

20.67. Model: A sinusoidal wave is traveling along a stretched string.

Solve: From Equation 20.17 and Equation 20.20, $v_{y \max} = \omega A$ and $a_{y \max} = \omega^2 A$. These two equations can be combined to give

$$\omega = \frac{a_{y \max}}{v_{y \max}} = \frac{200 \text{ m/s}^2}{2.0 \text{ m/s}} = 100 \text{ rad/s} \Rightarrow f = \frac{\omega}{2\pi} = 15.9 \text{ Hz} \Rightarrow A = \frac{v_{y \max}}{\omega} = \frac{2.0 \text{ m/s}}{100 \text{ rad/s}} = 2.0 \text{ cm}$$