

1. a)

$$a_n = \frac{(5+n)}{2n} \quad \lim_{n \rightarrow \infty} \frac{5+n}{2n} = \frac{1}{2}$$

b)  $a_n = 2 + (-0,5)^n \quad \lim_{n \rightarrow \infty} 2 + (-0,5)^n = 2$

2.

$$2(\log x)^2 - 5 \log x - 3 = 0$$

substituierte  $\log x$  mit  $z$

$$2z^2 - 5z - 3 = 0$$

$$z^2 - \frac{5}{2}z - \frac{3}{2} = 0$$

$$z_{1/2} = \frac{5}{4} \pm \sqrt{\frac{25}{16} + \frac{3}{2}}$$

$$z_1 = 3$$

$$z_2 = -\frac{1}{2}$$

Rücksubstitution:

$$z_1: 3 = \log x_1$$

$$x_1 = 10^3$$

$$x_1 = \underline{\underline{1000}}$$

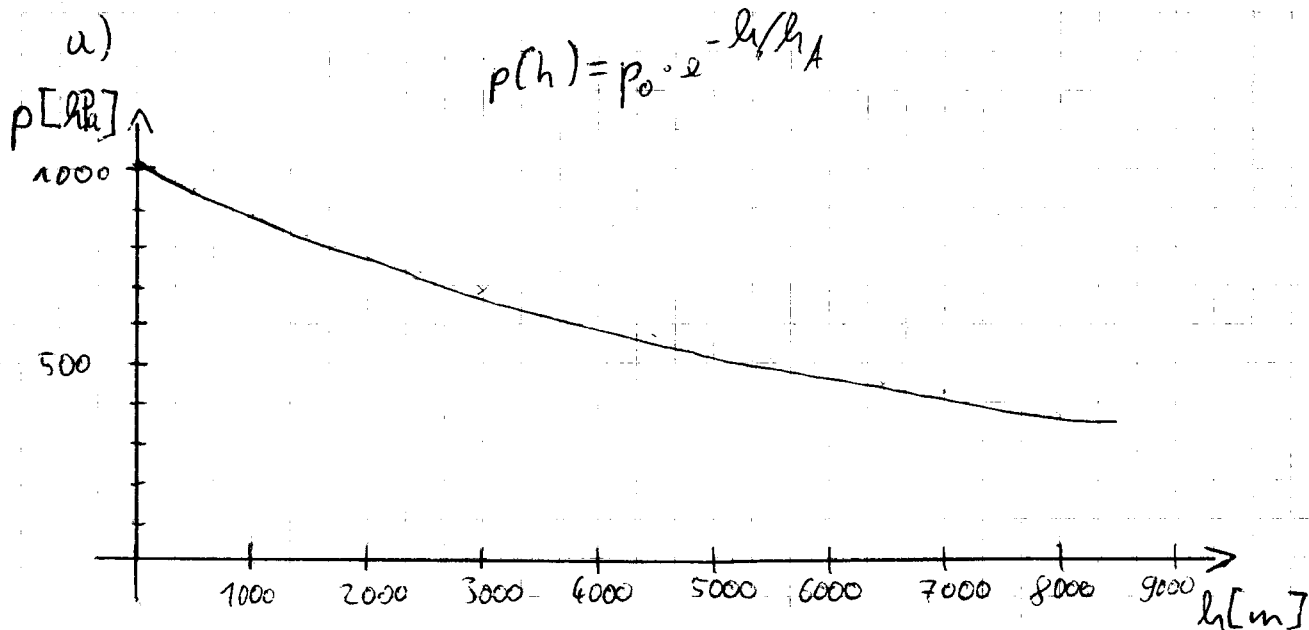
$$z_2: -\frac{1}{2} = \log x_2$$

$$x_2 = 10^{-\frac{1}{2}}$$

$$x_2 = \underline{\underline{\sqrt{10}^{-1}}}$$

$$I = \{ \sqrt{10}^{-1}, 1000 \}$$

3)



b.)

$$506,5 \text{ hPa} = 1013 \text{ hPa} \cdot e^{-\left(\frac{x}{8000 \text{ m}}\right)} \quad | : 1013 \text{ hPa}$$

$$\frac{1}{2} = e^{-\left(\frac{x}{8000 \text{ m}}\right)}$$

$$-\frac{x}{8000 \text{ m}} = \ln \frac{1}{2}$$

$$x = \ln \frac{1}{2} \cdot (-8000 \text{ m})$$

$$x \approx \underline{\underline{5545,18 \text{ m}}}$$