Prelab 3:
Resonance

PHYS 1320
Fall 2019
Due at the beginning of class.

1) The speed of sound in air depends on the temperature, T. The "accepted speed" for sound in air is given by the formula (NOTE: the parenthesis contain units.)

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

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:

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

CAUTION: Remember the base temperature in English units is 32° F, not zero!!!

Fill in the following table:

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

3) You are given an $L = 8$ ft long OPEN organ pipe. Compute the frequencies and wavelengths for the lowest three 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 an $L = 8$ ft long CLOSED organ pipe. Compute the frequencies and wavelengths for the lowest three 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 =