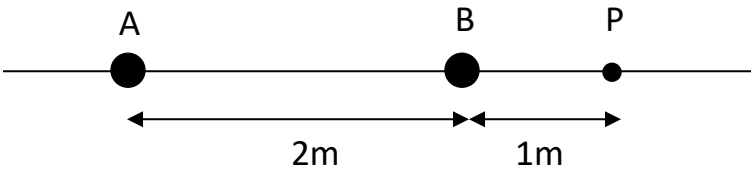
Physics 1135: Homework #28: Standing Waves, Wave Interference

1. The vibrating portion of a violin string has a length of 33cm and produces a fundamental frequency of 440 Hz (A_4) when played. How far from the end must the violinist put a finger to play a note of fundamental frequency 587Hz (D_5)?

2. A string of length 75.0cm has fixed ends. Two consecutive harmonics are 420Hz and 315 Hz. Find the wave speed and the fundamental frequency.

3. Two identical loudspeakers emit sinusoidal waves in phase and are 2m from each other. Point P is on the extension of the line connecting the speakers, 1.0m to the right of the right speaker.



What is the lowest frequency for which you obtain constructive interference at point P?
What is the lowest frequency for which you obtain destructive interference at point P?

4. Two speakers, A and B, are placed 3.0 meters apart and emit sound waves in phase at a frequency of 688 Hz. A student stands 4.0 meters in front of speaker A and 5.0 meters in front of speaker B. The speed of sound in air is 344 m/s.
What type of interference (constructive or destructive) does the student hear at their location?