

Namunaviy misollar

(Logarifmik tenglama va tengsizliklar)

1-misol

Tenglamani yeching:

$$\log_2(x - 1) = 2$$

AS: $x - 1 > 0 \rightarrow x > 1$.

Yechish: $x - 1 = 2^2 = 4 \rightarrow x = 5$.

Javob: $x = 5$

2-misol

Tenglamani yeching:

$$\log_3(2x + 1) = \log_3(x + 4)$$

AS: $2x + 1 > 0, x + 4 > 0 \rightarrow x > -1/2$.

Yechish: $2x + 1 = x + 4 \rightarrow x = 3$.

Javob: $x = 3$

3-misol

Tenglamani yeching:

$$\log_5 x + \log_5(x - 4) = 1$$

AS: $x > 4$.

Yechish: $\log_5[x(x - 4)] = 1 \rightarrow x(x - 4) = 5$

$$x^2 - 4x - 5 = 0 \rightarrow (x - 5)(x + 1) = 0$$

AS ga mos: $x = 5$.

Javob: $x = 5$

4-misol

Tengsizlikni yeching:

$$\log_2(x + 3) \geq 2$$

AS: $x + 3 > 0 \rightarrow x > -3$.

Yechish: $2 > 1 \rightarrow x + 3 \geq 2^2 = 4 \rightarrow x \geq 1$.

Javob: $x \geq 1$

5-misol

Tengsizlikni yeching:

$$\log_{1/2}(x - 1) \leq 3$$

AS: $x - 1 > 0 \rightarrow x > 1$.

Yechish: $0 < 1/2 < 1 \rightarrow$ belgi teskari:

$$x - 1 \geq (1/2)^3 = 1/8 \rightarrow x \geq 9/8.$$

$$\text{Javob: } x \geq 9/8$$

6-misol

Tenglamani yeching:

$$\log_4(x + 2) = 1/2$$

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

$$\text{Yechish: } x + 2 = 4^{1/2} = 2 \rightarrow x = 0.$$

$$\text{Javob: } x = 0$$

7-misol

Tenglamani yeching:

$$\log_2 x = \log_8(x + 4)$$

$$\text{AS: } x > 0.$$

$$\text{Yechish: } \log_8(x + 4) = (1/3) \cdot \log_2(x + 4).$$

$$3 \cdot \log_2 x = \log_2(x + 4) \rightarrow \log_2(x^3) = \log_2(x + 4)$$

$$x^3 = x + 4 \rightarrow x^3 - x - 4 = 0$$

$$x = 2 \text{ (AS ga mos).}$$

$$\text{Javob: } x = 2$$

8-misol

Tengsizlikni yeching:

$$\log_3(x^2 - 5x + 6) > 1$$

$$\text{AS: } x^2 - 5x + 6 > 0 \rightarrow (x - 2)(x - 3) > 0$$

$$\rightarrow x < 2 \text{ yoki } x > 3.$$

$$\text{Yechish: } 3 > 1 \rightarrow x^2 - 5x + 6 > 3$$

$$x^2 - 5x + 3 > 0$$

$$\text{Ildizlar: } x = (5 \pm \sqrt{13})/2$$

Yechimlar AS bilan kesishmada olinadi.

$$\text{Javob: } x < (5 - \sqrt{13})/2 \text{ yoki } x > (5 + \sqrt{13})/2$$

9-misol

Tenglamani yeching:

$$\log_3(x - 1) + \log_3(x - 3) = 2$$

$$\text{AS: } x > 3.$$

$$\text{Yechish: } \log_3[(x - 1)(x - 3)] = 2 \rightarrow (x - 1)(x - 3) = 9$$

$$x^2 - 4x - 6 = 0$$

$$x = (4 \pm \sqrt{40})/2 = 2 \pm \sqrt{10}$$

$$\text{AS ga mos: } x = 2 + \sqrt{10}.$$

$$\text{Javob: } x = 2 + \sqrt{10}$$

10-misol

Tengsizlikni yeching:

$$\log_2(x + 1) \leq \log_2(3 - x)$$

AS: $x + 1 > 0, 3 - x > 0 \rightarrow -1 < x < 3.$

Yechish: $2 > 1 \rightarrow x + 1 \leq 3 - x$

$$2x \leq 2 \rightarrow x \leq 1.$$

AS bilan birlashtiramiz.

Javob: $-1 < x \leq 1$