

Activitats MRUA

1) Dades

a. $v = 30 \text{ m/s}$
 $t = 10 \text{ s}$
 $v_0 = 0 \text{ m/s}$
 $t_0 = 0 \text{ s}$

$$a = \frac{v - v_0}{t - t_0} = \frac{30 - 0}{10 - 0} = [3 \text{ m/s}^2]$$

b. $v = v_0 + a \cdot t$
 $v = 3 \cdot 6 = [18 \text{ m/s}]$

Si $t = 6 \text{ s}$ encara no havia arribat als 30 m/s als 10 s .

2) Dades

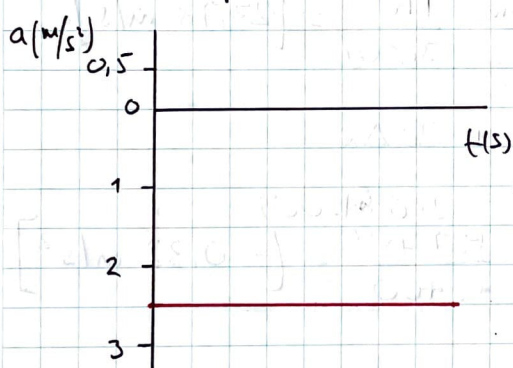
a. $v_0 = 108 \text{ km/h}$
 $v = 0 \text{ m/s} \rightarrow \text{s'atura}$
 $t = 12 \text{ s}$

$$\frac{108 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = [30 \text{ m/s}]$$

$$a = \frac{v - v_0}{t - t_0} = \frac{0 - 30}{12 - 0} = [-2,5 \text{ m/s}^2]$$

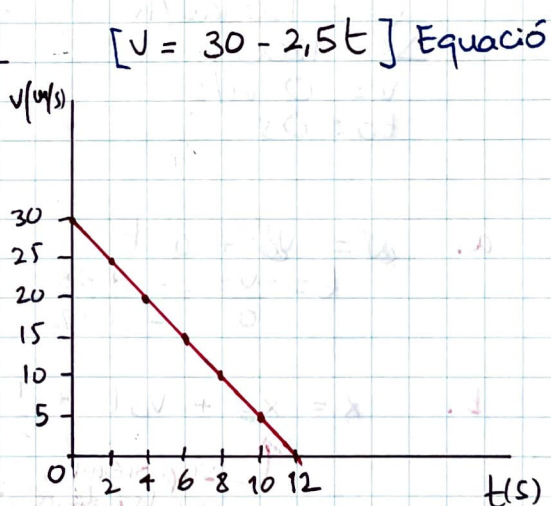
frena!

b. Gràfic $a - t$



Gràfic $v - t$

$t \text{ (s)}$	$v \text{ (m/s)}$
0	30
2	25
4	20
6	15
8	10
10	5
12	0



$$[v = 30 - 2,5t] \text{ Equació}$$

3) Dades

$v_0 = 144 \text{ km/h}$
 $v = 0 \text{ m/s}$
 $t = 1 \text{ min } 20 \text{ s} = 80 \text{ s}$

$$\frac{144 \text{ km}}{\text{h}} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = [40 \text{ m/s}]$$

a. $a = \frac{v - v_0}{t - t_0} = \frac{0 - 40}{80 - 0} = [-0,5 \text{ m/s}^2]$

frena!

b. $\frac{216 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 60 \text{ m/s}$

$$v = v_0 + a \cdot t$$

$$0 = 60 - 0,5t$$

$$t = \frac{60}{0,5} = [120 \text{ s}]$$

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a.

(A) MRU $v = 30 \text{ m/s}$ } $x_0 = 0 \text{ m}$ $x = 30t$

(B) MRUA $a = 1,5 \text{ m/s}^2$ } $t_0 = 0 \text{ s}$ $v_0 = 0 \text{ m/s}$ $x = \frac{1,5t^2}{2}$

(A) $x = x_0 + v \cdot (t - t_0)$

$[x = 30t]$

(B) $x = x_0 + v_0 t + \frac{1}{2} a t^2$

$[x = 0,75t^2]$

Condiç es $\rightarrow$ igualar equa  es

$30t = 0,75t^2$

$0,75t^2 - 30t = 0$

$t(0,75t - 30) = 0$

$t = 0 \text{ s}$ ja ho sabem

$\rightarrow t = \frac{30}{0,75} = [40 \text{ s}]$

b. $x = 30 \cdot 40 = [1200 \text{ m}]$

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Dades

$v_0 = -100 \text{ km/h}$

$\Delta x = 1200 \text{ m}$

$v = 0 \text{ m/s}$

$t_0 = 0 \text{ s}$

$\frac{-100 \text{ km}}{\text{h}} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = [27,78 \text{ m/s}]$

$v^2 = v_0^2 + 2a\Delta x$

$-(-27,78)^2 = 2 \cdot a \cdot 1200$

$a = \frac{-(27,78)^2}{2400} = [-0,32 \text{ m/s}^2]$

a. $v = v_0 + a \cdot t$

$t = \frac{-v_0}{a} = \frac{-27,78}{-0,32} = [86,4 \text{ s}]$

b. $x = x_0 + v_0 t + \frac{1}{2} a t^2 = 1200 - 27,78 \cdot 10 - \frac{1}{2} \cdot 0,32 (10)^2 = 906,2 \text{ m}$

$\uparrow$ suprimem que ha de rec  rir als 1200 m

dist  ncia: $1200 - 906,2 = [293,8 \text{ m}]$

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Dades

$v = 25 \text{ km/h}$

$v_0 = 50 \text{ km/h}$

$t = 4 \text{ s}$

$4 \text{ s} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 1,11 \cdot 10^{-3} \text{ h}$

$a = \frac{v - v_0}{t - t_0} = \frac{25 - 50}{1,11 \cdot 10^{-3} - 0} = [-22500 \text{ km/h}^2]$

$\Delta x \Rightarrow$

$v^2 = v_0^2 + 2a\Delta x$

$\Delta x = \frac{v^2 - v_0^2}{2a} = \frac{25^2 - 50^2}{2 \cdot (-22500)} = 0,0416 \text{ km} = [41,6 \text{ m}]$

7)

Dados

$$\left. \begin{array}{l} x_0 = 0 \text{ m} \\ t_0 = 0 \text{ s} \\ v_0 = 0 \text{ m/s} \end{array} \right\} \text{ rep\`os}$$

$$\begin{array}{l} v = 162 \text{ km/h} \\ t = 30 \text{ s} \end{array}$$

$$\frac{162 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 45 \text{ m/s}$$

a.

$$a = \frac{v - v_0}{t - t_0} = \frac{45 - 0}{30 - 0} = [1,5 \text{ m/s}^2]$$

b.

$$v^2 = \cancel{v_0^2} + 2a\Delta x$$

$$v = \sqrt{2a\Delta x} = \sqrt{2 \cdot 1,5 \cdot 200} = [24,49 \text{ m/s}]$$