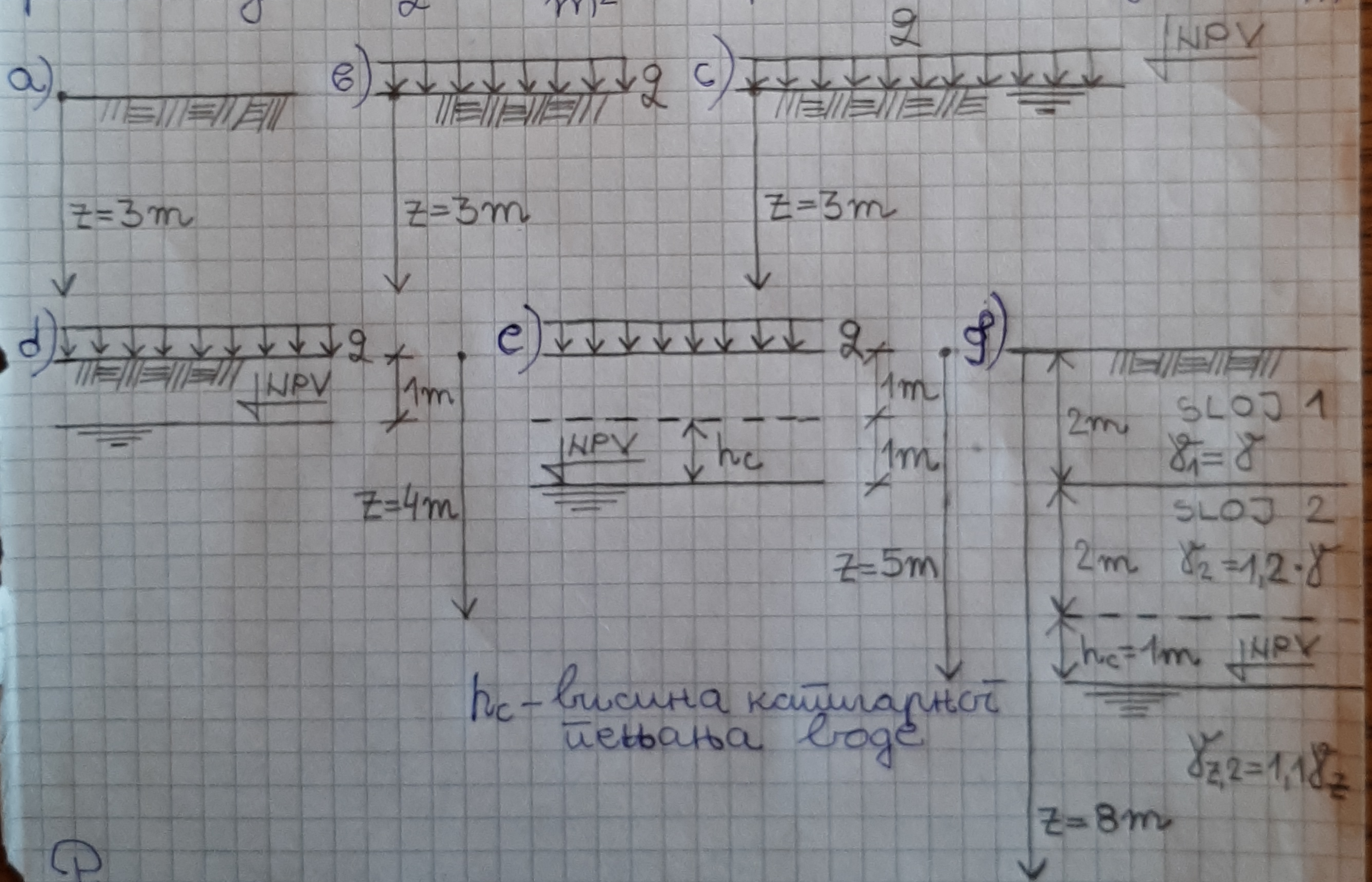


# ЗАДАТАК

За задате геолошке профиле терена израчу-  
најти бриједности и скицајте дијаграме  
вертикалних поглавних напона ( $\sigma_v$ ), хорних  
притиска ( $u$ ) и вертикалних ефективних  
напона  $\sigma'_v$  до дубине  $z$ . Запремина  
тежина тла износи  $\gamma = 18 \frac{\text{kN}}{\text{m}^3}$ . Запремина  
тежина тла у засићеном стању износи  $\gamma_z = 21 \frac{\text{kN}}{\text{m}^3}$ .  
Расподјелено оптерећење по површини те-  
рета износи  $q = 20 \frac{\text{kN}}{\text{m}^2}$ . Запремина те. воде  $\gamma_w = 10 \frac{\text{kN}}{\text{m}^3}$ .

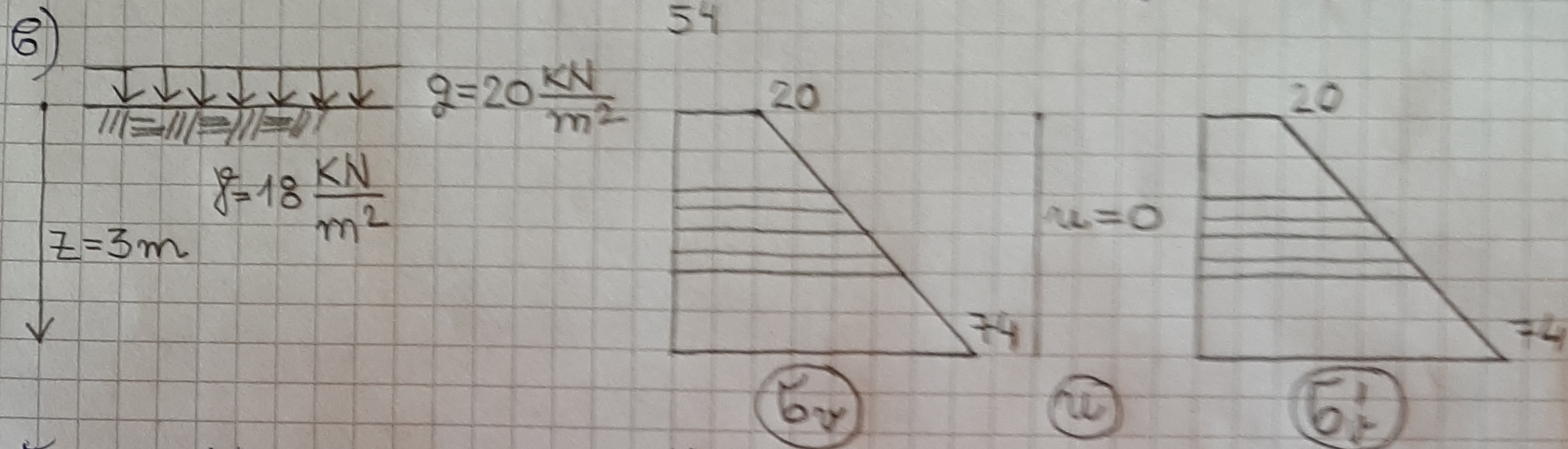
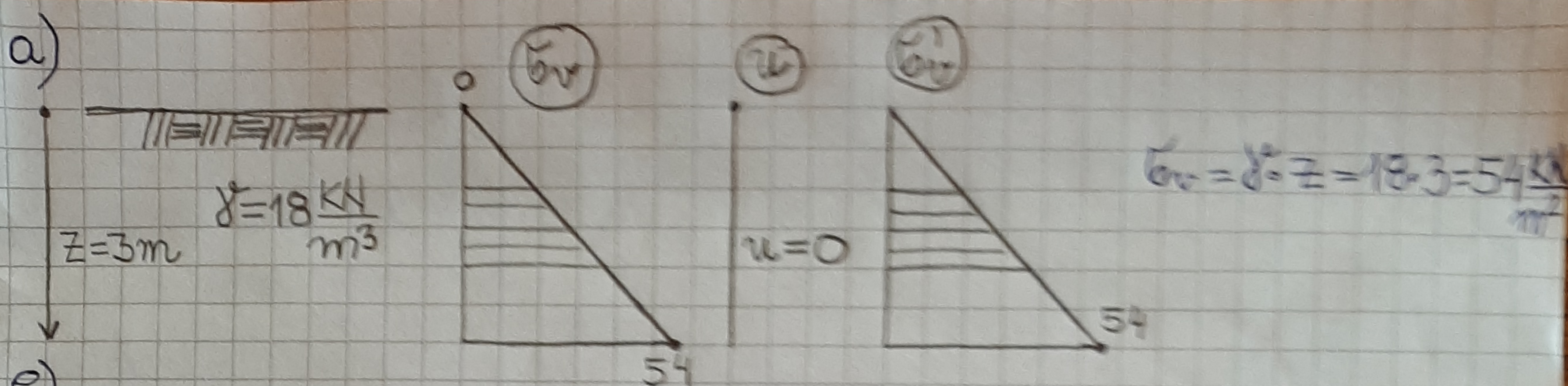


Решене

$$\sigma'_v = \sigma_v - u$$

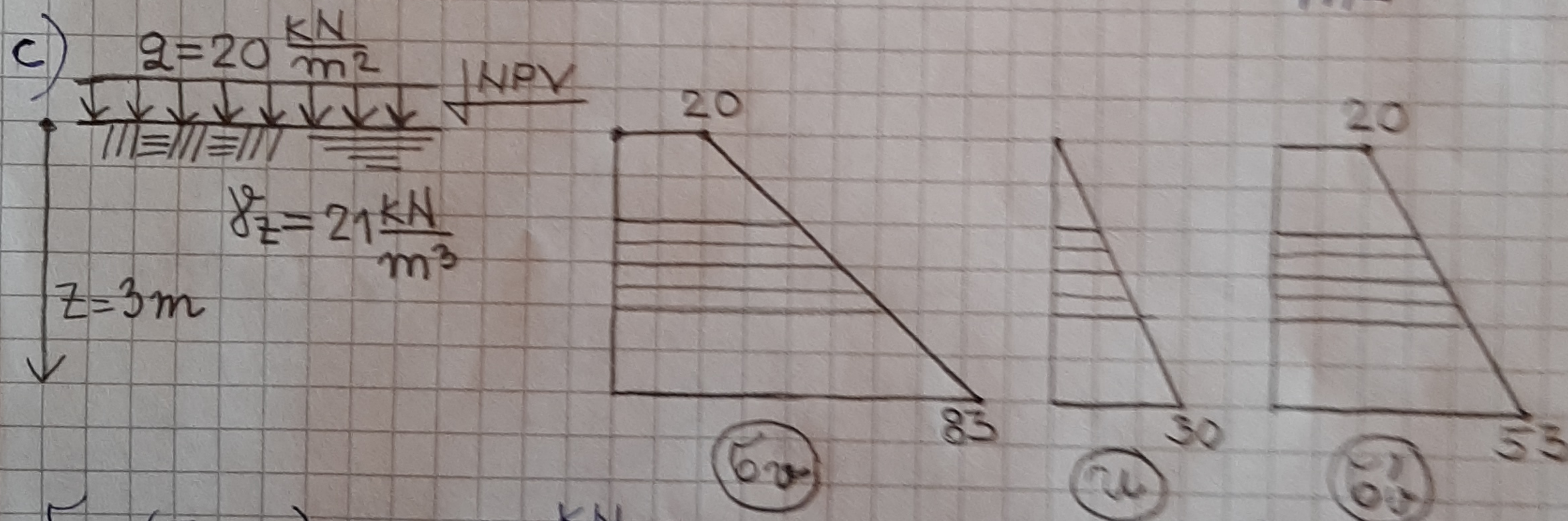
$$u = \gamma_w \cdot h_w$$

Расподјела напона  $\sigma_v$  односно  $\sigma'_v$  по дубини тла  
је линеарна. Најбоље праве линије се скицају при  
пројекцији запреминске тежине тла.



$\sigma_v(z=0) = q = 20 \frac{\text{kN}}{\text{m}^2}$

$\sigma_v(z=3\text{m}) = q + \gamma \cdot z = 20 + 18 \cdot 3 = 74 \frac{\text{kN}}{\text{m}^2}$



$\sigma_v(z=0) = q = 20 \frac{\text{kN}}{\text{m}^2}$      $u(z=0) = 0 \Rightarrow \sigma_v'(z=0) = 20 \frac{\text{kN}}{\text{m}^2}$

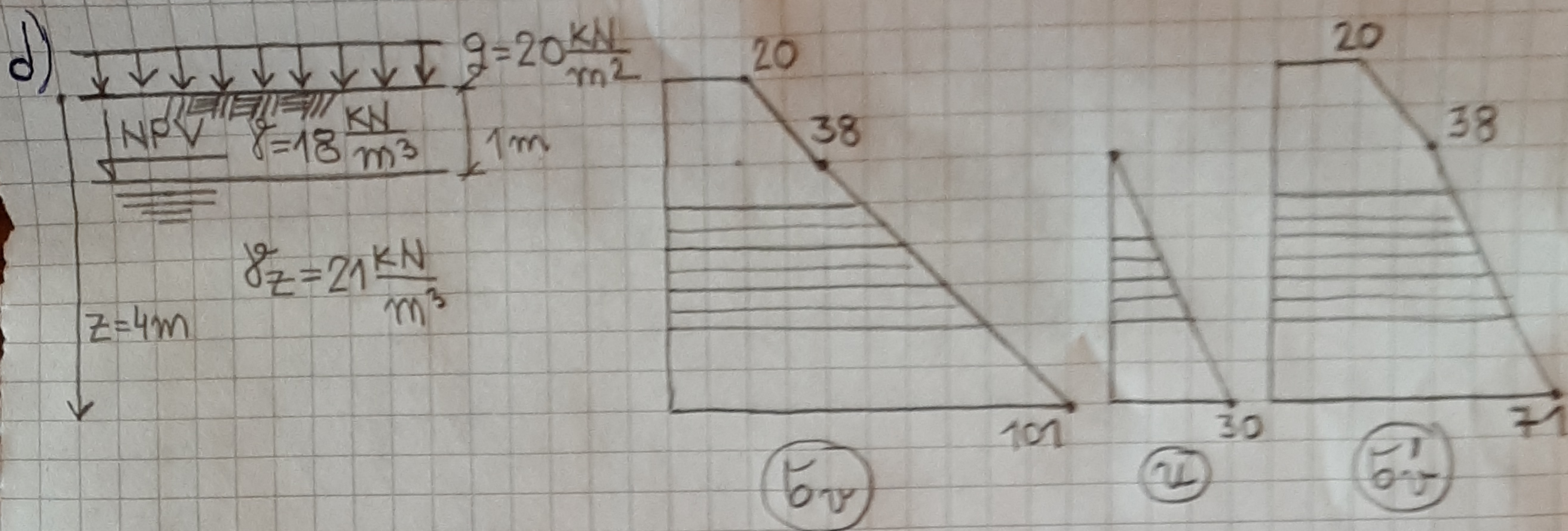
$\sigma_v(z=3\text{m}) = 20 + 21 \cdot 3\text{m} = 83 \frac{\text{kN}}{\text{m}^2}$      $u(z=3\text{m}) = 10 \cdot 3 = 30 \frac{\text{kN}}{\text{m}^2}$

$\sigma_v'(z=3\text{m}) = 83 - 30 = 53 \frac{\text{kN}}{\text{m}^2}$

На гудини  $z=3\text{m}$  вертикални ефективни напон се може израчунавати директно на следећи начин:

$$\sigma_v'(z=3\text{m}) = \underbrace{q + \gamma_z \cdot z}_{\sigma_v} - \underbrace{\gamma_w \cdot z}_u = q + (\gamma_z - \gamma_w) \cdot z = q + \gamma' \cdot z$$

$\sigma_v'(z=3\text{m}) = 20 + (21 - 10) \cdot 3 = 53 \frac{\text{kN}}{\text{m}^2}$



$$\sigma_v(z=0) = q = 20 \frac{\text{kN}}{\text{m}^2} \quad u(z=0) = 0 \Rightarrow \sigma'_v(z=0) = 20 \frac{\text{kN}}{\text{m}^2}$$

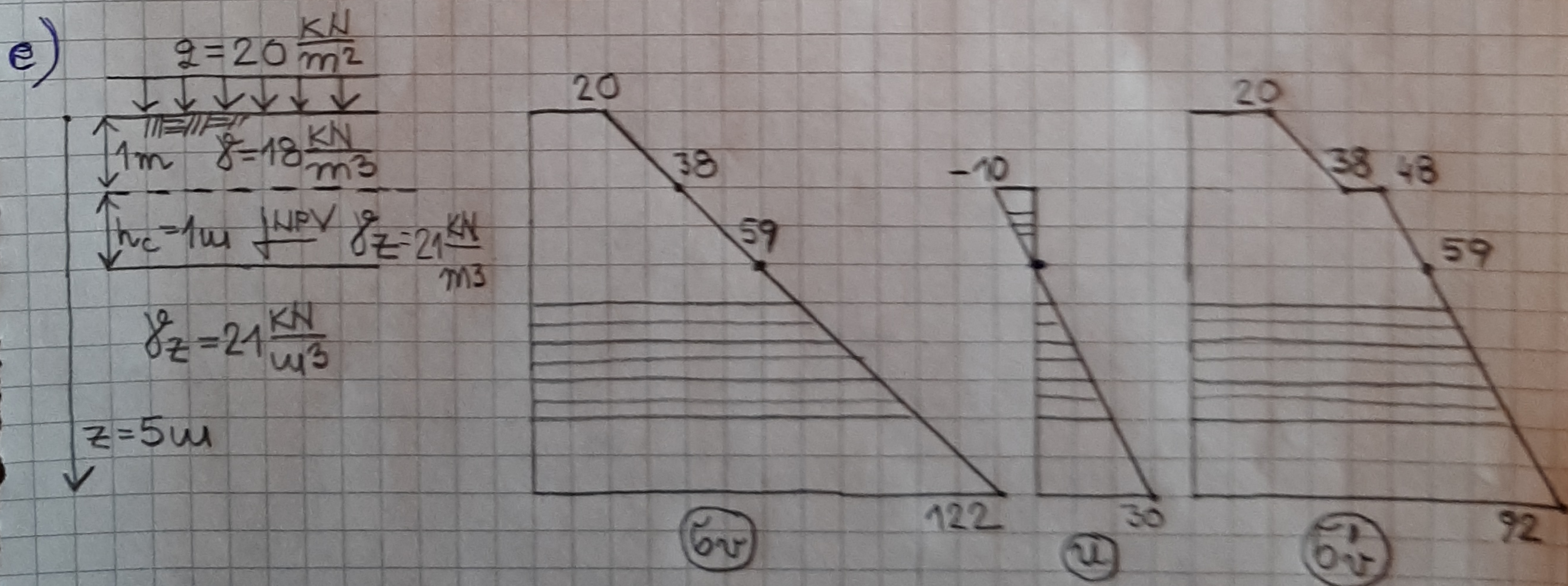
$$\sigma_v(z=1\text{m}) = 20 + 18 \cdot 1 = 38 \frac{\text{kN}}{\text{m}^2} \quad u(z=1\text{m}) = 0 \Rightarrow \sigma'_v(z=1\text{m}) = 38 \frac{\text{kN}}{\text{m}^2}$$

$$\sigma_v(z=4\text{m}) = 20 + 18 \cdot 1 + 21 \cdot 3 = 101 \frac{\text{kN}}{\text{m}^2} \quad u(z=4\text{m}) = 10 \cdot 3 = 30 \frac{\text{kN}}{\text{m}^2}$$

$$\sigma'_v(z=4\text{m}) = 101 - 30 = 71 \frac{\text{kN}}{\text{m}^2}$$

$$\sigma'_v(z=4\text{m}) = \underbrace{20}_{q} + \underbrace{18 \cdot 1}_{\gamma \cdot 1\text{m}} + \underbrace{21 \cdot 3}_{\gamma_z \cdot 3\text{m}} - \underbrace{10 \cdot 3}_{\gamma_w \cdot 3\text{m}} = 20 + 18 \cdot 1 + (21 - 10) \cdot 3$$

$$\sigma'_v(z=4\text{m}) = 71 \frac{\text{kN}}{\text{m}^2}$$



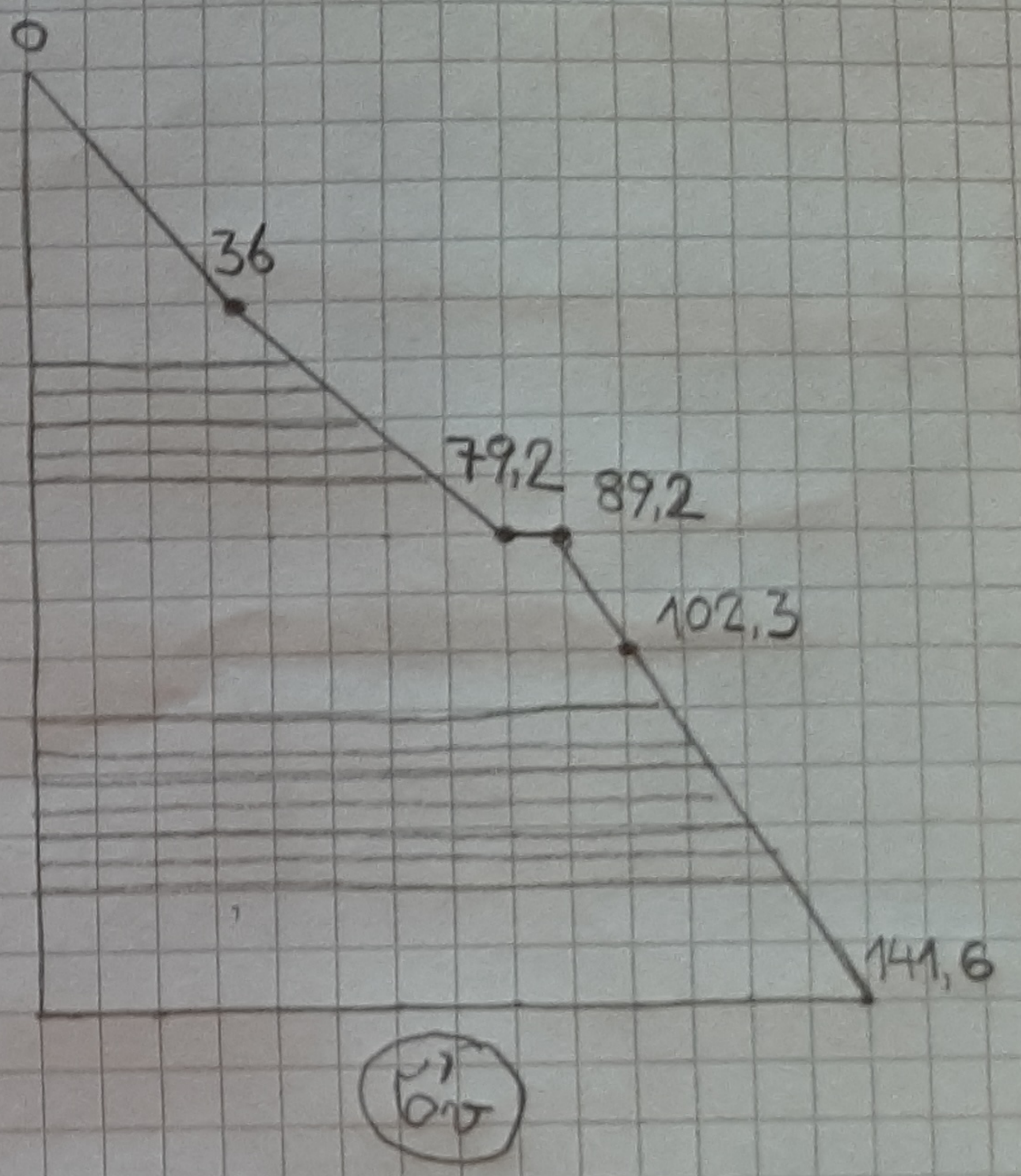
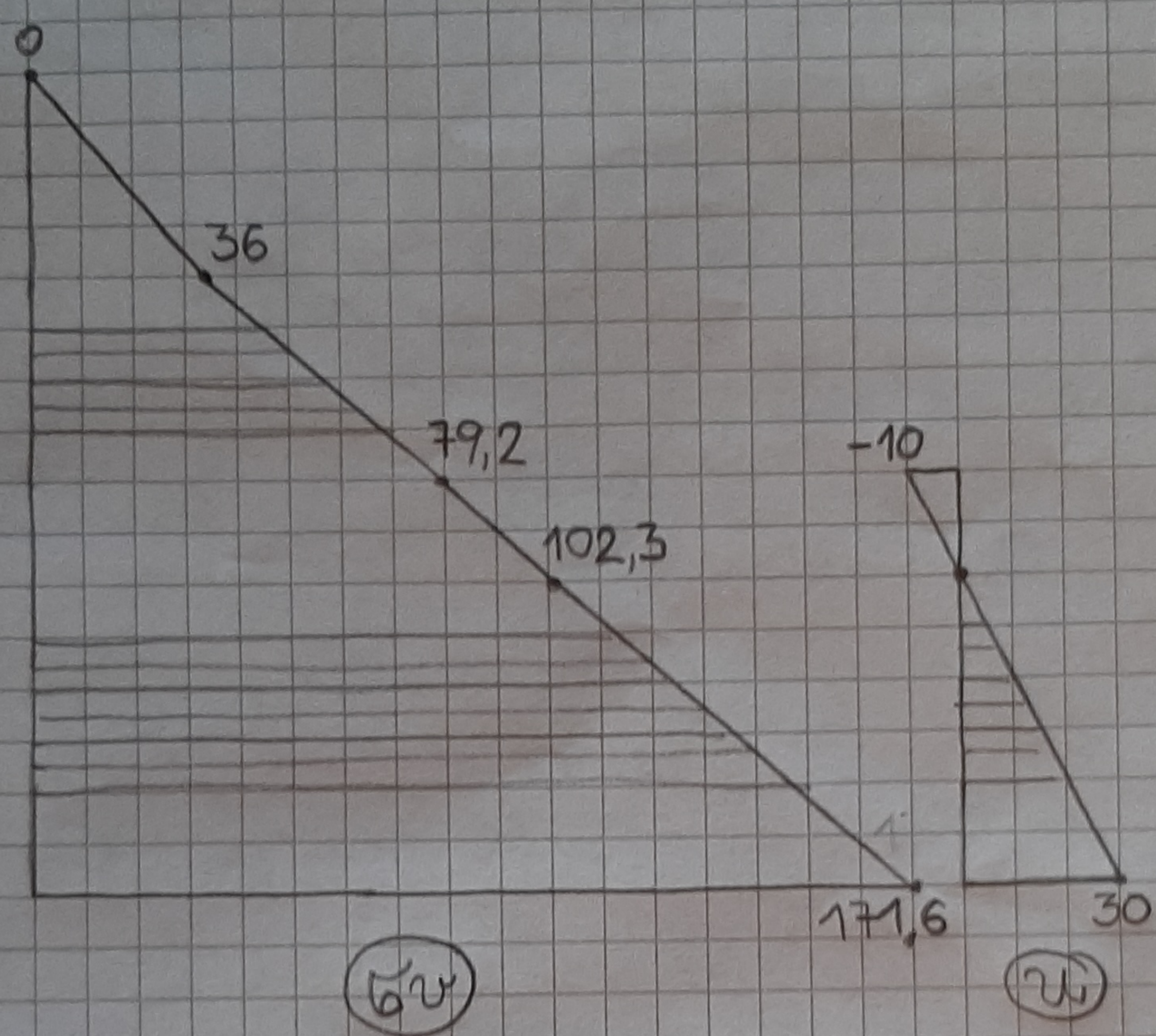
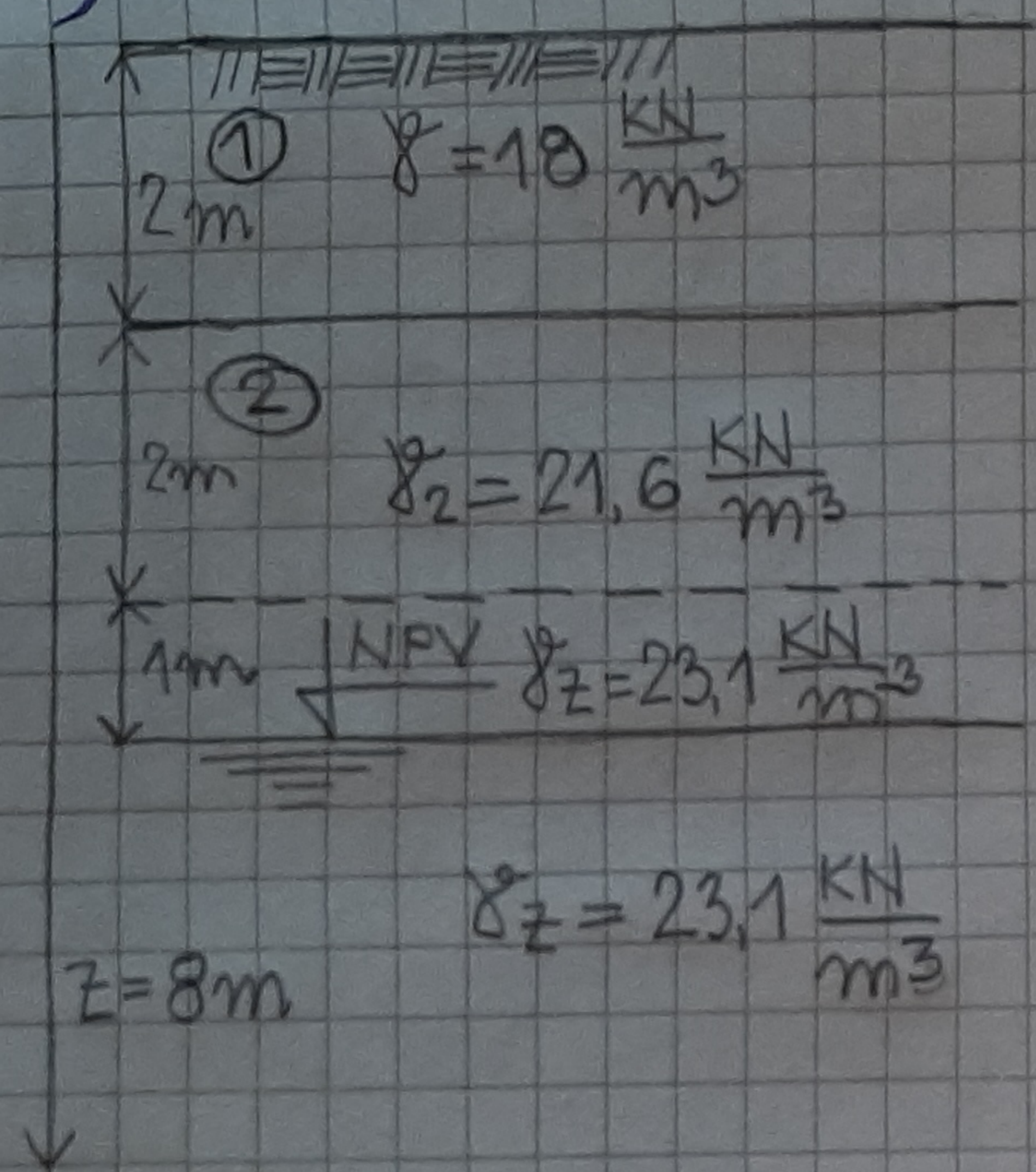
$$\sigma_v(z=0) = 20 \frac{\text{kN}}{\text{m}^2} \quad u(z=0) = 0 \quad \sigma'_v(z=0) = 20 \frac{\text{kN}}{\text{m}^2}$$

$$\sigma_v(z=1\text{m}) = 38 \frac{\text{kN}}{\text{m}^2} \quad u(z=1\text{m})^{\text{pore}} = 0 \Rightarrow \sigma'_v(z=1\text{m})^{\text{pore}} = 38 \frac{\text{kN}}{\text{m}^2}$$

$$\sigma_v(z=1\text{m}) = 38 \frac{\text{kN}}{\text{m}^2} \quad u(z=1\text{m})^{\text{dofe}} = -10 \frac{\text{kN}}{\text{m}^2}$$

$$\sigma'_v(z=1\text{m})^{\text{dofe}} = \underbrace{38}_{\sigma_v} - \underbrace{(-10)}_u = 48 \frac{\text{kN}}{\text{m}^2}$$

f)



$$\begin{aligned} \sigma_v(z=2m) &= 18 \cdot 2 = 36 \frac{KN}{m^2} & u(z=2m) &= 0 & \sigma_v'(z=2m) &= 36 \frac{KN}{m^2} \\ \sigma_v(z=4m)^{gove} &= 18 \cdot 2 + 21,6 \cdot 2 = 79,2 \frac{KN}{m^2} & u(z=4m)^{gove} &= 0 & \sigma_v'(z=4m)^{gove} &= 79,2 \frac{KN}{m^2} \\ \sigma_v(z=4m)^{dolje} &= 79,2 \frac{KN}{m^2} & u(z=4m)^{dolje} &= -10 \frac{KN}{m^2} & \sigma_v'(z=4m)^{dolje} &= 79,2 - (-10) = 89,2 \frac{KN}{m^2} \\ \sigma_v(z=5m) &= 18 \cdot 2 + 21,6 \cdot 2 + 23,1 \cdot 1 = 102,3 \frac{KN}{m^2} & u(z=5m) &= 0 & \sigma_v' &= 102,3 \frac{KN}{m^2} \\ \sigma_v(z=8m) &= 18 \cdot 2 + 21,6 \cdot 2 + 23,1 \cdot 1 + 23,1 \cdot 3 = 171,6 \frac{KN}{m^2} & u(z=8m) &= 10 \cdot 3 = 30 \frac{KN}{m^2} \\ \sigma_v'(z=8m) &= 141,6 \frac{KN}{m^2} \end{aligned}$$