**Worksheet 4 – Resonance in Pipes**

1. Draw a picture of two waves that display destructive interference.
2. Create a depiction of a standing wave. Point out the nodes and antinodes.
3. Sketch a series of standing waves on a string between two solid points. Show the first three harmonics.
4. A pipe is 155 cm long and open on one of its ends. (a) What are the frequencies of the first three harmonics that resonate in the pipe? (b) What is the wavelength of the first harmonic?
5. A pipe is 18.5 cm long and open on one of its ends. (a) What are the frequencies of the first three harmonics that resonate in the pipe? (b) What is the wavelength of the third harmonic?