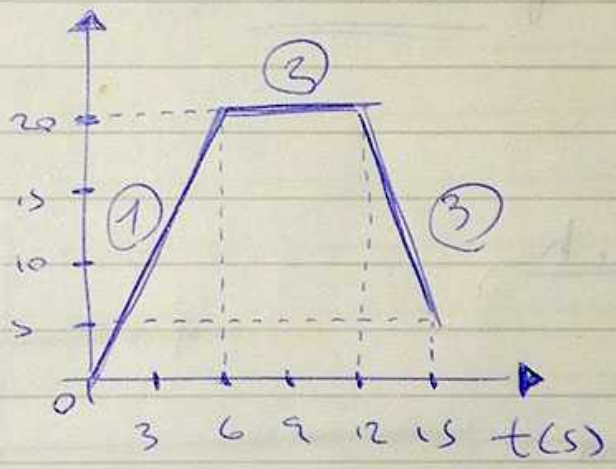
El gráfico representa el movimiento en línea recta de un tren

a) Determina el tipo de movimiento en cada intervalo.
b) Determina la aceleración en cada intervalo
c) Determina el desplazamiento en cada intervalo.
d) Grafica $x = f(t)$ y $a = f(t)$ sabiendo que $x_I = 0$ m



a) ① M.R.U.V
② M.R.U
③ M.R.U.V

b) $a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_I}{t_f - t_I}$

① $a = \frac{20 - 0}{6 - 0} = \frac{20}{6} = 3{,}3 \text{ m/s}^2$

② $a = \frac{20 - 20}{12 - 6} = \frac{0}{6} = 0 \ m/s^2$

③ $a = \frac{5 - 20}{15 - 12} = \frac{-15}{3} = -5 \ m/s^2$

∴ SIGNIFICA QUE LA VELOCIDAD DISMINUYE O LA ACELERACIÓN ES NEGATIVA

AHORA

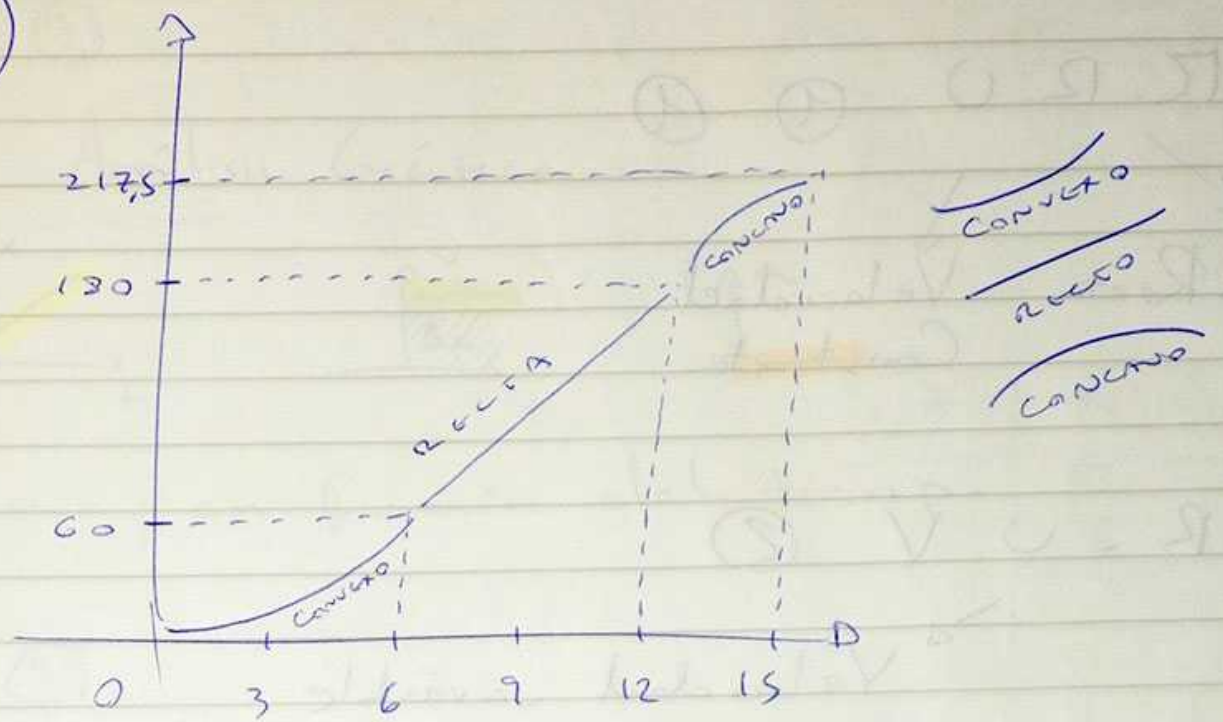
b) $A'_D = \frac{(3 + b) \cdot h}{2}$

① $\Delta x_1 = 60m$

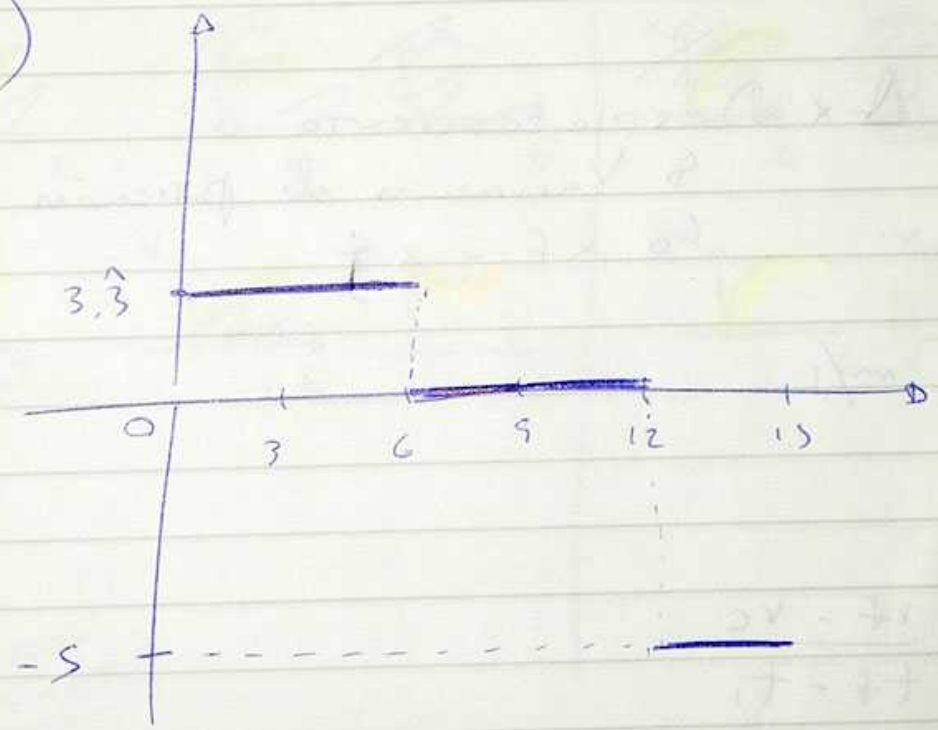
② $\Delta x_2 = 120m$

③ $\Delta x_3 = 37,5m$

d) 1


217,5
130
60
CONCAVO
RETTA
CONVESSO
0
3
6
9
12
15
D
CONVESSO
RETTO
CONCAVO

d 2)


3,3̂
-5
0
3
6
9
12
15
D

M.R.U ①-①

↙ Línea Recta

↘ Velocidad Constante

M.R.U.V ②

↙ Línea recta

↘ Velocidad variable

↳ Aceleración constante

①-②

$V = \frac{\Delta x}{\Delta i}$

Δx ⇒ Desplazamiento

↳ Variación de posición

(o $x_f - x_i$)

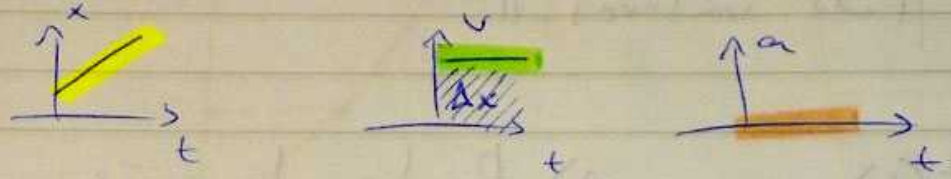
Unidades ⇒ m/s

②-②

$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_c}{t_f - t_i}$

(1) - (3)

Análisis Gráfico

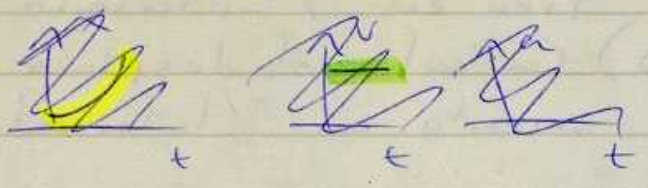


Posición en función del tiempo.

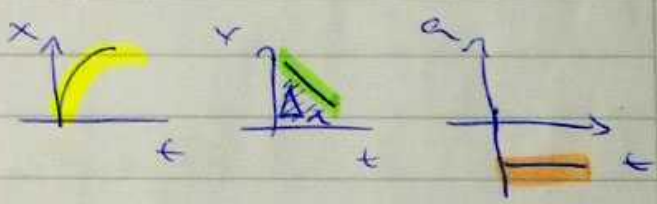
(2) - (3)

Análisis Gráfico

Velocidad aumenta



Velocidad disminuye



Δx

Área de desplazamiento

Ejemplo → Se estudian el movimiento de un tren que viaja en línea recta y se obtiene el siguiente cuadro de valores.

V (m/s)	t (s)
5	0
10	2
15	4
20	6
20	8
20	10
0	12

A) Realiza la gráfica de $v = f(t)$

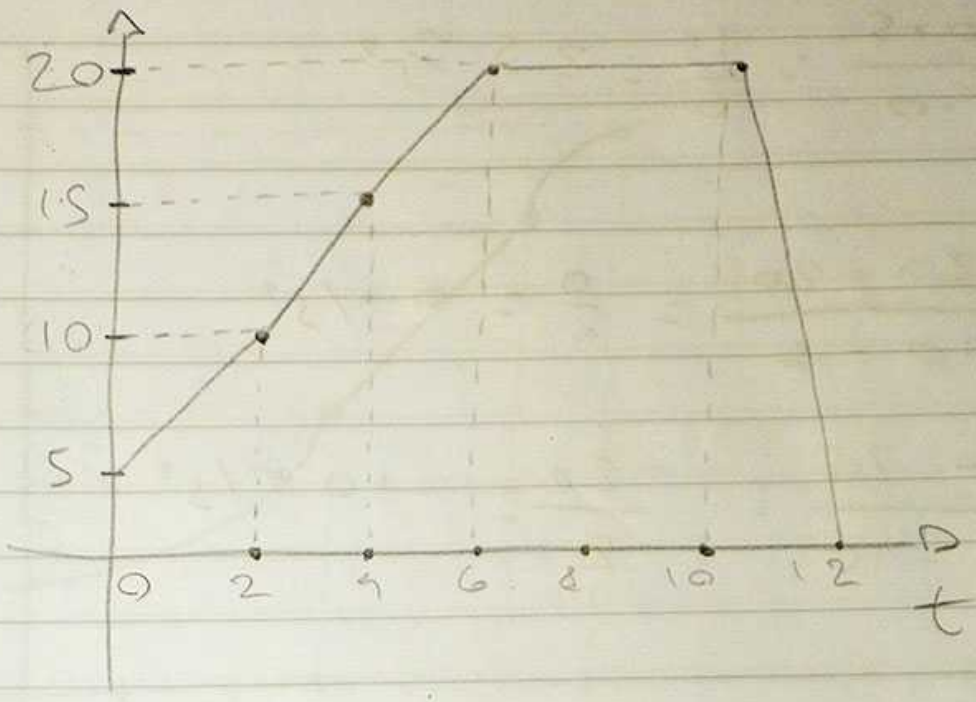
b) Determina el tipo de movimiento en cada intervalo

c) Calcular la a del tren en c/ Intervalo

D) Calcular el desplazamiento en c/ Intervalo

E) Graficar $x = f(t)$ sabiendo que la posición inicial es de 30 m

a)



b) ① R. R. V. V

② R. R. V

③ R. R. V. V

c) ① $a = \frac{10-5}{2-0} = \frac{5}{2} = 2.5\ m/s$

② $a = \frac{15-10}{4-2} = \frac{5}{2} = 2.5\ m/s$

③ $a = \frac{20-15}{6-4} = \frac{5}{2} = 2.5\ m/s$

④ $a = \frac{20-20}{12-6} = \frac{0}{6} =$

① $a = \frac{20-5}{6-0} = \frac{15}{6} = 2.5\ m/s^2$

② $a = \frac{20-20}{10-6} = \frac{0}{4} = 0\ m/s^2$

③ $a = \frac{0-20}{12-10} = \frac{-20}{2} = -10\ m/s^2$

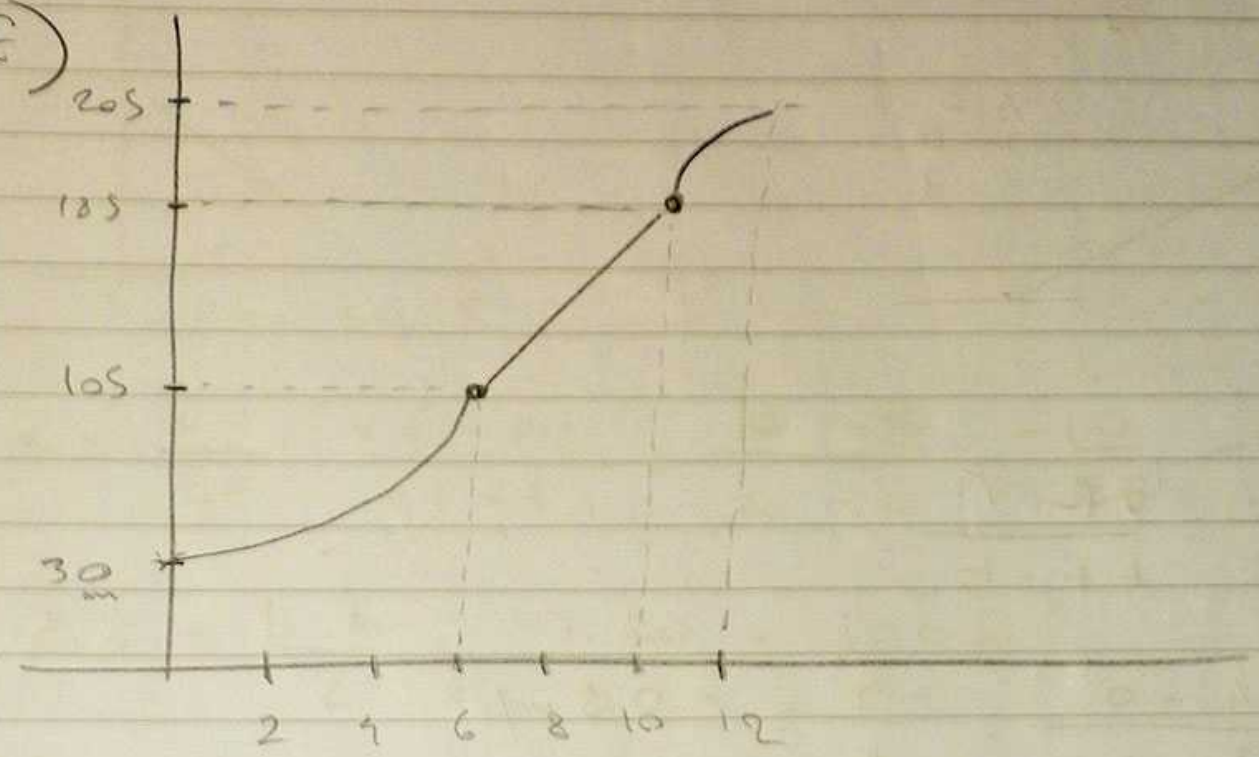
D)

$$A_{\square} = \frac{(B+b)\cdot h}{2} = \frac{(20+5)\cdot 6}{2} = 75$$

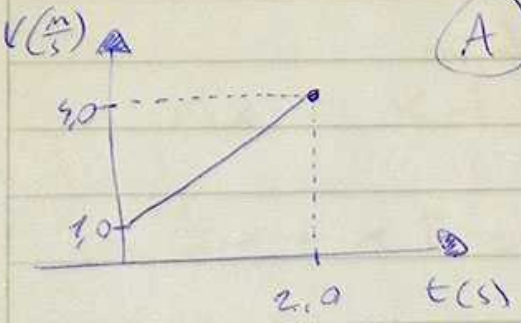
$$A\square = b \times a = 20 \cdot 4 = 80$$

$$A\triangle = \frac{b \cdot a}{2} = \frac{20 \cdot 2}{2} = 20$$

E)



A)



$$a = \frac{\Delta v}{\Delta t} = \frac{vf - vi}{tf - ti}$$

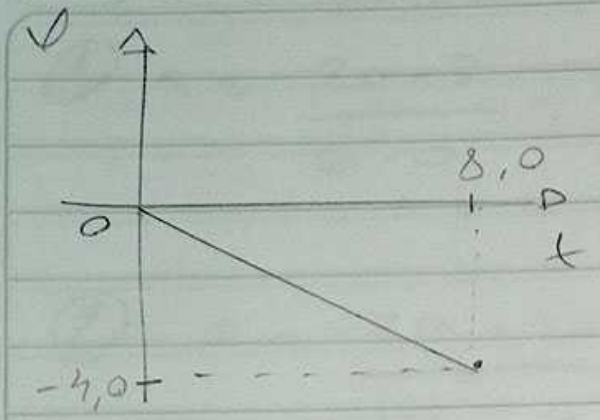
$$a = \frac{4 - 1}{4 - 0} = \frac{3}{4} = 0{,}75\ m/s^2$$

$$\Delta x = \frac{(B + b) \cdot h}{2} = \frac{(4 + 4) \cdot 4}{2} = 10\ m$$

$x_1 = 6.0\ m$ $\quad \Delta x = xf - x_1$

$\Delta x + x_1 = xf = 10 + 6{,}0 = xf$

$16\ m = xf$



$$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i}$$

$$a = \frac{-4 - 0}{8 - 0} = \frac{-4}{8} = -0,5\ m/s^2$$

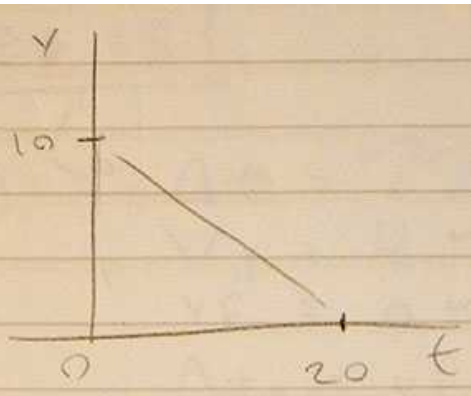
$$\Delta x = \frac{b \cdot h}{2} = \frac{-4,0 \cdot 8}{2} = -16\ m$$

$$x_i = -8\ m$$

$$\Delta x = x_f - x_i$$

$$\Delta x + x_i = x_f$$

$$-16 - 8 = -24\ m$$



$$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i} = \frac{10 - 10}{20 - 0} = \frac{-10}{20} = -0{,}5 \text{ m/s}^2$$

$$\Delta x = \frac{b \cdot h}{2} = \frac{10 \cdot 20}{2} = 100 \text{ m}$$

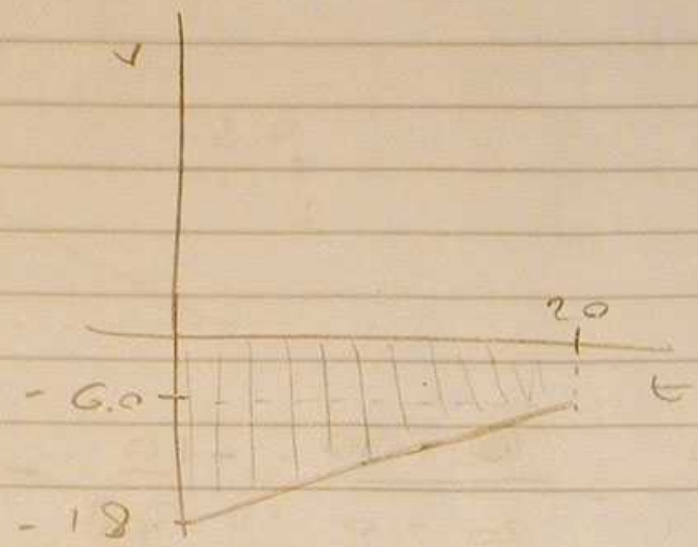
$$x_I = 0 \text{ m}$$

$$\Delta x = x_f - x_I$$

$$\Delta x + x_I = x_f$$

$$100 + 0 = 100 \text{ m} = x_f$$

D)



$$a = \frac{vf - vi}{tf - ti} = \frac{-6 + 18}{20 - 0} = \frac{12}{20} = 0.6 \text{ m/s}^2$$

$$\Delta x = \frac{b \cdot h}{2} = \frac{12 \cdot 20}{2} = 120 \text{ m}$$

$$x_I = -60 \text{ m}$$

$$\Delta x = xf - x_i$$

$$\Delta x + x_I = xf$$

$$120 - 60 = 60 \text{ m} = xf$$

Ex 15

a) $\Delta t = ?$

$V_I = 12 \text{ m/s}$

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

$\Delta t.g = vf - v_I$

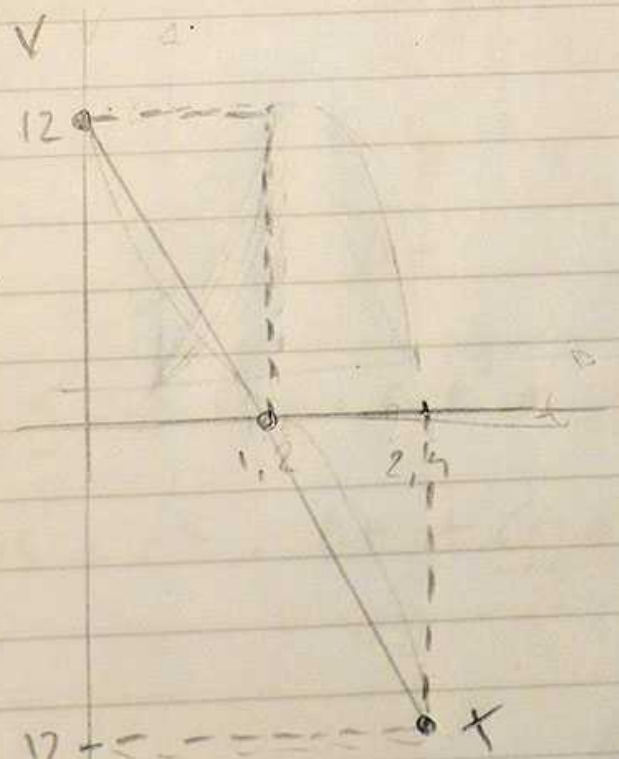
$\Delta t = \frac{vf - v_I}{g}$

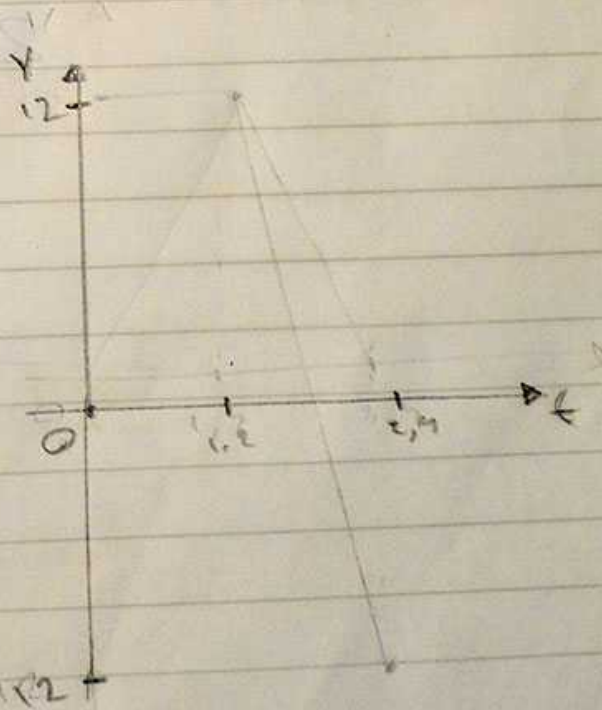
$\Delta t = \frac{0 - 12}{-10} = 1,2 \text{ s}$

b) $\Delta y = \frac{(vf + v_I) \cdot \Delta t}{2}$

$\Delta y = \frac{(0 + 12) \cdot 1,2}{2} \Rightarrow \Delta y = 7,2 \text{ m}$

c) $\Delta t \text{ ao } 2' = 1,2' \times 2 = 2,4 \text{ s}$





Partie II

6 Données : $v_i = 0\ m/s$, $\Delta t = 3,0\ s$

$\Delta y = ?$

$\Delta y = 0 \cdot 3,0 + \frac{-10 \cdot 3.0^2}{2}$

$\Delta y = -45\ m$

— o —

7

1) $g = \frac{\Delta v}{\Delta t} = \frac{v_f - v_I}{\Delta t}$

2) $v_f^2 = v_i^2 + 2 \cdot g \cdot \Delta y$

3) $\Delta y = v_I \cdot \Delta t + \frac{1}{2} g \cdot \Delta t^2$

4) $\Delta y = \frac{(v_f + v_I) \cdot \Delta t^2}{2}$

$v_I = 5,0 \text{ m/s}$

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

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

$$g = \frac{f_f - v_I}{\Delta t}$$

$$-10 = \frac{0 - 5}{\Delta t}$$

$$\Delta t \cdot -10 = 0 - 5$$

$$\Delta t = \frac{-5}{-10} = 0,5 \text{ s}$$

Trecho 2 = $\Delta t = 0,5$ s

Trecho 3 = $\Delta y = -45$ m

$v_I = -5,0$ m/s

$g = -10 \text{ m/s}^2$

Δt

$$\Delta y = v_I \cdot \Delta t + \frac{g \cdot \Delta t^2}{2}$$

$$-45 = -5 \cdot \Delta t + \frac{(-10) \cdot \Delta t^2}{2}$$

$vf^2 = -5^2 + 2 \cdot -10 \cdot -45$

$vf^2 = -25 + 900$

$vf^2 = 925 \Rightarrow vf = -\sqrt{925}$

$vf = -30,4 \text{ m/s}$

$= - =$

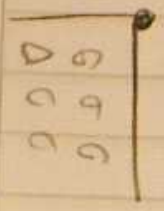
$$g = \frac{vf - vi}{\Delta t}$$

$$-10 = \frac{-30,4 + 5}{\Delta t}$$

$$\Delta t = \frac{-25,4}{-10} = 2,54 \text{ s}$$

Demora en llegar al suelo 2,54 s

d) Demora 2,54 s



$\Delta y = 5,0\ m$

$vI = 25\ m/s$

$\Delta t = 2,5\ s$

$$g = \frac{vf - vI}{\Delta t}$$

$$\Delta t = \frac{0 - 25}{-10}$$

$$\Delta t = \frac{-25}{-10} = 2,5\ s$$

=

$$vf^2 = 25^2 + 2 \cdot (-10) \cdot 5$$

$$vf^2 = 625 + (-100)\ 300$$

$$vf = \sqrt{325} = \cancel{2619}\ 18$$

—

$$\Delta t = \frac{18\ s - 25}{-10} = \cancel{0,19}\ 0,7\ s$$

$$vf^2 = 25^2 + 2 \cdot (-10) \cdot 20$$

$$vf^2 = 625 + (-400)$$

$$vf^2 = 225 = \sqrt{225} = 15\ m/s$$

$$\Delta t = \frac{15 - 25}{10}$$