

## B) Masalalar yechimlari

### 1-masala yechimi

$$\text{AS: } x - 2 \geq 0 \rightarrow x \geq 2.$$

$$\sqrt{x + 4} = 4 - \sqrt{x - 2}$$

Kvadratlaymiz:

$$x + 4 = 16 - 8\sqrt{x - 2} + x - 2$$

$$8\sqrt{x - 2} = 10$$

$$\sqrt{x - 2} = 5/4$$

$$x - 2 = 25/16$$

$$x = 57/16$$

Tekshiruv:

$$\sqrt{\frac{57}{16} + 4} = \sqrt{\frac{121}{16}} = 11/4,$$

$$\sqrt{\frac{57}{16} - 2} = \sqrt{\frac{25}{16}} = 5/4,$$

$$11/4 + 5/4 = 4.$$

**Javob:**  $x = 57/16$

### 2-masala yechimi

$$\text{AS: } 2x - 3 \geq 0 \rightarrow x \geq 3/2.$$

$$\sqrt{x + 1} = \sqrt{2x - 3} + 1$$

Kvadratlaymiz:

$$x + 1 = 2x - 3 + 1 + 2\sqrt{2x - 3}$$

$$x + 1 = 2x - 2 + 2\sqrt{2x - 3}$$

$$2\sqrt{2x - 3} = 3 - x$$

Bu yerda  $3 - x \geq 0$  bo'lishi kerak, ya'ni  $x \leq 3$ . Demak,  $x \in (3/2, 3]$ .

Yana kvadratlaymiz:

$$4(2x - 3) = (3 - x)^2$$

$$8x - 12 = x^2 - 6x + 9$$

$$x^2 - 14x + 21 = 0$$

$$x = (14 \pm \sqrt{196 - 84})/2 = (14 \pm \sqrt{112})/2 = (14 \pm 4\sqrt{7})/2 \\ = 7 \pm 2\sqrt{7}$$

AS va  $x \leq 3$  shartni tekshiramiz: faqat  $x = 7 - 2\sqrt{7}$  mos.

**Javob:**  $x = 7 - 2\sqrt{7}$

### 3-masala yechimi

AS:  $x \geq -3$ .

$\sqrt{x+3} \leq x+1$ . Chap tomon  $\geq 0$ , shuning uchun o'ng tomon ham  $\geq 0$  bo'lishi kerak:

$$x + 1 \geq 0 \rightarrow x \geq -1$$

Endi ( $x \geq -1$  da) kvadratlash mumkin:

$$x + 3 \leq (x + 1)^2 \\ x + 3 \leq x^2 + 2x + 1 \\ 0 \leq x^2 + x - 2 \\ 0 \leq (x + 2)(x - 1)$$

Shundan:  $x \leq -2$  yoki  $x \geq 1$ .

Buni  $x \geq -1$  bilan kesishamiz: faqat  $x \geq 1$  qoladi.

**Javob:**  $x \geq 1$

### 4-masala yechimi

AS:  $x + 2 \geq 0$  va  $3 - x \geq 0 \rightarrow -2 \leq x \leq 3$ .

$$\sqrt{x+2} + \sqrt{3-x} = \sqrt{5}$$

Kvadratlaymiz:

$$x + 2 + 3 - x + 2\sqrt{(x+2)(3-x)} = 5 \\ 5 + 2\sqrt{(x+2)(3-x)} = 5 \\ \sqrt{(x+2)(3-x)} = 0$$

Demak:  $(x+2)(3-x) = 0 \rightarrow x = -2$  yoki  $x = 3$ .

Ikkalasi ham AS ga mos va tenglamani qanoatlantiradi.

**Javob:**  $x = -2, x = 3$

### 5-masala yechimi

$$\sqrt{x^2 + 3} \geq x + 1.$$

Agar  $x + 1 \leq 0$  (ya'ni  $x \leq -1$ ) bo'lsa, chap tomon  $\geq 0$  bo'lgani uchun tengsizlik bajariladi.

Endi  $x > -1$  bo'lsa,  $x + 1 > 0$  va kvadratlash mumkin:

$$\begin{aligned}x^2 + 3 &\geq (x + 1)^2 \\x^2 + 3 &\geq x^2 + 2x + 1 \\2 &\geq 2x \\x &\leq 1\end{aligned}$$

Bu natija  $x > -1$  bilan birga:  $-1 < x \leq 1$ .

Barcha yechimlarni birlashtiramiz:  $x \leq -1$  yoki  $-1 < x \leq 1$ , ya'ni  $x \leq 1$ .

**Javob:**  $x \leq 1$