A traveling wave is described by the function

\[ y = (1.73 \text{ mm}) \sin \left( 27.0x + 5720t + \frac{\pi}{6} \right) \]

Except where shown, all distance are in meters. Other quantities are in the usual and appropriate units.

(a) Calculate the magnitude of the velocity of the wave.

\[ v = \frac{\lambda}{k} = \frac{5720}{270} \approx 21.2 \text{ m/s} \]

(b) Specify in words, the direction of the wave.

In the negative \( x \) direction, or to the left.

(c) Calculate the wavelength.

\[ \lambda = \frac{2\pi}{k} = \frac{2\pi}{27} \approx 0.233 \text{ m} \]

(d) Calculate the frequency in Hertz.

\[ f = \frac{v}{\lambda} = \frac{5720}{27} \approx 910 \text{ Hz} \]

(e) At \( t = 0 \), calculate the first positive value of \( x \) for which \( y = 0 \).

\[ y = 0 \text{ when } (27x + \frac{\pi}{6}) = n\pi \]

\[ x = \frac{n\pi - \frac{\pi}{6}}{27} \]

Take \( n = 1 \)

\[ x = \frac{5\pi}{6(27)} = 0.0970 \text{ m} \]