

Problema n° 9

Onda armónica moviéndose en $+x$

$$A = 2 \text{ cm} ; \lambda = 4 \text{ cm} ; f = 5 \text{ Hz}$$

a) rapidez de la onda $\rightarrow v = \frac{\lambda}{T} = \lambda f$

$$v = 4(\text{cm}) \cdot 5 \left(\frac{1}{\text{seg}} \right) = \underline{20 \text{ cm/seg.}} = 0,2 \text{ m/seg.}$$

b) $v_t(x, t) = \frac{\partial y}{\partial t}$

si $y(x, t) = A \sin(kx - \omega t)$

$$v_t(x, t) = -A\omega \cos(kx - \omega t)$$

$$k = \frac{2\pi}{\lambda} = \frac{2\pi}{4} = 1,56 \left(\frac{\text{rad}}{\text{cm}} \right) = 0,5\pi$$

$$\omega = 2\pi f = 2\pi \cdot 5 = 10\pi \left(\frac{\text{rad}}{\text{seg}} \right)$$

$$v = \frac{\omega}{k} = \frac{10\pi}{0,5\pi} = 20 \frac{\text{cm}}{\text{seg.}}$$

$$y(x, t) = 2(\text{cm}) \sin(1,56x - 10\pi t)$$

$$v_t(x, t) = -2(\text{cm}) \cdot 10\pi \left(\frac{\text{rad}}{\text{seg}} \right) \cos(1,56x - 10\pi t)$$

$$v_t(x, t) = -20\pi \left(\frac{\text{cm}}{\text{seg}} \right) \cos(1,56x - 10\pi t)$$