

Activitat pàg. 68-69

23) Atleta 1 Atleta 2 MPUA
 $\Delta x = 200 \text{ m}$
 $t = 19,5 \text{ s}$ $v = 72 \text{ km/h}$
 $\frac{72 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 20 \text{ m/s}$

1) $x = x_0 + v_0 t + \frac{1}{2} a t^2$
 $200 = \frac{1}{2} a (19,5)^2$
 $a = \frac{400}{(19,5)^2} = 1,05 \text{ m/s}^2$
 $v = v_0 + a t = 1,05 \cdot 19,5 = 20,51 \text{ m/s}$

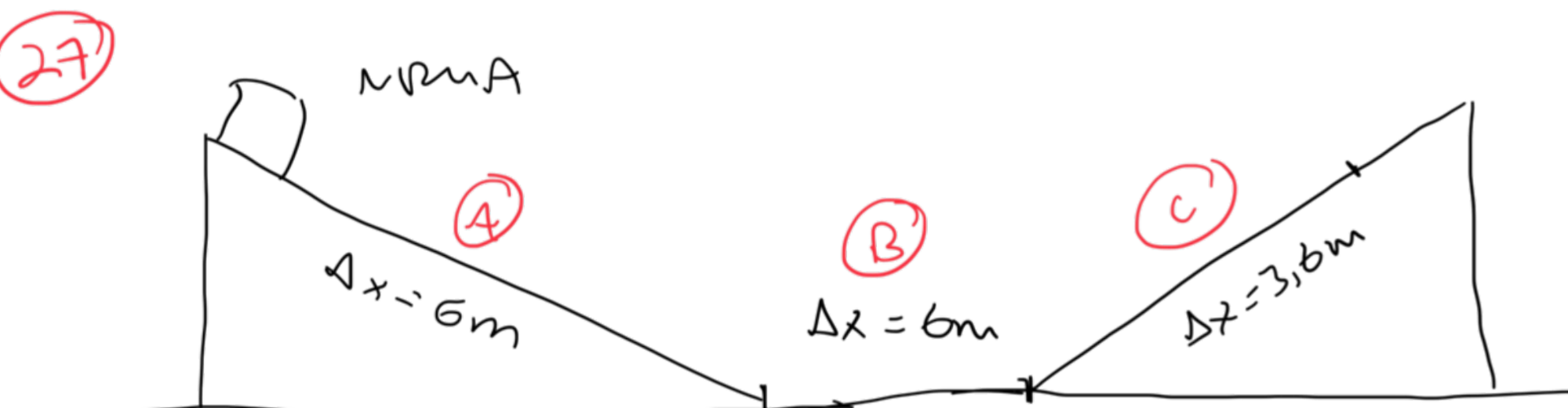
2) $v^2 = v_0^2 + 2a \Delta x$
 $20^2 = 2a \cdot 200$
 $a = \frac{20^2}{200 \cdot 2} = 1 \text{ m/s}^2$
 $v = v_0 + a t$
 $20 = 1 \cdot t$
 $t = 20 \text{ s}$

24) Motorista Cotxe (MPU)
 $a = 1,5 \text{ m/s}^2$ $v = 108 \text{ km/h}$
 $x_0 = 0 \text{ m}$ $x_0 = 2000 \text{ m}$

$x = x_0 + v_0 t + \frac{1}{2} a t^2$
 $x_A = 0,75 t^2$ $x_A = x_B$
 $0,75 t^2 = 2000 - 30 t$
 $0,75 t^2 + 30 t - 2000 = 0$

$t = \frac{-30 \pm \sqrt{(30)^2 - 4 \cdot 0,75 \cdot (-2000)}}{2 \cdot 0,75} = \frac{-30 \pm 83,06}{1,5}$
 $t = 35,38 \text{ s}$

$x_A = 0,75 \cdot (35,38)^2 = 938,68 \text{ m}$

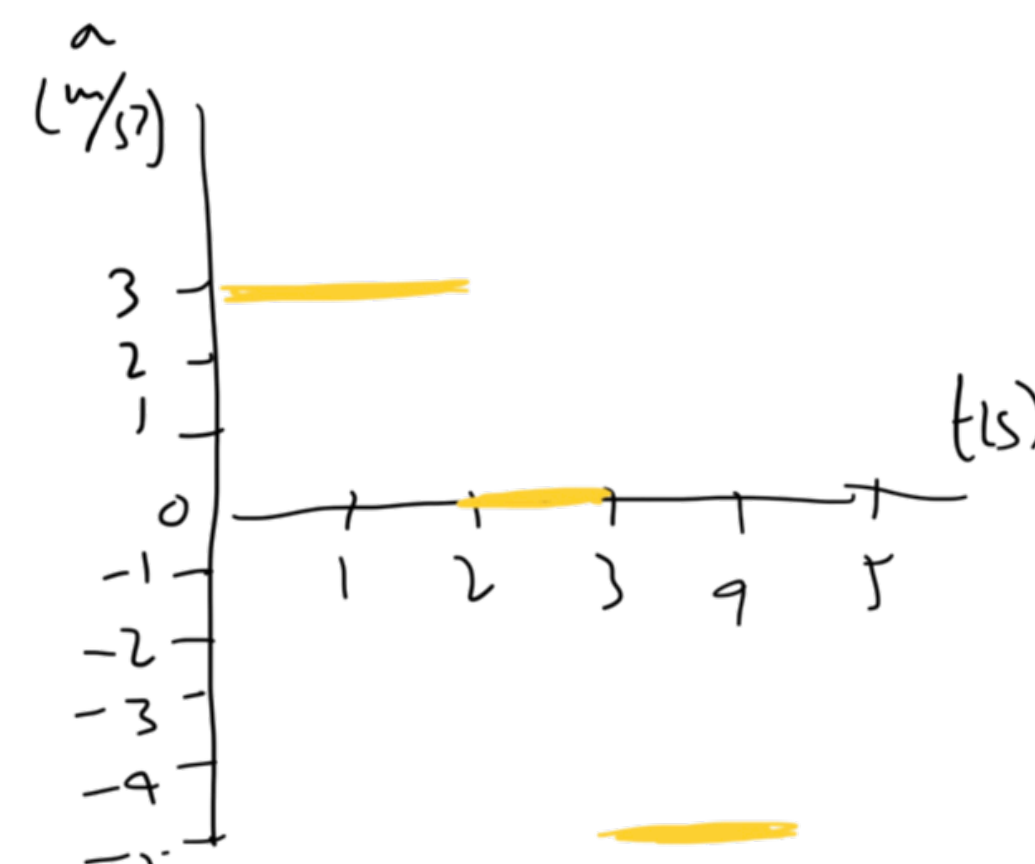
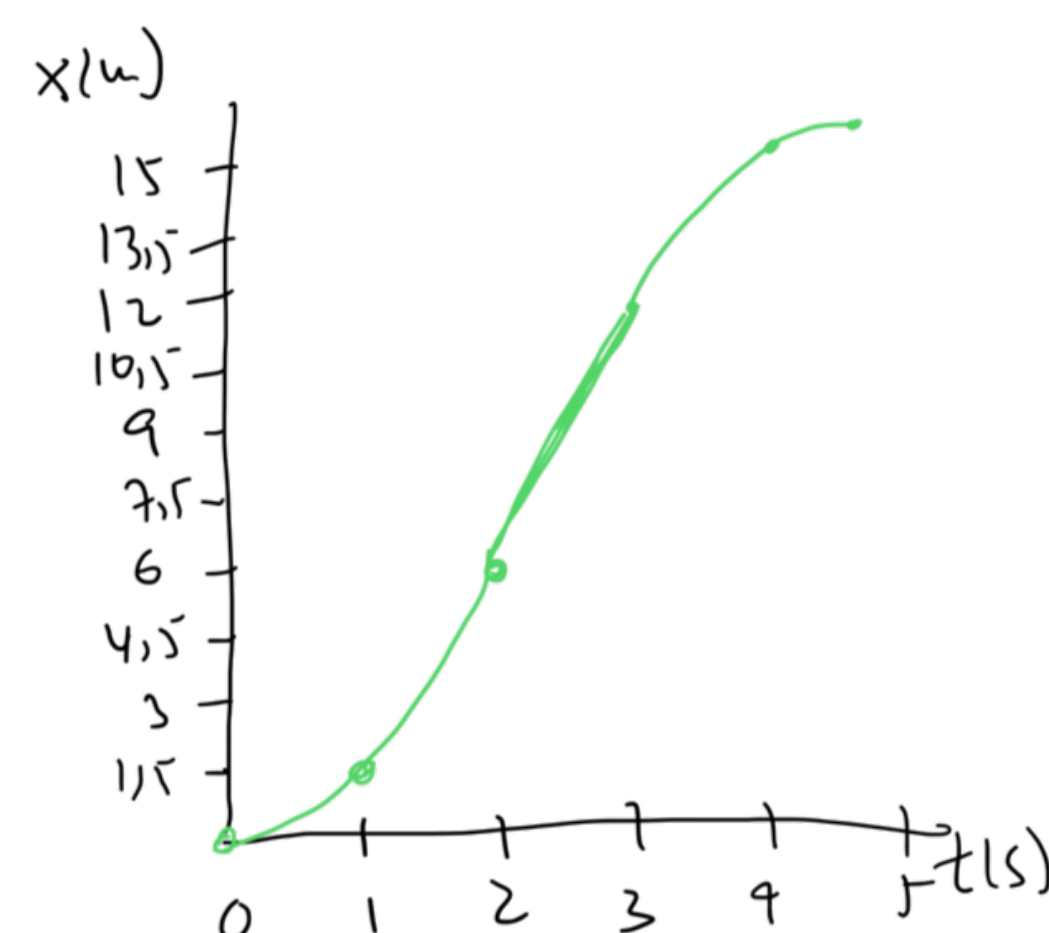
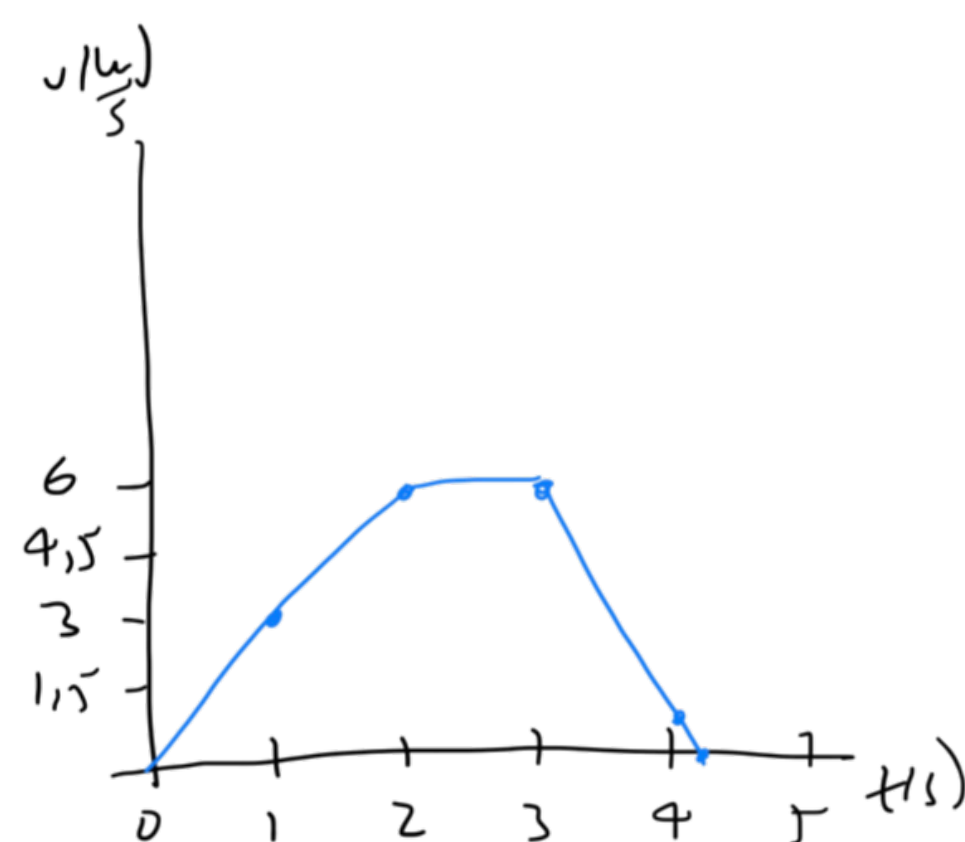


$t = 2 \text{ s}$ $t = 2 \text{ s}$
 $x = x_0 + v_0 t + \frac{1}{2} a t^2$ $v_B = 6 \text{ m/s}$
 $6 = \frac{1}{2} a \cdot 2^2$ $x = x_0 + v t$
 $a = \frac{12}{4} = 3 \text{ m/s}^2$ $12 = 6 + 6 t$
 $t = 1 \text{ s}$

$v_A = v_0 + a t = 3 \cdot 2 = 6 \text{ m/s}$
 $15,6 = 12 + 6 t - 2,5 t^2$
 $2,5 t^2 - 6 t - 3,6 = 0$

$v_A = 3 t$
 $x_A = 1,5 t^2$
 $v_B = 6 \text{ m/s}$
 $x_B = 6 + 6 t$
 $v_C = 6 - 5 t$
 $x_C = 12 + 6 t - 2,5 t^2$

t(s)	v(m/s)	t(s)	x(m)
0	0	0	0
1	3	1	1,5
2	6	2	6
3	9	3	6
4	12	4	12
5	15	5	15,5
6	18	6	15,6



25) (A)
 $x_0 = 0 \text{ m}$
 $v_0 = 10 \text{ m/s}$
 $MPUA$

a) $v^2 = v_0^2 + 2a \Delta x$
 $50^2 = 10^2 + 2 \cdot a \cdot 500$
 $a = \frac{50^2 - 10^2}{1000} = 2,4 \text{ m/s}^2$

$x_A = x_B$

$10 t + 1,2 t^2 = 500 - 20(t-3)$
 $1,2 t^2 + 10 t = 500 - 20 t + 60$
 $1,2 t^2 + 30 t - 560 = 0$

$t = \frac{-30 \pm \sqrt{(30)^2 - 4 \cdot 1,2 \cdot (-560)}}{2 \cdot 1,2} = \frac{-30 \pm 59,9}{2,4}$
 $t = 12,46 \text{ s}$

$x_A = 10(12,46) + 1,2(12,46)^2 = 310,85 \text{ m}$

c) $v_A = v_B$
 $v_A = 10 + 2,4 t$ $v_B = 20 \text{ m/s}$
 $10 + 2,4 t = 20$
 $t = \frac{10}{2,4} = 4,17 \text{ s}$

$x_A = 10(4,17) + 1,2(4,17)^2 = 62,5 \text{ m}$

(B)
 $x_0 = 500 \text{ m}$
 $v_A = 50 \text{ m/s}$
 $t_0 = 3 \text{ s}$
 $v = 20 \text{ m/s (MPU)}$

f) $x_A = 10 t + 1,2 t^2$
 $x_B = 500 - 20(t-3)$

26) $v_{tram} = 60 \text{ km/h}$
 $v_0 = 120 \text{ km/h}$
 $x_0 = 0 \text{ km}$
 $x = 7 \text{ km}$
 $v = 22 \text{ km/h}$
 $\text{reacció de frenada } 300 \text{ m} \cdot \frac{1 \text{ km}}{10^3 \text{ m}} = 0,3 \text{ km}$

a) $v_{tram} + v_{pavell} = 60 + 22 = 82 \text{ km/h}$

f) $v^2 = v_0^2 + 2a \Delta x$
 $22,78^2 = 33,33^2 + 2a \cdot 300$
 $a = \frac{22,78^2 - 33,33^2}{600} = -0,987 \text{ m/s}^2$
 $1000 = x_0 + 33,33 t + \frac{1}{2} a t^2$
 $16,67 = 33,33 + a t$
 $a = \frac{16,67 - 33,33}{t}$

c) $1000 = x_0 + 33,33 t + \frac{1}{2} a t^2$
 $16,67 = 33,33 + a t$
 $a = \frac{16,67 - 33,33}{t}$

$1000 = 33,33 t + \frac{1}{2} \left(\frac{-16,67}{t} \right) t^2$
 $2000 = 66,66 t - 16,67 t$
 $t = \frac{2000}{50} = 40 \text{ s}$
 $a = \frac{-16,67}{40} = -0,42 \text{ m/s}^2$

d) 1) 50% de 300 € $\rightarrow 150 \text{ €}$
 2) 20% de 300 € $\rightarrow 300 + 60 = 360 \text{ €}$