < \arcsin(1 - x)$

- A)  $[0; \frac{1}{2})$  B)  $[-1; 1]$  C)  $(-\infty; \frac{1}{2}]$  D)  $[0; 2]$

26.  $|\sin 3x| \geq \frac{\sqrt{3}}{2}$  tengsizlikni yeching.

- A)  $\frac{\pi}{9} + \frac{2\pi n}{3} \leq x \leq \frac{2\pi}{9} + \frac{2\pi n}{3}, n \in Z$  B)  $\frac{\pi}{9} + \frac{\pi n}{3} \leq x \leq \frac{2\pi}{9} + \frac{\pi n}{3}, n \in Z$   
 C)  $\frac{\pi}{18} + \frac{\pi n}{3} \leq x \leq \frac{5\pi}{18} + \frac{\pi n}{3}, n \in Z$  D)  $\frac{\pi}{18} + \frac{2\pi n}{3} \leq x \leq \frac{5\pi}{18} + \frac{2\pi n}{3}, n \in Z$

27. Ushbu  $x = \arccos 0,9$ ;  $y = \arccos(-0,7)$ ;  $z = \arccos(-0,2)$  sonlarni o'sib borish tartibida yozing.

- A)  $y < z < x$  B)  $x < y < z$  C)  $y < x < z$  D)  $x < z < y$

28. Tengsizlikni yeching:  $\arccos x > 2$

- A)  $(\cos 2; 1]$  B)  $[-1; \cos 2)$  C)  $(\cos 2; +\infty)$  D)  $(-\infty; \cos 2)$

29. Tengsizlikni yeching:  $\arccos x > \arccos x^2$

- A)  $(0; 1)$  B)  $[-1; 0)$  C)  $(-\infty; 0) \cup (1; \infty)$  D)  $(1; \infty)$

**Kalitlar**

1.	A	16.	B
2.	C	17.	C
3.	C	18.	A
4.	D	19.	D
5.	B	20.	C
6.	A	21.	B
7.	C	22.	B
8.	A	23.	B
9.	B	24.	A
10.	A	25.	A
11.	C	26.	B
12.	A	27.	D
13.	C	28.	B
14.	C	29.	B
15.	A		