

1)  $m_v = 80 \text{ g}$

a)  $V_1 = 75 \text{ cm}^3$

$m_1 = 170 \text{ g} - 80 \text{ g} = 90 \text{ g}$

$\rho_1 = \frac{m_1}{V_1} = 90/75 = \underline{\underline{1,2 \text{ g/cm}^3}}$

b)  $V_2 = 65 \text{ cm}^3$

$\rho_2 = 800 \text{ g/cm}^3 = 0,8 \text{ g/cm}^3$

$m_2 = V_2 \cdot \rho_2 = 65 \cdot 0,8 = 52 \text{ g}$        $m = 52 + 80 = \underline{\underline{132 \text{ g}}}$

c)  $\rho = 1100 \text{ g/cm}^3 = 1,1 \text{ g/cm}^3$

$m_3 = 170,2 \text{ g} - 80 \text{ g} = 90,2 \text{ g}$

$V_3 = \frac{m_3}{\rho_3} = \underline{\underline{82 \text{ cm}^3}}$

d)  $m = m_1 + m_2 + m_3 = 90 + 52 + 90,2 = 232,2 \text{ g}$

$V = V_1 + V_2 + V_3 = 75 + 65 + 82 = 222 \text{ cm}^3$

$\rho = \frac{m}{V} = \frac{232,2}{222} \doteq 1,046 \text{ g/cm}^3$

2) plavání:  $\rho_1 = 600 \text{ m}, \tau_1 = 20 \text{ min} = 1200 \text{ s}$

cyklist.  $\rho_2 = 15 \text{ km} = 15000 \text{ m}, N_2 = 25 \text{ km/h}$

$\tau_2 = \frac{\rho}{N} = 0,6 \text{ h} = 2160 \text{ s} = 36 \text{ min}$

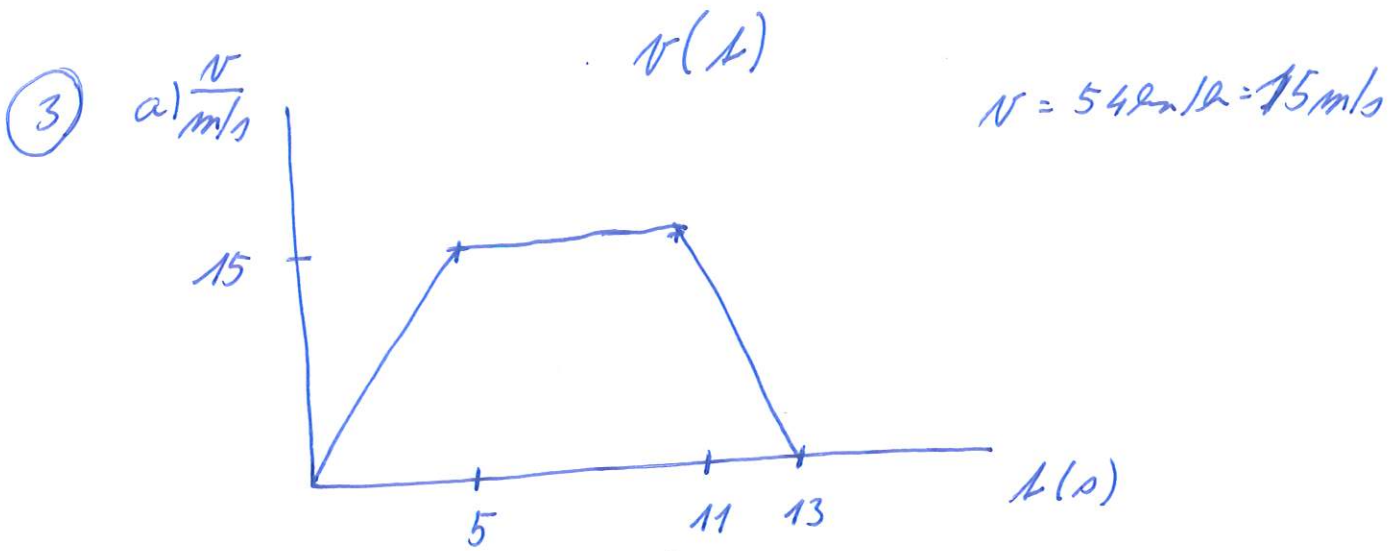
běh:  $N_3 = 6 \text{ m/s}, \tau_3 = 12 \text{ min } 15 \text{ s} = 735 \text{ s}$

$\rho_3 = N \cdot \tau = 6 \cdot 735 = 4410 \text{ m}$

délka závodu:  $\rho_c = \rho_1 + \rho_2 + \rho_3 = 600 + 15000 + 4410 = \underline{\underline{20010 \text{ m}}}$

čas vítěze:  $\tau_c = \tau_1 + \tau_2 + \tau_3 = 1200 + 2160 + 735 = \underline{\underline{4095 \text{ s}}}$

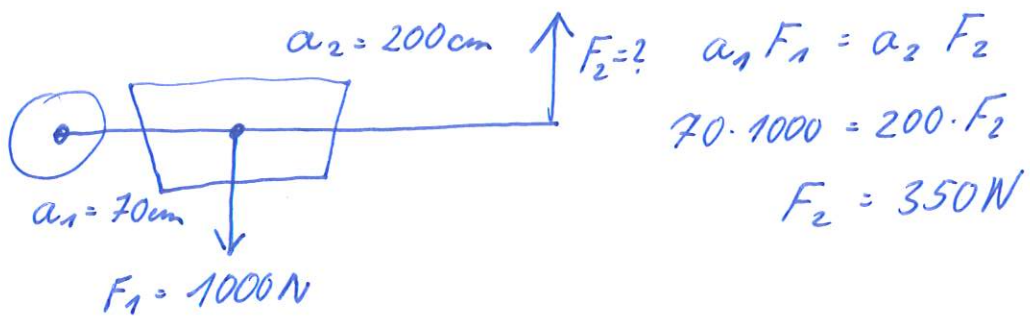
$N_p = \frac{\rho_c}{\tau_c} = \frac{20010}{4095} \doteq 4,89 \text{ m/s} = \underline{\underline{17,59 \text{ km/h}}}$



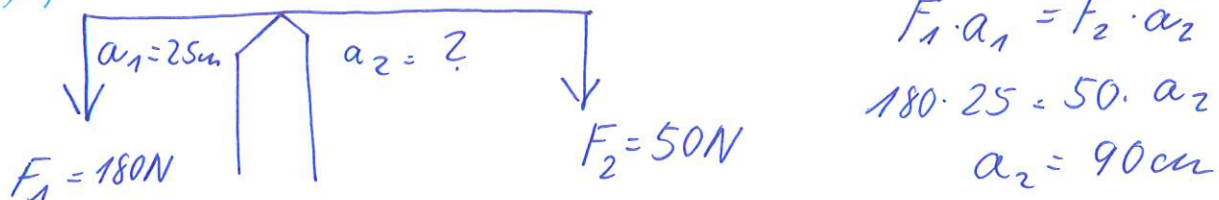
b) rozjídění  $s = v_p \cdot t = 7,5 \cdot 5 = 37,5 \text{ m}$   
 rovnoměrný  $s = v \cdot t = 15 \cdot 6 = 90 \text{ m}$   
 zpomalení  $s = v_p \cdot t = 7,5 \cdot 2 = 15 \text{ m}$

c)  $s_c = 37,5 + 90 + 15 = 142,5 \text{ m}$   $t_c = 13 \text{ s}$   
 $v_p = \frac{s_c}{t_c} = 10,96 \text{ m/s}$

4) a)



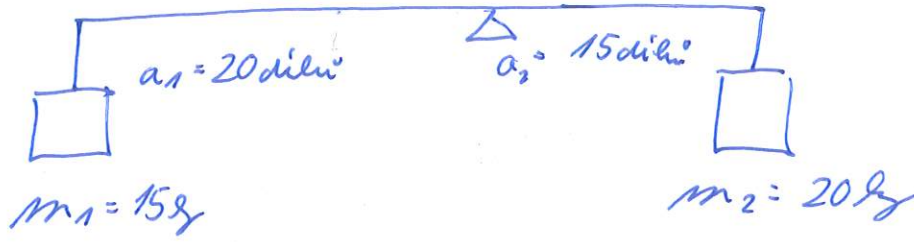
b)



$l = a_1 + a_2 = 25 + 90 = \underline{\underline{115 \text{ cm}}}$

$$a = 280 \text{ cm}$$

d)



$$\begin{array}{l} 35 \text{ dilu} \dots 280 \text{ cm} \\ 1 \text{ dilu} \dots 8 \text{ cm} \\ \hline \end{array}$$

$$\begin{array}{l} 20 \text{ dilu} \quad 160 \text{ cm} \\ 15 \text{ dilu} \quad 120 \text{ cm} \end{array}$$

$$\underline{\underline{a_1 = 160 \text{ cm}}}$$

$$\underline{\underline{a_2 = 120 \text{ cm}}}$$