

$$x = x_0 + v(t - t_0)$$

(38)

Mòbil (A)

$$x_0 = 0 \text{ m}$$

$$v = 4 \text{ m/s}$$

Mòbil (B)

$$x_0 = 80 \text{ m}$$

$$v = -4 \text{ m/s}$$

$$t_0 = 6 \text{ s}$$

$$[x = 4t]$$

$$x = 80 - 4(t - 6)$$

$$[x = 104 - 4t]$$

Instant creuament

$$4t = 104 - 4t$$

$$8t = 104$$

$$t = \frac{104}{8} = [13 \text{ s}]$$

(39)

(A)

$$x_0 = 0 \text{ km}$$

$$v = 60 \text{ km/h}$$

$$[x = 60t]$$

(B)

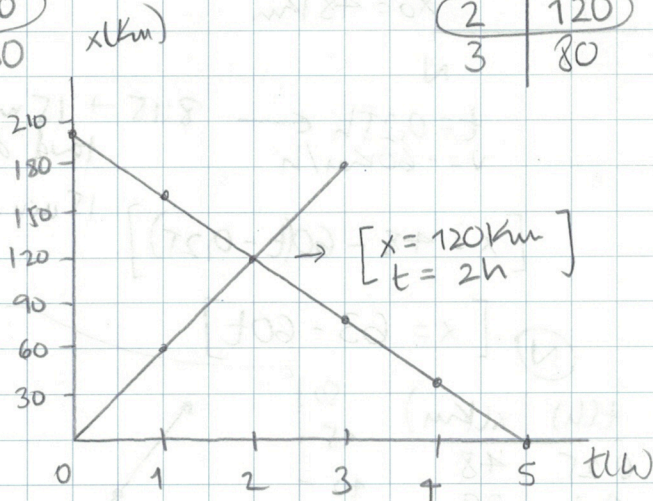
$$x_0 = 200 \text{ km}$$

$$v = -40 \text{ km/h}$$

$$[x = 200 - 40t]$$

t(h)	x(km)
0	0
1	60
2	120
3	180

t(h)	x(km)
0	200
1	160
2	120
3	80



(40)

verd

$$x = x_0 + v(t - t_0)$$

$$v = \frac{x - x_0}{t - t_0} = \frac{0 - 60}{10 - 0} = -6 \text{ m/s}$$

$$x_0 = 60 \text{ m}$$

$$t_0 = 0 \text{ s}$$

lentit negativ

$$[x = 60 - 6t]$$

vermell

$$v = \frac{x - x_0}{t - t_0} = \frac{54 - 0}{10 - 2} = 6,75 \text{ m/s}$$

$$x_0 = 0 \text{ m}$$

$$t_0 = 2 \text{ s}$$

lentit positiv

$$[x = -6,75(t - 2)]$$

$$[x = -6,75t + 13,5]$$

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Cotxe

$$v = 60 \text{ km/h}$$

$$t_0 = 0 \text{ h}$$

$$x_0 = 0 \text{ km}$$

Moto

$$v = 90 \text{ km/h}$$

$$t_0 = 0,5 \text{ h}$$

$$x_0 = 0 \text{ km}$$

Mateix punt unitat de referència

$$[x = 60t]$$

$$[x = 90t - 45]$$

t(h)	x(km)
0	0
0,5	30
1	60
1,5	90
2	120

t(h)	x(km)
0,5	0
1	45
1,5	90
2	135
2,5	180

Es trobaran al cap de 1,5 h a 90 km de distància

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$$\Delta x = 48 \text{ km}$$

$$x_0 = 48 \text{ km}$$

referència

8:00h

$$t = 0 \text{ h}$$

$$v = 45 \text{ km/h}$$

$$t = 0,25 \text{ h}$$

$$v = -60 \text{ km/h}$$

8:15 → 15 minuts més tard de la referència

$$15 \text{ min. } \frac{1 \text{ h}}{60 \text{ min}} = 0,25 \text{ h}$$

$$[x = 45t]$$

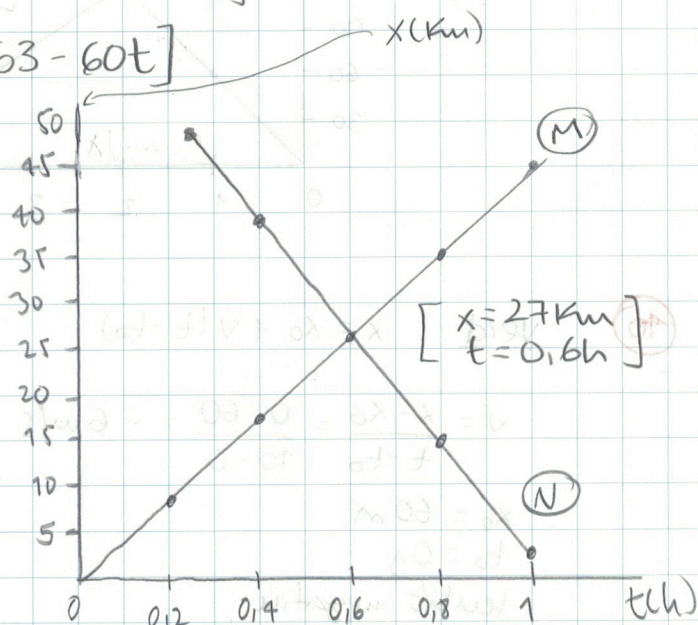
$$[x = 48 - 60(t - 0,25)]$$

(M)

t(h)	x(km)
0	0
0,2	9
0,4	18
0,6	27
0,8	36
1	45

(N)

t(h)	x(km)
0,25	48
0,4	39
0,6	27
0,8	15
1	3



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Repòs $\begin{cases} x_0 = 0\text{m} \\ v_0 = 0\text{ m/s} \\ t_0 = 0\text{s} \end{cases} \quad a = 8\text{ m/s}^2$

$$x = \cancel{v_0 t} + \cancel{v_0 t} + \frac{1}{2} a t^2$$

$$[x = 4t^2]$$

a) Si $x = 100\text{ m}$

$$100 = 4t^2$$

$$\frac{100}{4} = t^2$$

$$25 = t^2$$

$$t = \pm\sqrt{25} = [5\text{ s}]$$

b) $v = \cancel{v_0} + a \Delta t$

$$v = 8t \quad \text{en } t = 5\text{ s}$$

$$\hookrightarrow v = 8 \cdot 5 = [40\text{ m/s}]$$

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$$\begin{matrix} t_0 = 0\text{s} \\ v_0 = 20\text{ m/s} \end{matrix}$$

$$t = 30\text{s}$$

$$v = 5\text{ m/s}$$

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

a) $a = \frac{v - v_0}{t - t_0} = \frac{5 - 20}{30 - 0} = [-0,5\text{ m/s}^2]$

b) $t = 40\text{s} \quad [v = 20 - 0,5t]$

$$v = 20 - (0,5 \cdot 40) = [0\text{ m/s}]$$

$$t = 60\text{s}$$

$$v = 20 - (0,5 \cdot 60) = [-10\text{ m/s}]$$

45

$$v_0 = 26\text{ km/h}$$

$$v = 80\text{ km/h}$$

$$t = 2\text{ min}$$

$$a = \frac{v - v_0}{t - t_0} = \frac{80 - 26}{2 - 0} = [27\text{ km/h / min}]$$

$$\frac{27\text{ km}}{\text{h} \cdot \text{min}} \cdot \frac{1000\text{ m}}{1\text{ km}} \cdot \frac{1\text{ h}}{60\text{ min}} \cdot \frac{1\text{ K}}{3600\text{ s}} = [0,125\text{ m/s}^2]$$

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Repòs $\begin{cases} t_0 = 0\text{s} \\ v_0 = 0\text{ m/s} \\ x_0 = 0\text{m} \end{cases}$

$$a = \frac{v - v_0}{t - t_0} = \frac{10 - 0}{40 - 0} = [0,25\text{ m/s}^2]$$

$$x = \cancel{x_0} + \cancel{v_0 t} + \frac{1}{2} a t^2$$

$$x = \frac{0,25 \cdot (40)^2}{2} = [200\text{ m}]$$

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$[v_0 = 10\text{ m/s}] \leftarrow$ instant el gràfic

$$t_0 = 2\text{s}$$

$$a = \frac{v - v_0}{t - t_0} = \frac{30 - 10}{10 - 2} = 2,5\text{ m/s}^2$$

origen
 $x = 0\text{m}$

$$x = \cancel{x_0} + v_0(t - t_0) + \frac{1}{2} a(t - t_0)^2$$

$$[x = 10(t - 2) + 1,25(t - 2)^2] \rightsquigarrow x [1,25t^2 + 7,5t - 15]$$

simplificada

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$$v_0 = 10 \text{ m/s}$$

$$a = -0,8 \text{ m/s}^2$$

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

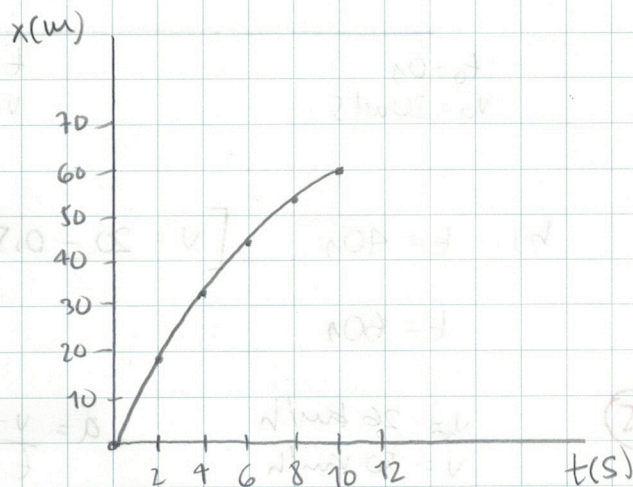
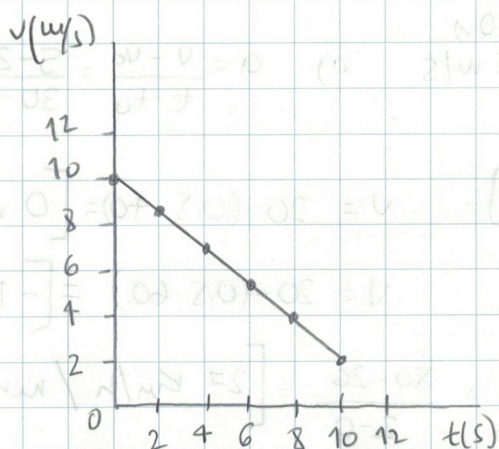
$$[x = 10t - 0,4t^2]$$

$$v = v_0 + at$$

$$[v = 10 - 0,8t]$$

t(s)	v(m/s)
0	10
2	8,4
4	6,8
6	5,2
8	3,6
10	2

t(s)	x(m)
0	0
2	18,4
4	33,6
6	45,6
8	54,4
10	60



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

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- (A) $x = 2 + 20t - 4t^2$
- (B) $x = -8(t-5) + 6(t-5)^2$
- (C) $x = -6 + 12(t-1) - (t-1)^2$
- (D) $x = 5 + 10(t+2)^2$ $(-); (-) \rightarrow (+)$
- (E) $x = 10 + 5(t-8)$

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$$a = -2 \text{ m/s}^2$$

$$v_0 = 6 \text{ m/s}$$

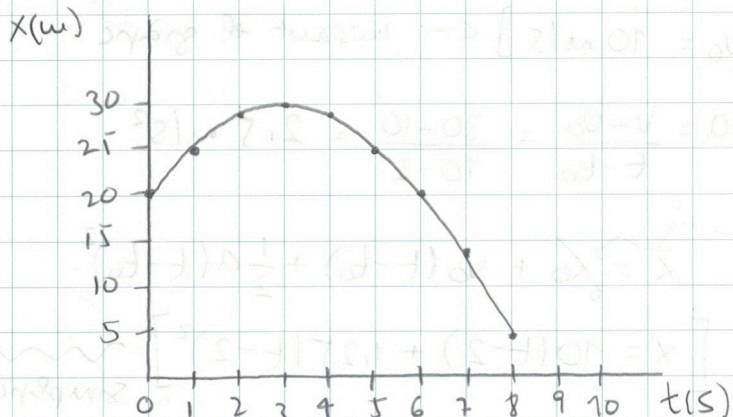
$$x_0 = 20 \text{ m}$$

$$t_0 = 0$$

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

$$[x = 20 + 6t - t^2]$$

t(s)	x(m)
0	20
1	25
2	28
3	29
4	28
5	25
6	20
7	13



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(A) Recta descendente

$$a = \frac{v - v_0}{t - t_0} = \frac{0 - 30}{40 - 0} = [-0,75 \text{ m/s}^2]$$

$$v_0 = 30 \text{ m/s}$$

$$t_0 = 0 \text{ s}$$

$$x_0 = 0 \text{ m}$$

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

$$[x = 0 + 30t - 0,375t^2]$$

$$\text{Si } t = 40 \text{ s} \quad x = 30 \cdot 40 - 0,375 \cdot (40)^2 = [600 \text{ m}]$$

(B) Recta ascendente

$$a = \frac{v - v_0}{t - t_0} = \frac{10 - (-10)}{40 - 0} = [0,5 \text{ m/s}^2]$$

$$v_0 = -10 \text{ m/s}$$

$$t_0 = 0 \text{ s}$$

$$x_0 = 0 \text{ m}$$

$$[x = 0 - 10t + 0,25t^2]$$

$$\text{Si } t = 40 \text{ s} \rightarrow x = -10(40) + 0,25 \cdot (40)^2 = [0 \text{ m}]$$

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$$x_0 = 30 \text{ m}$$

$$v_0 = 15 \text{ m/s}$$

$$t_0 = 4 \text{ s}$$

$$a = 6 \text{ m/s}^2$$

$$x = x_0 + v_0(t - t_0) + \frac{1}{2} a(t - t_0)^2$$

$$[x = 30 + 15(t - 4) + 3(t - 4)^2] \quad \text{Simplificada}$$

$$\text{Si } v = 45 \text{ m/s}$$

$$v = v_0 + a(t - t_0)$$

$$45 = 15 + 6(t - 4)$$

$$45 = 15 + 6t - 24$$

$$45 - 15 + 24 = 6t$$

$$54 = 6t$$

$$t = \frac{54}{6} = [9 \text{ s}]$$

$$[x = 3t^2 - 9t + 18]$$

OPCIÓ B

$$v^2 = v_0^2 + 2a\Delta x \quad (x - x_0)$$

$$\frac{v^2 - v_0^2}{2a} = x - x_0$$

$$x = \frac{45^2 - 15^2}{2 \cdot 6} + 30 = [180 \text{ m}]$$

OPCIÓ A

trobar el temps i substituir a l'altra equació

$$x = 30 + 15(9 - 4) + 3(9 - 4)^2 = 30 + (15 \cdot 5) + 3 \cdot (5)^2$$

$$x = 30 + 75 + 75 = [180 \text{ m}]$$

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$$a) \quad a = \frac{v - v_0}{t - t_0} = \frac{10 - 50}{20 - 0} = [-2 \text{ m/s}^2]$$

$$b) \quad v^2 = v_0^2 + 2a\Delta x$$

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

$$\Delta x = \frac{v^2 - v_0^2}{2a} = \frac{10^2 - (50)^2}{2 \cdot (-2)} = [600 \text{ m}]$$

$x - x_0$
no la sabem

c) No podem calcular la posició.

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Moto (MRUA) $a = 2 \text{ m/s}^2$
 $t_0 = 0 \text{ s}$
 $x_0 = 0 \text{ m}$
 $v_0 = 0 \text{ m/s}$ (parado)

Wtxe (MRU) $v = 15 \text{ m/s}$
 $v = 54 \text{ km/h} \rightarrow \text{m/s}$
 avança
 $x_0 = 0 \text{ m}$ $t_0 = 0 \text{ s}$

$$\frac{54 \text{ km}}{\text{h}} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 15 \text{ m/s}$$

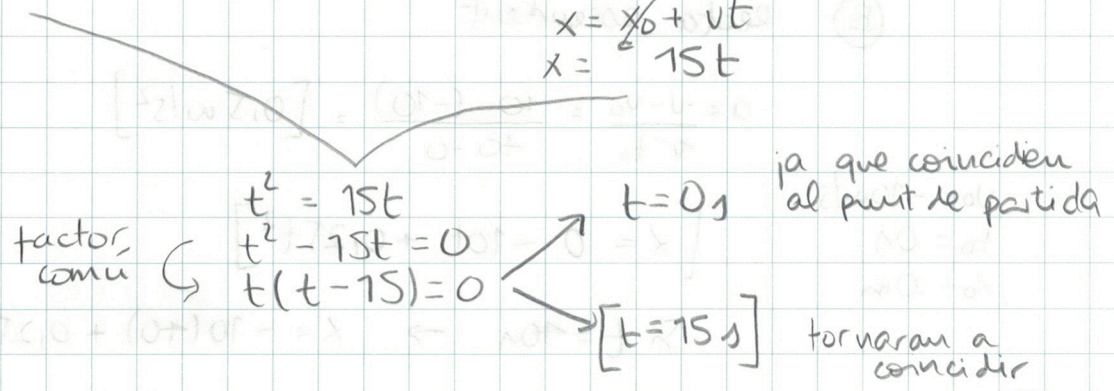
$$x = x_0 + v_0 t + \frac{1}{2} a t^2$$

$$x = t^2$$

$$x = x_0 + v t$$

$$x = 15 t$$

a)



b) $x = 15 \cdot t$ a $t = 15 \text{ s}$
 $x = 15 \cdot 15 = [225 \text{ m}]$

c) $v = v_0 + a t$
 $v = 0 + 2 \cdot 15 = [30 \text{ m/s}]$

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Esportista (MRU) $v = 6 \text{ m/s}$
 $v_0 = 6 \text{ m/s}$
 $t_0 = 0 \text{ s}$
 $x_0 = 0 \text{ m}$

Esportista MP3 (MRU) $v = 6 \text{ m/s}$
 $x_0 = 20 \text{ m}$
 $t = 10 \text{ s}$
 $v = 6 \text{ m/s}$

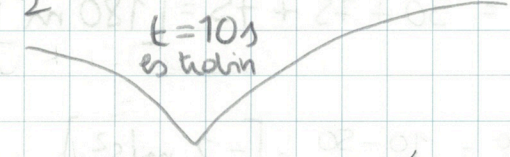
↑
 accelera (MRUA)

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

$$x = 6t + \frac{a}{2} t^2$$

$$x = x_0 + v t$$

$$x = 20 + 6t$$



$$6t + \frac{a}{2} t^2 = 20 + 6t$$

$$\frac{a(10)^2}{2} = 20$$

$$100a = 40$$

$$a = \frac{40}{100} = [0,4 \text{ m/s}^2]$$