Physics 9B Fall 2013 - Discussion #2

1. A sinusoidal wave is described by the wavefunction

\[ y(x, t) = 0.25 \sin(0.30x - 40t), \]

where \( x \) and \( y \) are in meters and \( t \) is in seconds. Determine for this wave (a) the amplitude, (b) the angular frequency, (c) the frequency, (d) the period, (e) the wave number, (f) the wavelength, (g) the wave speed, and (h) the direction of motion.

2. The wavefunction for a wave on a taut string is

\[ y(x, t) = 0.350 \sin \left( 10\pi t - 3\pi x + \frac{\pi}{4} \right), \]

where \( x \) and \( y \) are in meters and \( t \) is in seconds. If the linear mass density of the string is 75.0 g/m, (a) what is the average rate at which energy is transmitted along the string? (b) What is the tension in the string?

3. A certain vibrating string on a piano has a length of 74.0 cm and forms a standing wave having two antinodes. (a) Which harmonic does this wave represent? (b) Determine the wavelength of this wave. (c) How many nodes are there in the wave pattern?

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