

A traveling simple-harmonic-wave train is described by

$$y = A \sin(kx + \omega t),$$

where the wave number $k = \frac{2\pi}{\lambda}$, and the angular frequency $\omega = 2\pi f$.

The traveling wave velocity v_{wave} is

- A) $v_{wave} = \lambda f,$
 - B) $v_{wave} = -\lambda f,$
 - C) $v_{wave} = \frac{\lambda}{f},$
 - D) $v_{wave} = -\frac{\lambda}{f}.$
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Let the phase

$$kx + \omega t = \text{constant, then } \frac{d(kx + \omega t)}{dt} = 0,$$

$$v_{wave} = \frac{dx}{dt} = -\frac{\omega}{k} = -\frac{2\pi f}{\frac{2\pi}{\lambda}} = -\lambda f.$$

Answer **B**.