Two points x1 and x2 at x = 0 and x = 1 m are observed. The transverse motion of the two points are found to be as follows:

y1(x,t)=0.2 sin 3πt

and y2(x,t)=0.2 sin (3πt + π/8)

Calculate the frequency, wavelength and speed of the wave.

$$y_1(x,t) = 0.2\sin 3\pi t = 0.2\sin 2\pi\frac{t}{\frac{2}{3}}$$

where $T = \frac{2}{3}$ – period of motion

Frequency equals:

$$f = \frac{1}{T} = \frac{1}{\frac{2}{3}} = \frac{3}{2}\frac{1}{s}$$

$$y_2(x,t) = 0.2\sin\left(3\pi t + \frac{\pi}{8}\right) = 0.2\sin 3\pi\left(t + \frac{\pi}{24}\right)$$

where $\Delta t = \frac{\pi}{24}$ – delay time

Therefore, speed of the wave equals:

$$v = \frac{1m}{\Delta t} = \frac{24}{\pi}\frac{m}{s}$$

The wavelength λ of a sinusoidal waveform traveling at constant speed v is given by:

$$\lambda = \frac{v}{f} = \frac{24}{\pi}\frac{2}{3} = \frac{16}{\pi}\ m$$

Answer: $f = 3/2\,\frac{1}{s}$, $v = \frac{24}{\pi}\frac{m}{s}$, $\lambda = \frac{16}{\pi}\ m$