

Reminders 03-03-08:

- Chapter 15 Homework Due Tonight
- Next Exam Wed March 12.
- POW 5 Due Monday March 10

Outline:

- Normal Modes
- Properties of Sound
- Energy, Intensity, and Intensity Level
- Doppler Effect

- **A string that has a linear mass density of 0.040kg/m is under tension of 360N and is fixed at both ends. One of its resonance frequencies is 375 Hz. The next highest resonance frequency is 450Hz. What is the fundamental frequency? Which harmonics have the given frequencies? What is the length of the string?**

Ans: $f_1=75\text{Hz}$; 5th and 6th harmonics; 2.0m

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$$\frac{450}{375} = \frac{6}{5}$$

fund. = 75

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$$v = \sqrt{\frac{360}{0.04}} = 300 \text{ m/s} \quad f = \frac{nv}{2L}$$

$$L = \frac{nv}{2f} = \frac{5(300)}{2(375)} = 2.0 \text{ m}$$

- A point source emits sound waves with an average power output of 80.0 W. If the sound intensity is measured to be 0.707 W/m² at a particular location, how far is this location from the source?

$$I = \frac{P}{4\pi r^2}$$

$$r = \sqrt{\frac{P}{4\pi I}} = \sqrt{\frac{80\text{ W}}{4\pi (0.707\text{ W/m}^2)}} \approx 3.0\text{ m}$$