

62. (a) The wave speed is

$$v = \sqrt{\frac{\tau}{\mu}} = \sqrt{\frac{120 \text{ N}}{8.70 \times 10^{-3} \text{ kg}/1.50 \text{ m}}} = 144 \text{ m/s} .$$

- (b) For the one-loop standing wave we have $\lambda_1 = 2L = 2(1.50 \text{ m}) = 3.00 \text{ m}$. For the two-loop standing wave $\lambda_2 = L = 1.50 \text{ m}$.
- (c) The frequency for the one-loop wave is $f_1 = v/\lambda_1 = (144 \text{ m/s})/(3.00 \text{ m}) = 48.0 \text{ Hz}$ and that for the two-loop wave is $f_2 = v/\lambda_2 = (144 \text{ m/s})/(1.50 \text{ m}) = 96.0 \text{ Hz}$.