PHYS 1110 Worksheet: Wave Interference

1. A standing wave in a horizontal clamped string has an amplitude of 3.0 centimeters and a frequency of 18.0 Hz. The distance between nodes is 15.0 centimeters.
   A. What is the wavelength of the standing wave?

   B. What is the angular frequency of the standing wave?

   C. What is the angular wavenumber of the standing wave?

   D. The standing wave does not travel, but it is the sum of two waves traveling in opposite directions. What is their propagation speed?

   E. A point on the string at an antinode moves up and down (transversely) in simple harmonic motion with an amplitude of 3.0 cm and a frequency of 18.0 Hz. What is the maximum (up or down) speed of this point on the string?

2. An oboe plays a concert A at 440 Hz while a clarinet plays a note at 435 Hz.
   A. How many cycles does the oboe's A complete in 1/5 s?

   B. How many cycles does the clarinet's note complete in 1/5 s?

   C. If the two notes were in phase (both at maximum displacement) at time $t = 0$, how much time later would they be in phase again?

   D. How many times per second will the waves interfere constructively?