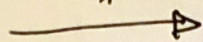


Qüestió 2: Potencial elèctric

1.- $x_i = 10 \text{ cm}$

$x_f = 30 \text{ cm}$

$E_x = 1000 \text{ V/m}$



$$\vec{d} = (x_f - x_i) \hat{x}$$

$$= 20 \text{ cm } \hat{x}$$

$$= 0,2 \text{ m } \hat{x}$$

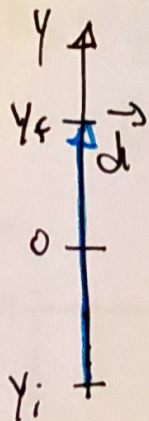
$$\Delta V = -\vec{E} \cdot \vec{d} = -Ed \cos(\theta)$$

$$\vec{E} \parallel \vec{d} \Rightarrow \theta = 0$$

$$\Delta V = -Ed = -1000 \text{ V/m} \cdot 0,2 \text{ m}$$

$$\Delta V = 200 \text{ V}_{//}$$

2.-



$y_i = -5 \text{ cm}$, $y_f = 5 \text{ cm}$

$$\vec{d} = (y_f - y_i) \hat{j} = 10 \text{ cm } \hat{j}$$

$$\vec{d} = 0,1 \text{ m } \hat{j}$$

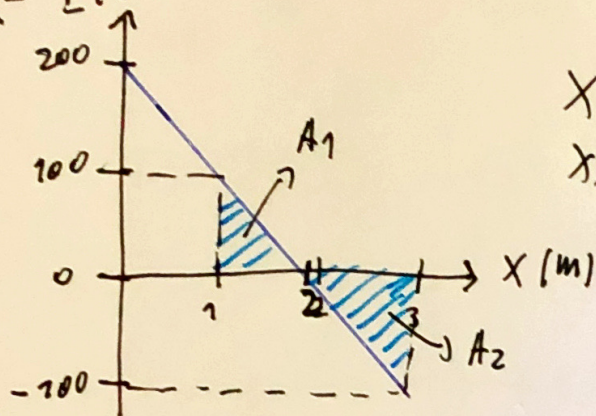
$$\Delta V = -\vec{E} \cdot \vec{d}$$

$$= -(2\hat{x} - 5\hat{j}) \times 10^4 \text{ V/m} \cdot 0,1 \text{ m } \hat{j}$$

$$= 5 \times 10^4 \text{ V/m} \cdot 0,1 \text{ m}$$

$$= 5 \times 10^3 \text{ V}_{//}$$

3.- $E(V/m)$



$$x_i = 1m$$

$$x_f = 3m$$

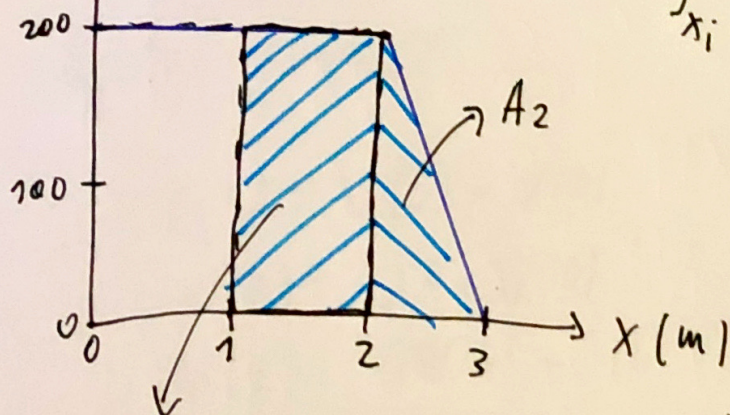
$$\Delta V = - \int_{x_i}^{x_f} \vec{E} \cdot d\vec{x} = - \left(\text{Área bajo la curva entre } x=1m \text{ y } x=3m \right)$$

$$A_1 = \frac{1}{2} (2-1) \cdot 100 = 50V \quad \left. \begin{array}{l} \\ \end{array} \right\} \Delta V = -(A_1 + A_2)$$

$$A_2 = \frac{1}{2} (3-2) \cdot -100 = -50V$$

$$\therefore \Delta V = -(50V - 50V) = 0$$

$E_x(V/m)$



$$\Delta V = - \int_{x_i}^{x_f} \vec{E} \cdot d\vec{x} = - \left(\text{Área bajo la curva entre } x_i=1m \text{ y } x_f=3m \right)$$

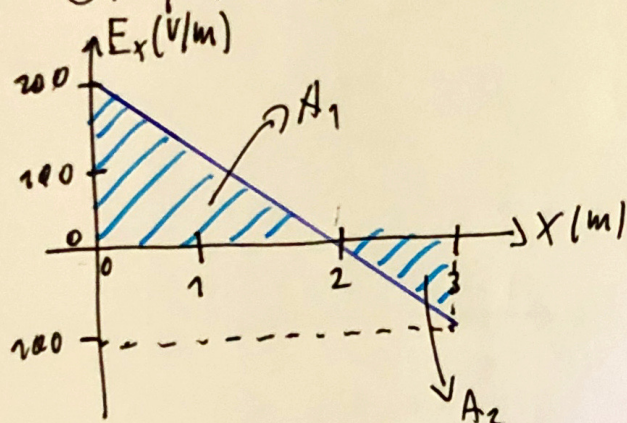
A_1

$$A_1 = (2-1)m \cdot 200V/m = 200V$$

$$A_2 = \frac{1}{2} (3-2) \cdot 200 = 100V$$

$$\Delta V = -(A_1 + A_2) = -300V$$

4.- El potencial eléctrico en $x=0\text{ m}$ es -40 V



$$\Delta V = - \int_{x_i}^{x_f} \vec{E} \cdot d\vec{x}$$

$$\Delta V = V(x_f) - V(x_i)$$

donde $x_i = 0\text{ m}$

$x_f = 3\text{ m}$

además $V(0) = -40\text{ V}$

$$\therefore V(3) = V(0) + \Delta V$$

$$V(3) = -40\text{ V} + \Delta V, \text{ donde } \Delta V = - \left(\text{área bajo la curva entre } 0 \text{ y } 3\text{ m} \right)$$

$$\Delta V = -(A_1 + A_2)$$

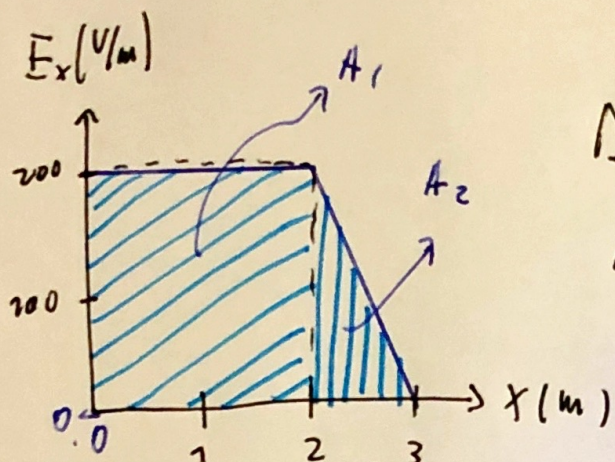
$$= - \left(\frac{1}{2} (2-0) \cdot 200 + \frac{1}{2} (3-2) (-100) \right)$$

$$= - (200\text{ V} - 50\text{ V})$$

$$\Delta V = -150\text{ V}$$

$$\therefore V(3) = -40\text{ V} - 150\text{ V}$$

$$V(3) = -190\text{ V} //$$



$$\Delta V = V(x_f) - V(x_i)$$

donc $V(x_i) = V(0) = -40 \text{ V}$

$$V(x_f) = V(3) = ?$$

$$\Delta V = - \int_{x_i=0}^{x_f=3} \vec{E} \cdot d\vec{x} = - \left(\text{Aires bajo la curva} \right. \\ \left. \text{entre } x=0 \text{ m y } 3 \text{ m} \right)$$

$$\Delta V = - (A_1 + A_2)$$

$$= - \left[(2-0) \text{ m} \cdot 200 \text{ V/m} + \frac{1}{2} (3-2) \cdot 200 \text{ V/m} \right]$$

$$= - [400 \text{ V} + 100 \text{ V}]$$

$$\Delta V = -500 \text{ V}$$

$$\therefore \Delta V = V(3) - V(0)$$

$$V(3) = \Delta V + V(0)$$

$$V(3) = -500 \text{ V} - 40 \text{ V}$$

$$V(3) = -540 \text{ V}$$