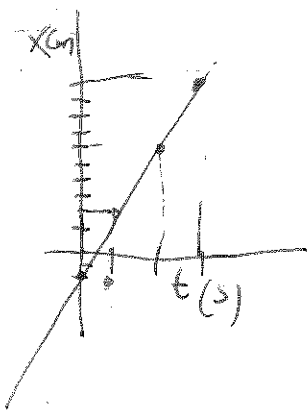


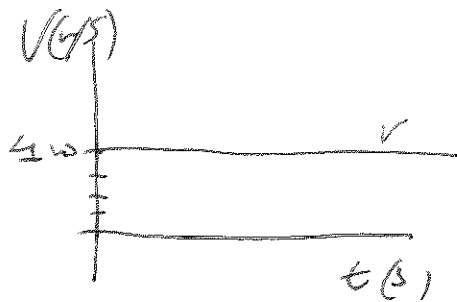
a) $x = (-2 + 4t) \text{ m}$

t	x
$x_0 = 0$	-2
1	2
2	6
3	10



Velocidad

$$v = \frac{dx}{dt} = \frac{d(-2 + 4t)}{dt} = 4 \text{ m/s}$$

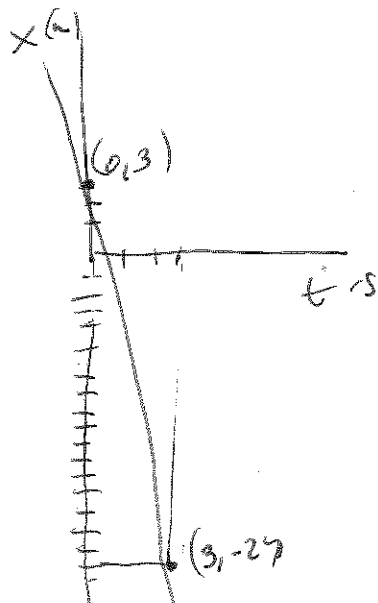


t(s)	v(m/s)
0	4 = v ₀
1	4
2	4
3	4

b)

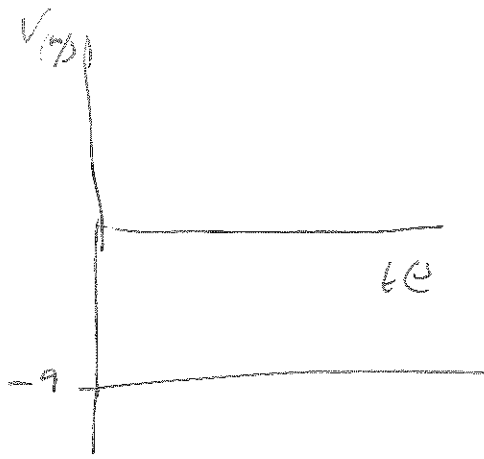
$x = 3 - 9t$

t	x
0	3 = x ₀
3	-24

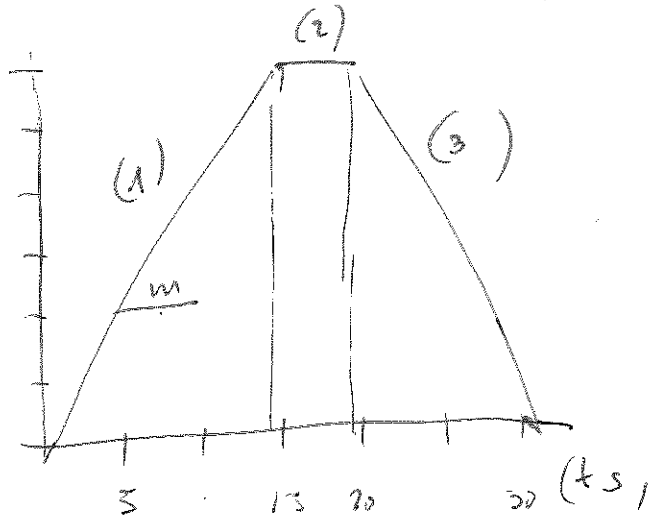


$$v = \frac{dx}{dt} = \frac{d(3 - 9t)}{dt} = -9 \text{ m/s}$$

t	V (m/s)
0	-9 = v ₀
3	-9



13)



Trazo (1)

t	0	15
x	0	30

$$x = mt$$

$$m = \frac{x_{15} - x_0}{15 - 0} = \frac{30}{15} = 2$$

$$x = 2t \text{ (m)}$$

$$v = \frac{dx}{dt} = \frac{d(2t)}{dt} \text{ m/s} = 2 \text{ m/s}$$

Trazo (2)

$$x = 30 \text{ m no depende de } t$$

$$v = \frac{dx}{dt} = 0 \text{ m/s}$$

Trazo (3)

t	20	30
x	30	0

$$x = mt$$

$$m = \frac{x_{30} - x_{20}}{30 - 20} = \frac{0 - 30}{10} = -3$$

$$x = -3t \text{ (m)}$$

$$v = \frac{dx}{dt} = \frac{d(-3t)}{dt} \text{ m/s} = -3 \text{ m/s}$$

b)

$t(s)$	$x(m)$
10	$x_{10} = 2 \cdot 10 \text{ m} = 20 \text{ m}$
17	$x_{17} = 2 \cdot 15 \text{ m} + 0.2 \text{ m} = 30 \text{ m}$
25	$x_{25} = 2 \cdot 15 \text{ m} + 0.5 \text{ m} - 3 \cdot 5 \text{ m} = 30 \text{ m} - 15 \text{ m} = 15 \text{ m}$

c)

$$\vec{v}_{\text{m}} = \frac{\vec{A}_x}{\Delta t} = \frac{x_{(25)} - x_{(10)}}{15} \text{ m/s} =$$

$$= \frac{15 \text{ m} - 20 \text{ m}}{15} = -\frac{1}{3} \text{ m/s}$$

d) → Trans (1) 0. a 15 s

$$\vec{r}_0 = 0 \text{ m}$$

$$\vec{r}_{15} = 30 \text{ m}$$

$$\vec{A}_1 = \vec{r}_{15} - \vec{r}_0 = 30 \text{ m} - 0 \text{ m} = 30 \text{ m}$$

$$|\vec{A}_1| = 30 \text{ m}$$

→ Trans (2) 15 s a 20 s

$$\vec{r}_{15} = 30 \text{ m}$$

$$\vec{r}_{20} = 30 \text{ m}$$

$$\vec{A}_2 = 30 \text{ m} - 30 \text{ m} = 0 \text{ m}$$

$$|\vec{A}_2| = 0 \text{ m}$$

→ Trans (3) 20 s a 30 s

$$\vec{r}_{20} = 30 \text{ m}$$

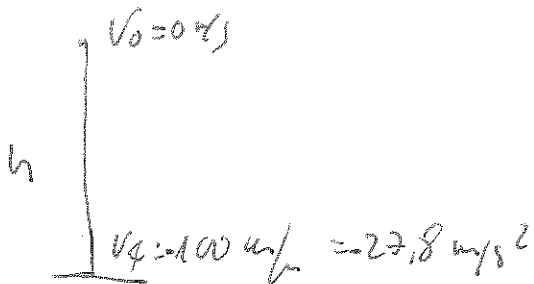
$$\vec{r}_{30} = 0 \text{ m}$$

$$\vec{A}_3 = 0 \text{ m} - 30 \text{ m} = -30 \text{ m}$$

$$|\vec{A}_3| = 30 \text{ m}$$

→ Total $\vec{A} = 0 \text{ m}$ → $|\vec{A}| = 0 \text{ m}$

215-7



$$y = h_0 - \frac{1}{2} g t^2 \quad \text{En el nivel } \gamma = 0 \text{ m}$$

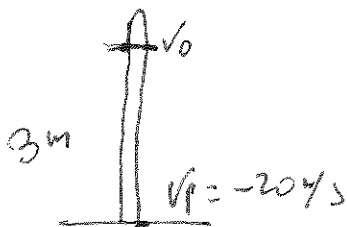
$$0 \text{ m} = h_0 - \frac{1}{2} g t^2 \Rightarrow h_0 = \frac{1}{2} g t^2 \quad (1)$$

$$v_f = v_0 - g t \Rightarrow +27.8 \text{ m/s} = -g t$$

$$t = \frac{27.8 \text{ m/s}}{9.8 \text{ m/s}^2} = 2.84 \text{ s}$$

$$(1) \quad h_0 = \frac{1}{2} \cdot 9.8 \cdot (2.84)^2 \text{ m} = \boxed{39.4 \text{ m}}$$

215-12



$$v_f = v_0 - g t$$

$$y = y_0 + v_0 t - \frac{1}{2} g t^2 \quad \left. \begin{array}{l} -20 \text{ m/s} = v_0 - g t \quad (2) \\ 0 \text{ m} = 3 \text{ m} + v_0 t - \frac{1}{2} g t^2 \end{array} \right\}$$

$$(2) \quad v_0 = g t - 20 \text{ m/s}$$

$$0 \text{ m} = 3 \text{ m} + (g t - 20 \text{ m/s}) t - \frac{1}{2} g t^2$$

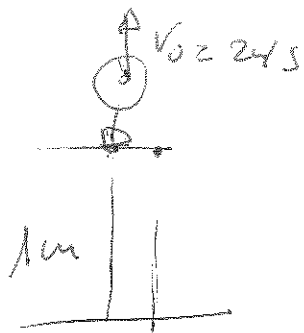
$$0 = 3 \text{ m} + g t^2 - 20 \text{ m/s} t - \frac{1}{2} g t^2 =$$

$$= 3 \text{ m} - 20 \text{ m/s} t + \frac{1}{2} g t^2$$

$$t = \frac{20 \pm \sqrt{400^2 - 5818}}{9.8} \text{ s} = \begin{cases} \frac{20 \pm 18.5}{9.8} = 3.92 \text{ s} \\ 0.15 \text{ s} \end{cases}$$

$$v_0 = 9.8 \cdot 3.92 \text{ s} - 20 \text{ m/s} = +18.4 \text{ m/s}$$

215-13



$$s = s_0 + v_0 t - \frac{1}{2} g t^2$$

$$v_f = v_0 - g t = (2 - 9.8 t) \text{ m/s}$$

$$0 \text{ m} = (1 \text{ m} + 2 t - \frac{1}{2} g t^2) \text{ m}$$

$$0 = 15 + 2t - 4.9t^2$$

$$t = \frac{-2 \pm \sqrt{4 + 294}}{-2 \times 4.9} = \frac{-2 \pm 17.26}{-9.8} \text{ s} =$$

$$= \boxed{1.96 \text{ s}}$$

$$v_f = 2 - (9.8 \cdot 1.96) \text{ m/s} = -1.712 \text{ m/s}$$

$$V_0 = 60 \text{ km/h} = 16,7 \text{ m/s} \quad a = 5 \text{ m/s}^2 \text{ frenada}$$

a) $V_0 = 60 \text{ km/h}$
 $V_0 = 16,7 \text{ m/s}$ $V_f = V_0 - at \Rightarrow t = \frac{V_0}{a}$

1) $0 \text{ m/s} = 16,7 - 5 \frac{\text{m}}{\text{s}^2} t$

$$t = \frac{16,7}{5} \text{ s} = 3,34 \text{ s}$$

$$x = V_0 t - \frac{1}{2} a t^2$$

$$x = 16,7 \cdot 3,34 - \frac{1}{2} \cdot 5 \cdot (3,34)^2 \text{ m} =$$

$$x = 27,9 \text{ m} \quad (*)$$

2)

$$V_0 = 120 \text{ km/h}$$

$$V_0 = 33,3$$

$$t = \frac{V_0}{a} = \frac{33,3}{5} \text{ s} = 6,66 \text{ s}$$

$$x = 111 \text{ m}$$

ya (como en (*))

b) 1) $x = x_0 + V_0 t - \frac{1}{2} a t^2$

$$x = 16,7 \cdot 1 + 27,9 \text{ m} = 54,6 \text{ m}$$

2) $x = 33,3 \cdot 1 + 111 = 144,3 \text{ m}$

c) $t = \frac{V_0}{a}$ proporcionalidad directa.

23 =

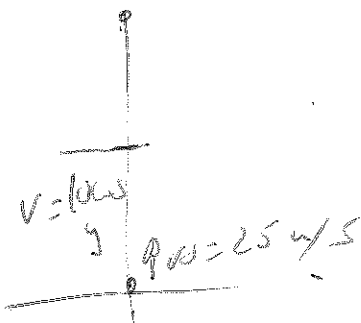


$$v_f = v_0 - gt \quad \text{en la altura máxima}$$

$$\left. \begin{aligned} v_f &= 0 \text{ m/s} \\ v_0 &= gt \end{aligned} \right\} t = \frac{v_0}{g}$$

depende de v_0 y de g
 t y v_0 proporcionalidad directa
 t y g proporcionalidad inversa

21 =



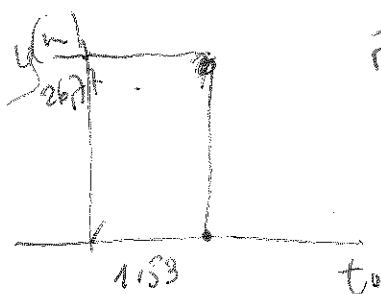
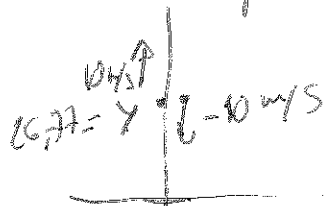
$$v_f = v_0 - gt$$

$$10 \text{ m/s} = 25 \text{ m/s} - 9.8 \text{ m/s}^2 t$$

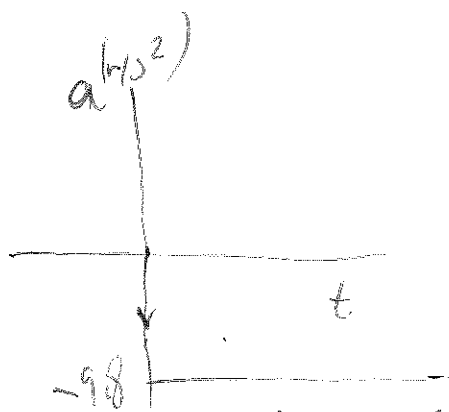
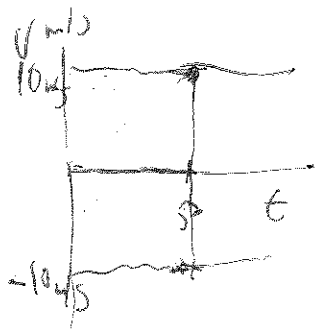
$$t = \frac{25 - 10}{9.8} \text{ s} = 1.53 \text{ s}$$

$$y = v_0 t - \frac{1}{2} g t^2 = 25 \text{ m/s} \cdot 1.53 \text{ s} - \frac{1}{2} 9.8 \text{ m/s}^2 (1.53 \text{ s})^2 = 26.77 \text{ m}$$

Se obtienen dos velocidades por que a el mismo punto y
 la velocidad puede tomar valor 10 m/s y -10 m/s



$$\vec{r} = 26.77 \text{ j (m)}$$



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