$$a = \frac{\Delta v}{\Delta t} = \frac{v - v_0}{t} \quad \left[\frac{m}{s^2}\right]$$

$$\begin{cases} v = v_0 + at \\ v^2 = v_0^2 + 2as \\ s = v_0 t + \frac{1}{2} a t^2 \end{cases}$$

$km/h \xrightarrow{\div 3.6} m/s$

$m/s \xrightarrow{\times 3.6} km/h$

4) $v_0 = 0$

$t = 29\,s$

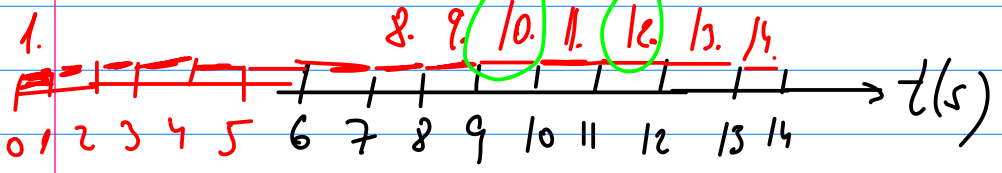
$v = 260\ km/h = 72.2\ m/s$

$a = ?$

$$a = \frac{\Delta v}{\Delta t} = \frac{v - v_0}{t} = \frac{72.2\ m/s - 0}{29\,s}$$

$$a = 2.49\ m/s^2$$

5)



$\Delta t = 2\,s$

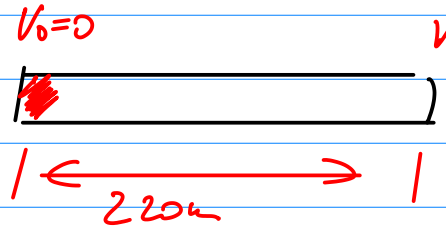
$v_0 = 28\ m/s$

$v = 13\ m/s$

$a = ?$

$$a = -7.5\ m/s^2$$

6)



$v_0 = 0$

$v = 10.97\ \frac{km}{s} = 10970\ m/s$

$s = 220\,m$

$a = ?$

$v^2 = v_0^2 + 2as$

$v^2 = 2as \Rightarrow a = \frac{v^2}{2s} = \frac{(10970\ m/s)^2}{440\,m} = 273502\ m/s^2$

$\approx 27\,350\,g$

a) $v_0 = 100\,m/s$

$a = -5\,m/s^2$

$v = 0$

$s = ?$

$t = ?$

$v^2 = v_0^2 - 2as$

$0 = v_0^2 - 2as$

$2as = v_0^2$

$s = \frac{v_0^2}{2a} = \frac{(100\,m/s)^2}{2 \cdot 5\,m/s^2} = 1000\,m$

$v = v_0 - a \cdot t$

$at = v_0 - v$

$t = \frac{v_0 - v}{a} = 20\,s$

16) I

$v_0 = 0$

$a = 2\,m/s^2$

$v = 20\,m/s$

$t_1 = ?$

$v = v_0 + at$

$v = at$

$t = \frac{v}{a} = 10\,s$

$t_1 = 10\,s$

$s_1 = ?$

$s_1 = \frac{1}{2} a t_1^2 = \frac{1}{2} \cdot 2\,m/s^2 \cdot (10\,s)^2 = 100\,m$

II

$v = 20\,m/s$

$t = 20\,s$

$t_2 = t = 20\,s$

$s_2 = ?$

$s_2 = v \cdot t$

$s_2 = 20\,m/s \cdot 20\,s$

$s_2 = 400\,m$

III

$a = \frac{\Delta v}{\Delta t}$

$a = \frac{v - v_0}{t}$

$a = -4\,m/s^2$

$v_0 = 20\,m/s$

$v = 0$

$t = 5\,s$

$t_3 = t = 5\,s$

$s_3 = ?$

$s_3 = v_0 \cdot t - \frac{1}{2} a t^2$

$s_3 = 20\,m/s \cdot 5\,s - \frac{1}{2} 4\,m/s^2 \cdot (5\,s)^2$

$s_3 = 100\,m - 50\,m$

$s_3 = 50\,m$

a) $t = ?$

b) $\bar{v} = ?$

a) $t = t_1 + t_2 + t_3$

$t = 35\,s$

b) $\bar{v} = \frac{s}{t}$

$s = s_1 + s_2 + s_3$

$s = 550\,m$

$\bar{v} = \frac{550\,m}{35\,s} = 15.7\,m/s$

1) a) $36 \frac{km}{h} = ? \frac{m}{s}$

$72 \frac{km}{h} \rightarrow 20 \frac{m}{s}$

$36 \frac{km}{h} = 36 \cdot \frac{1000 m}{3600 s} = 10 \frac{m}{s}$

$\frac{km}{h} \xrightarrow{:3.6} \frac{m}{s}$ $\quad \frac{m}{s} \xrightarrow{\times 3.6} \frac{km}{h}$

$15 \frac{m}{s} = ? \frac{km}{h}$

$15 \frac{m}{s} = 15 \cdot \frac{\frac{1}{1000} km}{\frac{1}{3600} h} = 15 \cdot \frac{3600 km}{1000 h} = 15 \cdot 3{,}6 \frac{km}{h} = 54 \frac{km}{h}$

2)

$s = 35 km$

$t = 35 min$

$v = ?$

$v = \frac{s}{t} = \frac{35 km}{\frac{35}{60} h} = \frac{35 \cdot 60 km}{1 \cdot 35 h} = 60 \frac{km}{h}$

$t = 35 min = \frac{35}{60} h$