

Namunaviy misollar

(Modul qatnashgan tenglama va tengsizliklar)

1-misol

Tenglamani yeching:

$$|2x - 1| = |x + 3|$$

Yechish:

$$|A| = |B| \Rightarrow A = B \text{ yoki } A = -B.$$

1. $2x - 1 = x + 3 \Rightarrow x = 4$
2. $2x - 1 = -(x + 3) \Rightarrow 3x = -2 \Rightarrow x = -2/3$

Javob: $x = -2/3, 4$

2-misol

Tenglamani yeching:

$$|x - 2| + |x - 5| = 7$$

Yechish:

Bo'linish nuqtalari: $x = 2$ va $x = 5$.

1. $x \geq 5: (x - 2) + (x - 5) = 7 \Rightarrow 2x - 7 = 7 \Rightarrow x = 7$
2. $2 \leq x < 5: (x - 2) + (5 - x) = 7 \Rightarrow 3 = 7$ — yechim yo'q
3. $x < 2: (2 - x) + (5 - x) = 7 \Rightarrow 7 - 2x = 7 \Rightarrow x = 0$

Javob: $x = 0, 7$

3-misol

Tengsizlikni yeching:

$$|3x - 1| \leq 5$$

Yechish:

$$-5 \leq 3x - 1 \leq 5$$

Har tomonga 1 qo'shamiz: $-4 \leq 3x \leq 6$

3 ga bo'lamiz: $-4/3 \leq x \leq 2$

Javob: $-4/3 \leq x \leq 2$

4-misol

Tenglamani yeching:

$$|x| = 2x - 1$$

Yechish:

O'ng tomon ≥ 0 bo'lishi kerak $\Rightarrow 2x - 1 \geq 0 \Rightarrow x \geq 1/2$.

1. $x \geq 0$: $|x| = x$
 $x = 2x - 1 \Rightarrow x = 1$
2. $x < 0$: $|x| = -x$
 $-x = 2x - 1 \Rightarrow 3x = 1 \Rightarrow x = 1/3$ ($x < 0$ shartni qanoatlantirmaydi)

Javob: $x = 1$

5-misol

Tengsizlikni yeching:

$$|x - 4| \geq |x - 1|$$

Yechish:

Kvadratlaymiz (ikkala tomon ≥ 0):

$$(x - 4)^2 \geq (x - 1)^2$$

$$x^2 - 8x + 16 \geq x^2 - 2x + 1$$

$$-6x \geq -15$$

$$x \leq 5/2$$

Javob: $x \leq 5/2$

6-misol

Tenglamani yeching:

$$|x + 1| + |2x - 3| = 6$$

Yechish:

Bo'linish nuqtalari: $x = -1$ va $x = 3/2$.

1. $x \geq 3/2$: $(x + 1) + (2x - 3) = 6$
 $3x - 2 = 6 \Rightarrow x = 8/3$
2. $-1 \leq x < 3/2$: $(x + 1) + (3 - 2x) = 6$
 $4 - x = 6 \Rightarrow x = -2$ (oraliqqa mos emas)
3. $x < -1$: $(-x - 1) + (3 - 2x) = 6$
 $2 - 3x = 6 \Rightarrow x = -4/3$

Javob: $x = -4/3, 8/3$

7-misol

Tengsizlikni yeching:

$$|x + 2| + |x - 3| \leq 7$$

Yechish:

Bo'linish nuqtalari: $x = -2$ va $x = 3$.

- $x \geq 3$: $(x + 2) + (x - 3) \leq 7$
 $2x - 1 \leq 7 \Rightarrow x \leq 4$
 $\Rightarrow 3 \leq x \leq 4$
- $-2 \leq x < 3$: $(x + 2) + (3 - x) \leq 7$
 $5 \leq 7$ — doim bajariladi
 $\Rightarrow -2 \leq x < 3$
- $x < -2$: $(-x - 2) + (3 - x) \leq 7$
 $1 - 2x \leq 7 \Rightarrow -2x \leq 6 \Rightarrow x \geq -3$
 $\Rightarrow -3 \leq x < -2$

Birlashtiramiz: $-3 \leq x \leq 4$

Javob: $-3 \leq x \leq 4$

8-misol

Tenglamani yeching:

$$|x - 1| = |2 - x|$$

Yechish:

$$|x - 1| = |x - 2|$$

$$\Rightarrow x - 1 = x - 2 \text{ yoki } x - 1 = -(x - 2)$$

- $-1 = -2$ — mumkin emas
- $x - 1 = -x + 2 \Rightarrow 2x = 3 \Rightarrow x = 3/2$

Javob: $x = 3/2$

9-misol

Tengsizlikni yeching:

$$|2x + 1| \geq |x - 4|$$

Yechish:

Kvadratlaymiz:

$$(2x + 1)^2 \geq (x - 4)^2$$

$$4x^2 + 4x + 1 \geq x^2 - 8x + 16$$

$$3x^2 + 12x - 15 \geq 0$$

$$x^2 + 4x - 5 \geq 0$$

$$(x + 5)(x - 1) \geq 0$$

$$x \leq -5 \text{ yoki } x \geq 1$$

Javob: $x \leq -5$ yoki $x \geq 1$

10-misol

Tenglamani yeching:

$$|x - 3| + |x + 1| = 2|x|$$

Yechish:

Bo'linish nuqtalari: $x = -1, 0, 3$.

1. $x \geq 3$: $(x - 3) + (x + 1) = 2x \Rightarrow 2x - 2 = 2x \Rightarrow -2 = 0$ — yo'q
2. $0 \leq x < 3$: $(3 - x) + (x + 1) = 2x \Rightarrow 4 = 2x \Rightarrow x = 2$
3. $-1 \leq x < 0$: $(3 - x) + (x + 1) = -2x \Rightarrow 4 = -2x \Rightarrow x = -2$ (mos emas)
4. $x < -1$: $(3 - x) + (-x - 1) = -2x \Rightarrow 2 - 2x = -2x \Rightarrow 2 = 0$ — yo'q

Javob: $x = 2$