USAC
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Campo eléctrico producido por una carga distribuída

Problemas propuestos y solución versión 2

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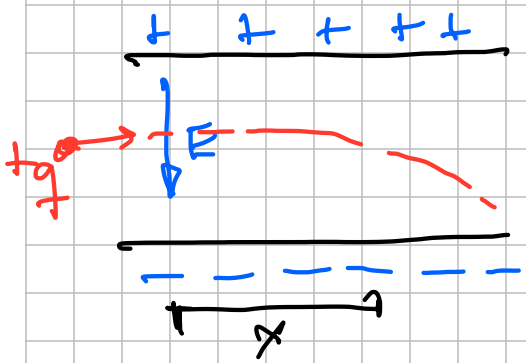
$m = 4\,kg \qquad q = 80\,mC \qquad E_x = -2.5\ \frac{N}{C}$

$v_{0x} = 80\ m/s \qquad t = 2$

rapidez?



$v = ? \qquad v = v_{0y} + at$

$a = \frac{Eq}{m} = \frac{(-2.5)(80 \times 10^{-3})}{4 \times 10^{-3}}$

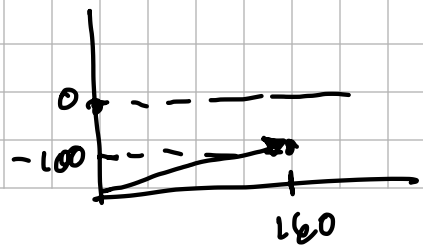
$a = -50\ m/s^2$

$v_y = v_{0y}^{0} + at = -50(2) = -100\ m/s$

a) $v = \sqrt{v_x^2 + v_y^2} = \sqrt{80^2 + (-100)^2} = 128\ m/s$

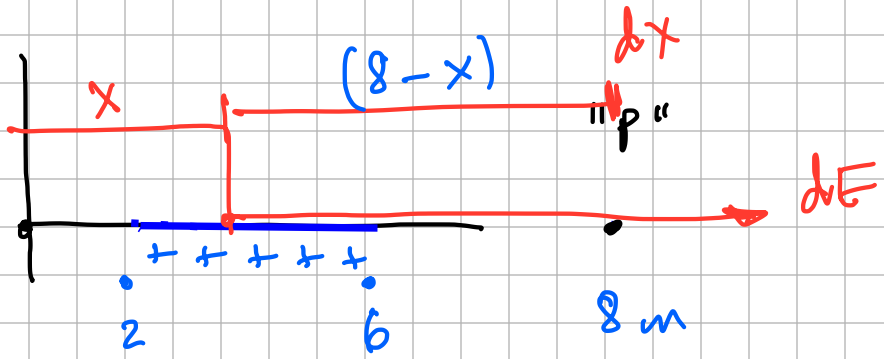
b) $x = v_{ox} t = 80(2) = 160\ m$

$y = v_{oy} t + \frac{1}{2} a t^2 = \frac{1}{2}(-50)(2)^2 = -100\ m$



$d = \sqrt{160^2 + 100^2}$

$d = 188,7\ m$



$$dE = \frac{K\,dq}{r^2} \qquad q = \lambda l \qquad dq = \lambda\,dx \qquad \lambda = \frac{q}{l}$$

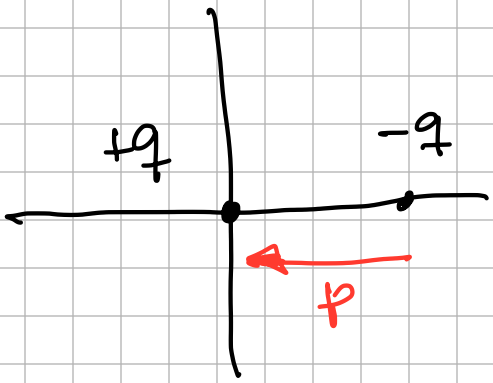
$$\lambda = \frac{2+n}{4}$$

$$\lambda = 6\,\frac{nC}{m}$$

$$dE = \int_2^6 \frac{K\lambda\,dx}{(8-x)^2} =$$

$$dE = \int_2^6 (9\times10^9)(6n)\,\frac{dx}{(8-x)^2}$$

$$dE = \int_2^6 \frac{54\,dx}{(8-x)^2}$$



$q = \pm 6\,\mu C$

a) $p = ql = (6\mu)(3\,m) = 18\ nCm$

$(-\hat{i})$

b)

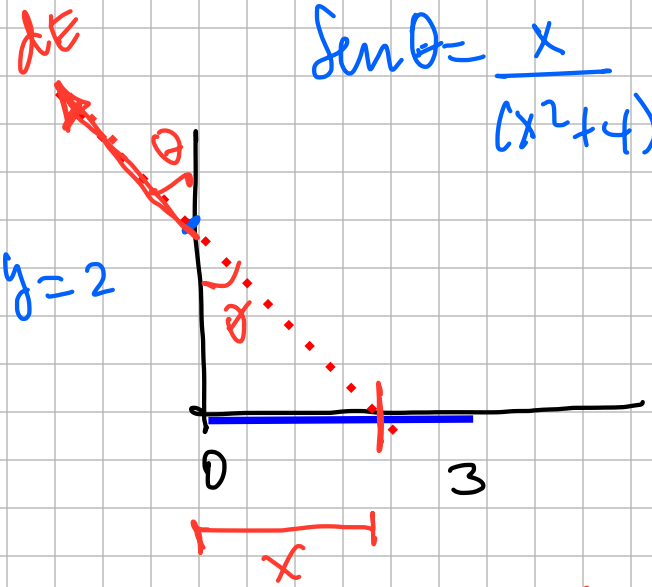
$\tau = \vec{P} \times \vec{E}$

$= PE \operatorname{sen} 30$

$\tau = (18\,n)(500)\operatorname{sen} 30$

$\tau = 4{,}5 \times 10^{-6}\ N.m$

P4



$\lambda = 2\pi \frac{C}{m}$

$\operatorname{Sen}\theta = \frac{x}{(x^2+4)^{1/2}}$

$r^2 = x^2 + y^2$

$r^2 = x^2 + 4$

$q = \lambda l$

$dq = \lambda\, dx$

$$dE = K\frac{dq}{r^2} = \frac{(9\times10^9)(\lambda)\,dx}{(x^2+4)} = \frac{18\,dx}{(x^2+4)}$$

$$dE_x = dE * \operatorname{Sen}\theta$$

$$dE_x = \int_0^3 \frac{18\,dx}{(x^2+4)} * \frac{x}{(x^2+4)^{1/2}}$$

$$dE_x = \frac{18x\,dx}{(x^2+4)^{3/2}}$$

$$dE_y = dE * \cos\theta \qquad \cos\theta = \frac{2}{(x^2+4)^{1/2}}$$

$$= \int_0^3 \frac{18\,dx}{(x^2+4)} * \frac{2}{(x^2+4)^{1/2}}$$

$$dE_y = \int_0^3 \frac{36\,dx}{(x^2+4)^{3/2}}$$