

85. (a) The frequency at which $\lambda = D$ is

$$f_1 = \frac{v}{D} = \frac{343 \text{ m/s}}{15.0 \times 10^{-2} \text{ m}} = 2.29 \times 10^3 \text{ Hz} ,$$

the frequency at which $\lambda = 10D$ is $f_2 = 2.29 \times 10^2 \text{ Hz}$, and the frequency at which $\lambda = 0.1D$ is $f_3 = 2.29 \times 10^4 \text{ Hz}$.

- (b) Now, $D' = 30.0 \text{ cm}$. The frequency at which $\lambda = D'$ is $f'_1 = v/D' = (343 \text{ m/s})/(30.0 \times 10^{-2} \text{ m}) = 1.14 \times 10^3 \text{ Hz}$, the frequency at which $\lambda = 10D'$ is $f'_2 = 1.14 \times 10^2 \text{ Hz}$, and the frequency at which $\lambda = 0.1D'$ is $f'_3 = 1.14 \times 10^4 \text{ Hz}$.