

$$\Rightarrow \ln(8^t \cdot 20) > \ln(4^t \cdot 310)$$

$$\Rightarrow \ln 8^t + \ln 20 > \ln 4^t + \ln 310$$

$$\Rightarrow t \ln 8 + \ln 20 > t \ln 4 + \ln 310$$

$$\Rightarrow t \ln 8 - t \ln 4 > \ln 310 - \ln 20$$

$$\Rightarrow t(\ln 8 - \ln 4) > \ln 310 - \ln 20 \quad | : (\) > 0$$

$$\Rightarrow t > \frac{\ln 310 - \ln 20}{\ln 8 - \ln 4} \approx 3,954 = \underline{4 \text{ (h)}}$$

$$\Gamma 8^t \cdot 20 > 4^t \cdot 310 \quad | : (4^t \cdot 20)$$

$$\Rightarrow \frac{8^t}{4^t} > \frac{310}{20} \quad \Rightarrow \left(\frac{8}{4}\right)^t > \frac{310}{20} \quad | \ln$$

$$\Rightarrow t \ln 2 > \ln \frac{310}{20} \quad | : \ln 2 > 0$$

$$\Rightarrow t > \frac{\ln \frac{310}{20}}{\ln 2} \approx 3,945 = \underline{4 \text{ (h)}}$$

5.16 a) $\lg(x+1) - \lg(4x) = 1$

$$\left. \begin{array}{l} x+1 > 0 \quad (\Rightarrow) x > -1 \\ 4x > 0 \quad (\Rightarrow) x > 0 \end{array} \right\} \Rightarrow x > 0$$

$$\Rightarrow \lg \frac{x+1}{4x} = 1 \quad | 2^{(\cdot)}$$

$$\Rightarrow 2^{\lg \frac{x+1}{4x}} = 2^1$$

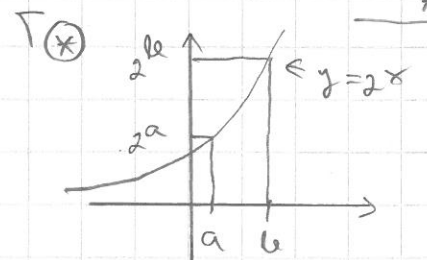
$$\Rightarrow \frac{x+1}{4x} = 2 \quad | \cdot 4x \quad \Rightarrow x+1 = 8x \quad \Rightarrow 1 = 7x \quad \Rightarrow x = \frac{1}{7}$$

b) $2 \leq \lg m \leq 3 \quad | 2^{(\cdot)} \otimes$

$$\Rightarrow 2^2 \leq 2^{\lg m} \leq 2^3$$

$$\Rightarrow 4 \leq m \leq 8$$

$$\Rightarrow \underline{4, 5, 6, 7, 8}$$



$$a < b \quad | 2^{(\cdot)}$$

$$\Rightarrow 2^a < 2^b$$

2^x aidosti kasvava

\rightarrow jorjitus sailyy

9.24 $9999^{9999} = 10^x \quad | \lg = \lg_{10}$

$$\Rightarrow \lg 9999^{9999} = \lg 10^x$$

$$\Rightarrow 9999 \lg 9999 = x \lg 10$$

$$\Rightarrow x \approx 39\,995,56572$$

$$9999 \approx 10^{39\,995,56572}$$

$$= 10^{39\,995 + 0,56572}$$

$$= 10^{39\,995} \cdot 10^{0,56572} \approx 3,678 \cdot 10^{39\,995}$$