

1.9.1
k4

$$\log_{4x}(2x) - \log_{2x^2}(4x^2) \geq -\frac{3}{2}$$

מציאת פתרונות

$$\sqrt{\frac{1}{2}}, \frac{1}{4} + x > 0 \leftarrow \begin{matrix} 2x > 0 \\ 1 + 4x > 0 \\ 1 + 2x^2 > 0 \\ 4x^2 > 0 \end{matrix}$$

$$\frac{\log_{2x}(2x)}{\log_{2x}(4x)} - \frac{\log_{2x}(4x^2)}{\log_{2x}(2x^2)} \geq -\frac{3}{2}$$

$$\frac{1}{\log_{2x}(2x) + \log_{2x}(2)} - \frac{2}{\log_{2x}(2x) + \log_{2x}(x)} \geq -\frac{3}{2}$$

$$1 + \frac{1}{\log_2(2x)} - \frac{2}{1 + \log_2(2x)} \geq -\frac{3}{2}$$

$$1 + \frac{1}{\log_2 2 + \log_2 x} - \frac{2}{1 + \frac{1}{\log_2 2 + \log_2 x}} \geq -\frac{3}{2}$$

$$1 + \frac{1}{1 + \log_2 x} - \frac{2}{1 + \frac{1}{\log_2 x + 1}} \geq -\frac{3}{2}$$

$$\frac{1}{1 + \log_2 x + 1} - \frac{2}{\frac{\log_2 x + 1 + 1}{\log_2 x + 1}} \geq -\frac{3}{2}$$

$$\frac{1 + \log_2 x}{2 + \log_2 x} - \frac{2 \log_2 x + 2}{\log_2 x + 2} \geq -\frac{3}{2}$$

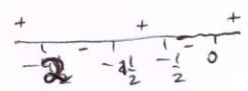
$$\log_2 x = t \quad (10)$$

$$-\frac{3}{2} \leq \frac{1+t}{2+t} - \frac{\frac{2}{t} + 2}{\frac{1}{t} + 2}$$

$$-\frac{3}{2} \leq \frac{1+t}{2+t} - \frac{2+2t}{\frac{1+2t}{t}} = \frac{1+t}{2+t} - \frac{2+2t}{1+2t}$$

$$0 \leq \frac{3}{2} + \frac{1+t}{2+t} - \frac{2+2t}{1+2t} = \frac{6t^2 + 15t + 6 + 4t^2 + 6t + 2 - 4t^2 - 12t - 8}{2(2+t)(1+2t)}$$

$$0 \leq \frac{6t^2 + 9t}{2(2+t)(1+2t)} = \frac{6t(t+1.5)}{2(2+t)(1+2t)}$$



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$$\begin{matrix} x \geq 1 & \leftarrow & \log_2 x \geq 0 \\ \frac{1}{2\sqrt{2}} < x < \frac{1}{\sqrt{2}} & \leftarrow & -\frac{1}{2} < \log_2 x < -\frac{1}{2} \\ x \leq \frac{1}{4} & \leftarrow & \log_2 x \leq -2 \end{matrix}$$

$$\begin{matrix} t \geq 0 \\ -\frac{1}{2} < t < -\frac{1}{2} \\ t \leq -2 \end{matrix}$$

$$\begin{matrix} x \geq 1 \\ \frac{1}{2\sqrt{2}} < x < \frac{1}{\sqrt{2}} \\ 0 < x < \frac{1}{4} \end{matrix}$$

אם יש פתרונות אחרים