A source vibrating with frequency of 360Hz sets up stationary waves on a string. The nodes are 30 m apart. What is the wave velocity?

Solution:

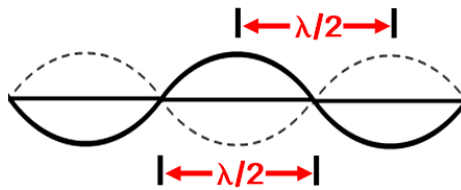A wave has both a frequency and a wavelength that are related by the equation

$$v = \lambda f$$

where λ is the wavelength, f the frequency, and v the velocity of the wave on the string.

The distance between two adjacent nodes or two adjacent antinodes is equal to half of the wavelength

So,

$$\frac{\lambda}{2} = 30 \ m$$

The wave velocity is

$$v = (60 \ m)(360 \ Hz) = 21600 \ m/s$$

Answer: $21600 \ m/s$.