GLOBAL TEMA

Cuestión 1

$u = -4i + 2j$

$v = 13_{35°} = 10{,}65i + 7{,}46j$

a) $-u + 3v = -(-4i + 2j) + 3(10{,}65i + 7{,}46j)$

$= +4i - 2j + 31{,}95i + 23{,}38j = 35{,}95i + 20{,}38j$

b) $|\vec{u}| = 4{,}47$

$|\vec{v}| = 13$

Cuestión 2

$u = -4i + 2j$ (m)

a) $v = 3i - 4j$

$v = \frac{\Delta r}{\Delta t} \Rightarrow \Delta r = v \cdot \Delta t$

$\vec{r}_2 - \vec{r}_1 = v \cdot \Delta t$

$r_2 = r_1 + v \cdot \Delta t = u + v \cdot \Delta t$

$= -4i + 2j + 20(3i - 4j)_{(m)}$

$= -4i + 2j + 60i - 80j_{(m)}$

$= 56i - 78j$ (m)

b) $\Delta r = v \cdot \Delta t = 20(3i - 4j) = 60i - 80j$ (m)

c) $|\Delta r| = |60i - 80j| = \sqrt{60^2 + 80^2} = 100$ m

EJERCICIO 1

$\vec{r} = (6t + 4)i + (3 + 3t^2)j$ (m)

a) $\vec{r}_1 = 10i + 6j$ (m)

$\vec{r}_2 = 22i + 30j$ (m)

$\Delta\vec{r} = \vec{r}_2 - \vec{r}_1 = (22i + 30j)_m - (10i + 6j)_m$

$\Delta\vec{r} = 12i + 24i$ (m)

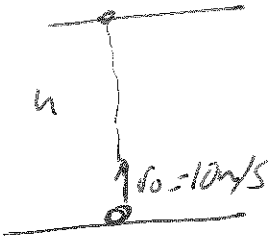
b) $\vec{v} = \frac{d\vec{r}}{dt} = \frac{d((6t+4)i + (3+3t^2)j)}{dt}$ m/s =

$\vec{v} = (6i + 6t)$ m/s

c) $|\vec{v}_{(t)}| = \sqrt{6^2 + (6t)^2} = 6\sqrt{1+t^2}$ m/s

d) $|v_{(5)}| = 6\sqrt{1+5^2}\ \frac{m}{s} = 30{,}6$ m/s

Ejercicio 2



a) $y = y_0 + v_0 t - \frac{1}{2} g t^2$

$v_f = v_0 - g t$

$v_f = 0 \text{ m/s} = 10 \text{ m/s} - g \cdot t$

$t = \frac{10 \text{ m/s}}{9{,}8 \text{ m/s}^2} = 1{,}02$ s

$y = 10t - \frac{1}{2} g t^2$ (m) $= 10 \cdot 1{,}02 - \frac{9}{2} \cdot (1{,}02)^2 =$

$= \boxed{5{,}1 \text{ m}}$

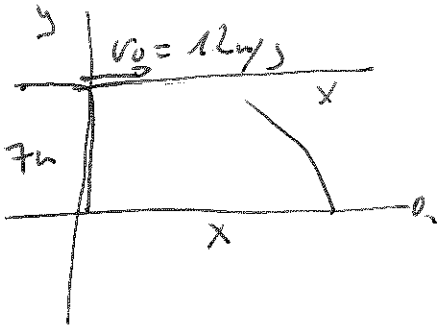
b) $y = y_0 + v_0 t - \frac{1}{2} g t^2$ sustituyendo

$2 \text{ m} = 10 \text{ m/s} \cdot t - 4{,}9 t^2 \Rightarrow$

$4{,}9 t^2 - 10 t + 2 = 0$

$t = \frac{10 \pm \sqrt{100 - 39{,}2}}{9{,}8} = \frac{10 \pm 7{,}8}{9{,}8} \Rightarrow \begin{cases} t_1 = 0{,}22 \text{ s} \\ t_2 = 1{,}82 \text{ s} \end{cases}$

Ejercicio 3



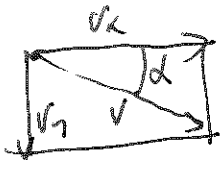
a) Cuando choca en el eje y

$y = y_0 + v_0 t - \frac{1}{2} g t^2$

$0 \text{ m} = 7 \text{ m} - \frac{1}{2} g t^2$

$t = \sqrt{\frac{2 \cdot 7}{9{,}8}}$ s $= \boxed{1{,}2 \text{ s}}$

b) $x = v_x \cdot t = 12 \text{ m/s} \cdot 1{,}2 \text{ s} = \boxed{14{,}3 \text{ m}}$

c) 

$v_y = v_0 - g t = -9 \cdot 1{,}2 \text{ s} = -11{,}76$ m/s

$v_x = 12$ m/s

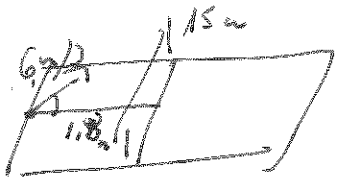
$\vec{v} = 12\,\vec{i} - 11{,}76\,\vec{j}$ (m/s)

$|\vec{v}| = \sqrt{12^2 + (-11{,}76)^2}$ $\quad \tan \alpha = \frac{-11{,}76}{12} = \boxed{-44{,}4°}$

Ejercicio 5

$v_x = 6 \cdot \cos 35° \text{ m/s} = 4{,}91 \text{ m/s}$

$v_x = 6 \cdot \sin 35 \text{ m/s} = 3{,}45 \text{ m/s}$



a) $x = 1{,}8 \text{ m}$ ... y $\quad x = v_x \cdot t \Rightarrow t = \frac{x}{v_x} = \frac{1{,}8 \text{ m}}{3{,}91 \text{ m/s}} =$

$= 0{,}36 \text{ s}$

b)

$y = y_0 + v_{0y} t - \frac{1}{2} g t^2$

$y = 3{,}45 \text{ s} \cdot 0{,}36 \text{ s} - \frac{1}{2} 9{,}8 \cdot 0{,}36 \text{ s}^2 =$

$= 0{,}61 \text{ m}$

Pasa a 61 cm de la mesa $\Rightarrow$ 46 cm de altura

c) $v_f = v_0 - gt \Rightarrow$ tarda en subir en altura máxima

$0 = 3{,}45 - 9{,}8 t \Rightarrow$

$t = \frac{3{,}45}{9{,}8 \text{ s}} = 0{,}352 \text{ s}$

tiempo total $= 2 \times t = 0{,}704 \text{ s}$

Luego en el eje x se desplaza

$x = v_x \cdot t = 3{,}9 \cdot 0{,}704 \text{ s} = 3{,}45 \text{ m}$

Golpea a $3{,}45 - 1{,}8 =$ 1,66 m de la red.