

Q1

a) Faux, car $[wt^2] = T^{-1} T^2 = T \neq 1$

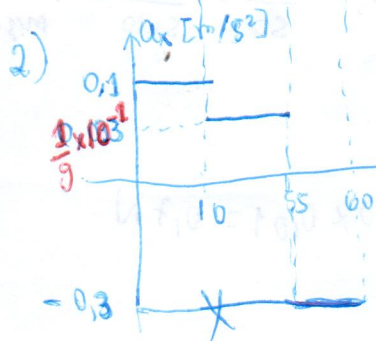
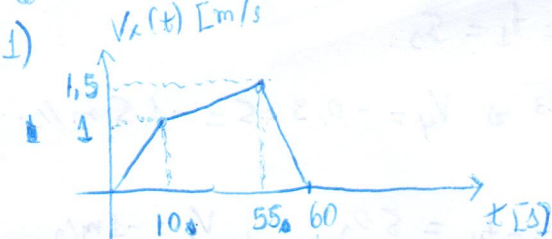
b) Faux, car $[w] = T^{-1} \neq \left[\sqrt{\frac{m}{k}} \right] = \sqrt{\frac{[m]}{[k]}} = \left(\frac{M}{MT^{-2}} \right)^{1/2} = (T^2)^{1/2} = T$

c) $m = 1,5 \times 10^{17} \text{ kg}$, $R = 50 \text{ km}$

$$i) g = \frac{Gm}{R^2} \Rightarrow [G] = [R^2 g / m] = L^2 \cdot L T^{-1} M^{-1} = L^3 T^{-1} M^{-1}$$

$$ii) g = \frac{5 \times 10^{-11} \cdot 1,5 \times 10^{17}}{(50 \times 10^3)^2} = \frac{5 \cdot 15 \cdot 10^{-11} \cdot 10^{16}}{(5 \cdot 10^4)^2} = \frac{7,5 \cdot 3 \cdot 10^5}{25 \cdot 10^8} = 3 \times 10^3 \text{ m/s}^2$$

Q2



$$a_1 = \frac{1-0}{10-0} = 0,1 \text{ m/s}^2$$

$$a_2 = \frac{1,5-1}{55-10} = \frac{0,5}{45} = \frac{1}{9} \times 10^{-1} \text{ m/s}^2$$

$$= \frac{0,5}{45} = \frac{3 \cdot 10^{-1}}{45 \cdot 3} = \frac{1}{30} \text{ m/s}^2$$

Q2.2) cont:

$$a_3 = \frac{0-1,5}{60-55} = \frac{-3 \times 10^{-1}}{5} = -0,3 \text{ m/s}^2$$

$$3) a_4 = a_3 \Rightarrow \frac{V_4 - V_3}{t_4 - t_3} = a_4 = a_3$$

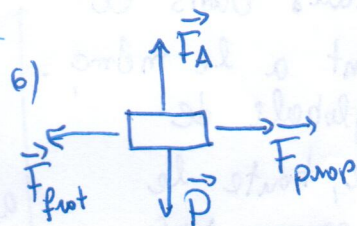
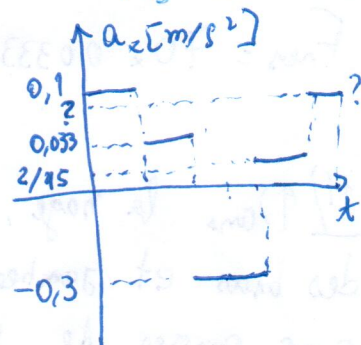
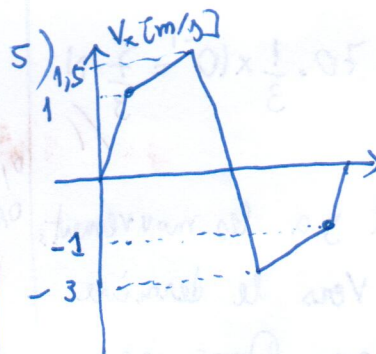
$$\Rightarrow V_4 = a_3 \times t_4 + V_3$$

$$V_4 = -0,3 \times 10 + 0 = -3 \text{ m/s}$$

$$4) V_5 = \frac{2}{3} V_4 = -\frac{2}{3} \times \frac{3}{2} = -1 \text{ m/s}$$

$$a_5 = \frac{V_5 - V_4}{t_5 - t_4} = \frac{-1 - (-3)}{45} = \frac{2}{45} \text{ m/s}^2$$

on doit supposer $t_5 = t_4 = t_2 - t_1 = 45$



\vec{F}_A : poussée d'Archimède
 \vec{P} : Poids
 \vec{F}_{prop} : Force de propulsion
 \vec{F}_{frot} : Force frottement

$$7) \sum \vec{F} = m \vec{a} \Rightarrow \begin{cases} F_{prop} - F_{frot} = m a_x \\ F_A - P = m a_y = 0 \end{cases}$$

$$8) P = mg = 70 \times 10 = 700 \text{ N}$$

points principales
 - $[g]$: force?
 - kg n'est pas SI?
 - pente accélération \checkmark
 - vecteurs \rightarrow ses composantes.
 - réaction.