Two waves traveling on a string are given by

\[ y_1 = 0.015 \sin \pi (x/2 - 40t) \]
\[ y_2 = 0.015 \sin \pi (x/2 + 40t) \]

where \( x \) and \( y \) are in meters and \( t \) in seconds.

(a) Write the equation for the resultant displacement of the two waves.

In general:

\[ y'(x,t) = 2y_m \sin kx \cos \omega t \quad \text{(standing waves)} \]

\[ y_m = 0.015 \text{ m}; \quad k = \frac{\pi}{2} \text{ m}^{-1}; \quad \omega = 40\pi \text{ rad/s} \]

\[ \Rightarrow y'(x,t) = 0.03 \sin \left( \frac{\pi}{2} x \right) \cos (40\pi t) \]

(b) What is the speed of the wave?

\[ V = \frac{\omega}{k} = \frac{40\pi}{\frac{\pi}{2}} = 80 \text{ m/s} \]

(c) Find the two smallest values of \( x \) corresponding to antinodes.

In general:

\[ x = n \frac{\lambda}{4} \quad n = 1, 3, 5, \ldots \]

\[ A_1 \rightarrow x_1 = \frac{\lambda}{4} = \frac{1}{4} \text{ m} \]

\[ A_2 \rightarrow x_2 = \frac{3\lambda}{4} = \frac{3}{4} \text{ m} \]

\[ \Rightarrow \lambda = \frac{2\pi}{k} = \frac{2\pi}{\frac{\pi}{2}} = 4 \text{ m} \]