Prelab 3:
Resonance

PHYS 1320
Fall 2015
Due at the beginning of class.

1) The speed of sound in air depends on the temperature. The "accepted speed" for sound in air is given by the formula:

$$v = 332\ \left(\frac{\text{m}}{\text{s}}\right) + 0.6\ \left(\frac{\text{m}}{\text{s}\ ^\circ\text{C}}\right)\ T$$

Fill in the following table:

T (°C)	v (m/s)
-20	
-10	
0	
+10	
+20	

2) Now we will do a similar exercise with English units. Use:

$$v = 1087\ \left(\frac{\text{ft}}{\text{s}}\right) + 1.1\ \left(\frac{\text{ft}}{\text{s}\ ^\circ\text{F}}\right)\ (T - 32^\circ)$$

CAUTION: Remember the base temperature in English units is $32^\circ\,\text{F}$, not zero!!!

Fill in the following table:

T (°F)	v (ft/s)
-20	
-10	
0	
+10	
+20	

3) You are given a $L = 8$ ft long OPEN organ pipe. Compute the frequencies and wavelengths for the lowest 3 resonant modes. Sketch the wave pattern in the figures. (Assume the temperature is such that $v = 1200$ ft/s.)

f =

λ =

f =

λ =

f =

λ =

4) You are given a $L = 8$ ft long CLOSED organ pipe. Compute the frequencies and wavelengths for the lowest 3 resonant modes. Sketch the wave pattern in the figures. (Assume the temperature is such that $v = 1200$ ft/s.)
(You may use the back of the page, if necessary.)

f =

λ =

f =

λ =

f =

λ =