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*Mavzu: Irratsional tenglamalar.
Irratsional tenglamalar sistemasi.*



TIIAME

1. Irratsional tenglamalar. Agar $A(x) = B(x)$ tenglamadagi $A(x)$ yoki $B(x)$ ifodalardan hech bo‘lmasa, u holda bu tenglama *irratsional tenglama* deyiladi. Ularni yechishda teng kuchli almashtirishlardan foydalaniladi.

Teorema. *Agar n soni musbat va toq bo‘lsa, u holda $A(x) = B(x)$ va $A^n(x) = B^n(x)$ tenglamalar teng kuchli bo‘ladi. Agar n soni musbat va juft bo‘lsa, $A^n(x) = B^n(x)$ tenglamaning ildizi $A(x) = B(x)$ va $A(x) = -B(x)$ tenglamalardan hech bo‘lmasa, u holda bu tenglamalar teng kuchli bo‘ladi.*

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

$$\sqrt[3]{x + 5} - 12\sqrt{x - 4} = 5$$

$$3x^{\frac{4}{7}} - \sqrt{x + 8} = 15$$



$$\sqrt{f(x)} = g(x) \Leftrightarrow \begin{cases} f(x) = g^2(x) \\ g(x) \geq 0 \end{cases}$$

$$\sqrt{f(x)} = \sqrt{g(x)} \Leftrightarrow \begin{cases} f(x) = g(x) \\ f(x) \geq 0 \quad (g(x) \geq 0) \end{cases}$$



TIIAME

MISOLLAR

$$\sqrt{2x - 3} = 4 - x$$

$$\begin{cases} 2x - 3 = (4 - x)^2 \\ 4 - x \geq 0 \end{cases} \Rightarrow \begin{cases} x^2 - 10x + 19 = 0 \\ x \leq 4 \end{cases}$$

$$x = 5 - \sqrt{6}$$

$$x = 5 + \sqrt{6} > 4 - \text{Tenglamani ildizi emas}$$

Javob: $x = 5 - \sqrt{6}$.

Tenglamani yechish

$$\text{e } \sqrt{x^2 - 2} = \sqrt{x}$$

$$\begin{cases} x^2 - 2 = x \\ x \geq 0 \end{cases} \Rightarrow \begin{cases} x^2 - x - 2 = 0 \\ x \geq 0 \end{cases} \Rightarrow$$

$$\Rightarrow \begin{aligned} x &= -1 < 0 && \text{Tenglamani ildizi emas} \\ x &= 2 \end{aligned}$$

Javob: 2.



TIIAME

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

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

$$3x - 1 = 9 + 6\sqrt{x - 2} + x - 2$$

$$3x - 1 = 7 + x + 6\sqrt{x - 2}$$

$$2x - 8 = 6\sqrt{x - 2}$$

$$x - 4 = 3\sqrt{x - 2}$$

$$x^2 - 8x + 16 = 9(x - 2)$$

$$x^2 - 17x + 34 = 0$$

$$D = 17^2 - 4 * 1 * 34 = 289 - 136 = 153$$

$$\sqrt{D} = \sqrt{153} = \sqrt{9 * 17} = 3\sqrt{17}$$

$$x = \frac{17 + 3\sqrt{17}}{2}$$

Tenglamaning ildizi

$$x = \frac{17 - 3\sqrt{17}}{2}$$

Tenglamaning ildizi emas

Aniqlanish sohasi

$$\begin{cases} 3x - 1 \geq 0 \\ x - 2 \geq 0 \end{cases} \Rightarrow x \geq 2$$



$$\sqrt[3]{5-x} + \sqrt[3]{x+5} = 1$$

$$(\sqrt[3]{5-x} + \sqrt[3]{x+5})^3 = 1^3$$

$$5-x + 3\sqrt[3]{(5-x)^2} * \sqrt[3]{x+5} + 3\sqrt[3]{5-x} * \sqrt[3]{(x+5)^2} + x+5 = 1$$

$$3\sqrt[3]{(5-x)(5+x)} (\sqrt[3]{5-x} + \sqrt[3]{x+5}) = -9$$

$$3\sqrt[3]{(5-x)(5+x)} * 1 = -9$$

$$\sqrt[3]{(5-x)(5+x)} = -3$$

$$(5-x)(5+x) = -27$$

$$25 - x^2 = -27$$

$$x^2 = 52$$

$$x = \pm 2\sqrt{13}$$

