

3.76
2

$$2 \log_x 3 \cdot \log_{3x} 3 \geq \log_{9\sqrt{x}} 3$$

הצבה חזרה

$$1 \neq x > 0$$

$$1 \neq 3x > 0$$

$$1 \neq 9\sqrt{x} > 0$$

$$\frac{1}{81}, \frac{1}{3}, 1 \neq x > 0 \leftarrow$$

יש לזכור שיש להציב את הערכים

$$\frac{2 \log_3 3}{\log_3 x} \cdot \frac{\log_3 3}{\log_3 3x} \geq \frac{\log_3 3}{\log_3 9\sqrt{x}}$$

$$\frac{2}{\log_3 x} \cdot \frac{1}{\log_3 3 + \log_3 x} \geq \frac{1}{\log_3 9 + \log_3 \sqrt{x}}$$

$$\frac{2}{t} \cdot \frac{1}{1+t} \geq \frac{1}{2+\frac{1}{2}t}$$

$$\log_3 x = t \quad \text{נניח}$$

$$\frac{2}{t(1+t)} \geq \frac{2}{4+t}$$

$$0 \leq 2 \left(\frac{1}{t(1+t)} - \frac{1}{4+t} \right) = 2 \left(\frac{4+t-t-t^2}{t(1+t)(4+t)} \right) = -2 \left(\frac{t^2-4}{t(1+t)(4+t)} \right)$$

$$0 \leq -2 \frac{(t+2)(t-2)}{t(1+t)(4+t)}$$

$$\begin{aligned} 0 < t \leq 2 &\rightarrow \\ -2 \leq t < -1 &\rightarrow \\ t < -4 &\rightarrow \end{aligned}$$

$$\begin{aligned} 0 < \log_3 x < 2 &\rightarrow \\ -2 < \log_3 x < -1 &\rightarrow \\ \log_3 x < -4 &\rightarrow \end{aligned}$$

$$\begin{array}{cccccc} + & & + & & + & * \\ -4 & -2 & -1 & 0 & 2 & - \end{array}$$

$$\begin{array}{l} 1 < x \leq 9 \\ \frac{1}{9} \leq x < \frac{1}{3} \\ 0 < x < \frac{1}{81} \\ \downarrow \\ \text{הצבה חזרה} \end{array}$$