Physics - 2 Worksheet

1. If a wave $y(x,t) = (6.0mm)\ sin(kx - (600rad/s)t + \phi)$ travels along a string, how much time does any given point on the string take to move between displacements $y = +2.0mm$ and $y = -2.0mm$?

2. A wave has an angular frequency of $110rad/s$ and a wavelength of $1.80m$. Calculate (a) the angular wave number and (b) the speed of the wave.

3. A sinusoidal wave travels along a string. The time for a particular point to move from maximum displacement to zero is $0.170s$.What are the (a) period and (b) frequency? (c) The wavelength is $1.40m$; what is the wave speed?

4. A transverse sinusoidal wave is moving along a string in the positive direction of an x axis with a speed of $80m/s$. At $t = 0$, the string particle at $x = 0$ has a transverse displacement of $4.0cm$ from its equilibrium position and is not moving. The maximum transverse speed of the string particle at $x = 0$ is $16m/s$. (a) What is the frequency of the wave? (b) What is the wavelength of the wave? If $y(x,t) = ymsin(kx - vt + \phi)$ is the form of the wave equation, what are (c) y_m, (d) k, (e) v, (f) f.

5. Use the wave equation to find the speed of a wave given by

$$y(x,t) = (3.00mm)\ sin[(4.00m^{-1})x - (7.00s^{-1})t]$$

6. Two identical traveling waves, moving in the same direction, are out of phase by $\pi/2\ rad$.What is the amplitude of the resultant wave in terms of the common amplitude y_m of the two combining waves?

7. What phase difference between two identical traveling waves, moving in the same direction along a stretched string, results in the combined wave having an amplitude 1.50 times that of the common amplitude of the two combining waves? Express your answer in (a) degrees, (b) radians, and (c) wavelengths.

8. Two sinusoidal waves with identical wavelengths and amplitudes travel in opposite directions along a string with a speed of $10cm/s$. If the time interval between instants when the string is flat is $0.50s$, what is the wavelength of the waves?

9. A string fixed at both ends is $8.40m$ long and has a mass of $0.120kg$. It is subjected to a tension of $96.0N$ and set oscillating. (a) What is the speed of the waves on the string? (b)What is the longest possible wavelength for a standing wave? (c) Give the frequency of that wave.