Wave Basics

Period: $T = \frac{\text{time}}{\text{cycles}}$ (s)

Frequency: $f = \frac{\text{cycles}}{\text{time}}$ (Hz or s^{-1} or /s)

$f = \frac{1}{T}$ OR $T = \frac{1}{f}$

mp1340

of cycles = 24

t = 36 s

T = ?

f = ?

$T = \frac{\text{time}}{\text{\# of cycles}}$

$T = \frac{36\text{ s}}{24\text{ cycles}}$

T = 1.5 s

$f = \frac{1}{1.5\text{ s}}$

f = 0.67 Hz

OR

$f = \frac{24}{36\text{ s}}$

f = 0.67 Hz

Universal Wave Equation

Recall: $v = \frac{\Delta d}{\Delta t}$

Consider a wave travelling a distance of one wavelength (λ). The time it takes for the wave to travel that distance is the period (T)

$$v = \frac{\lambda}{T}$$

$$v = \lambda\left(\frac{1}{T}\right)$$

Universal Wave Equation → $v = \lambda f$

MP 13.48

$f = 2.8\ Hz$

$\lambda = 0.36\ m$

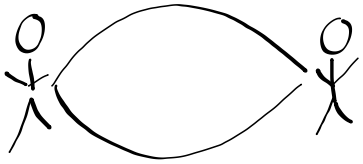
$v = ?$

$$v = \lambda f$$

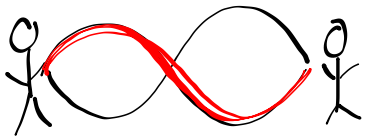
$$v = (0.36\ m)(2.8\ s^{-1})$$

$$v = 1.0\ m/s$$

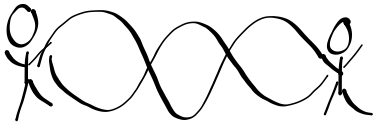
Standing Waves



$L_1 = \frac{1}{2}\lambda$ ← fundamental mode



$L_2 = \frac{2}{2}\lambda$



$L_3 = \frac{3}{2}\lambda$