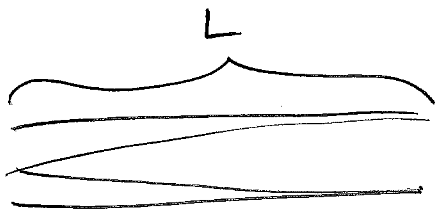
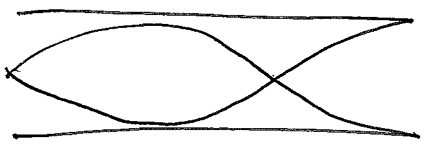
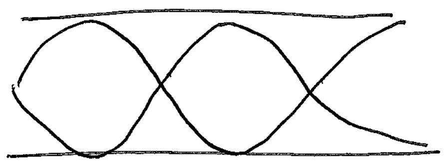
4) tube is 98.5 cm long



$$L = \frac{1}{4}\lambda$$



$$L = \frac{3}{4}\lambda$$



$$L = \frac{5}{4}\lambda$$

$$\Rightarrow \quad L = \frac{(2n+1)}{4}\lambda$$

(this picks odd integers for $n = 0, 1, 2, \ldots$)

$$= \frac{(2n+1)}{4}\frac{v}{f}$$

$$\Rightarrow \quad f_n = \frac{(2n+1)}{4}\frac{v}{L}$$

$f_0 = 87.1\ Hz \sim F$

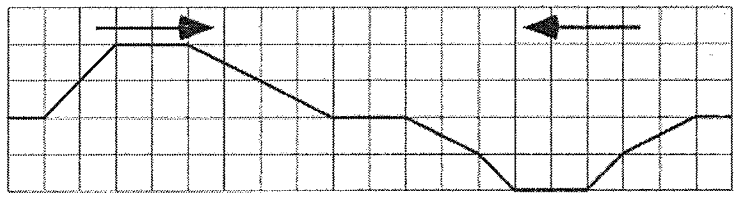
$f_1 = 261\ Hz \sim C$

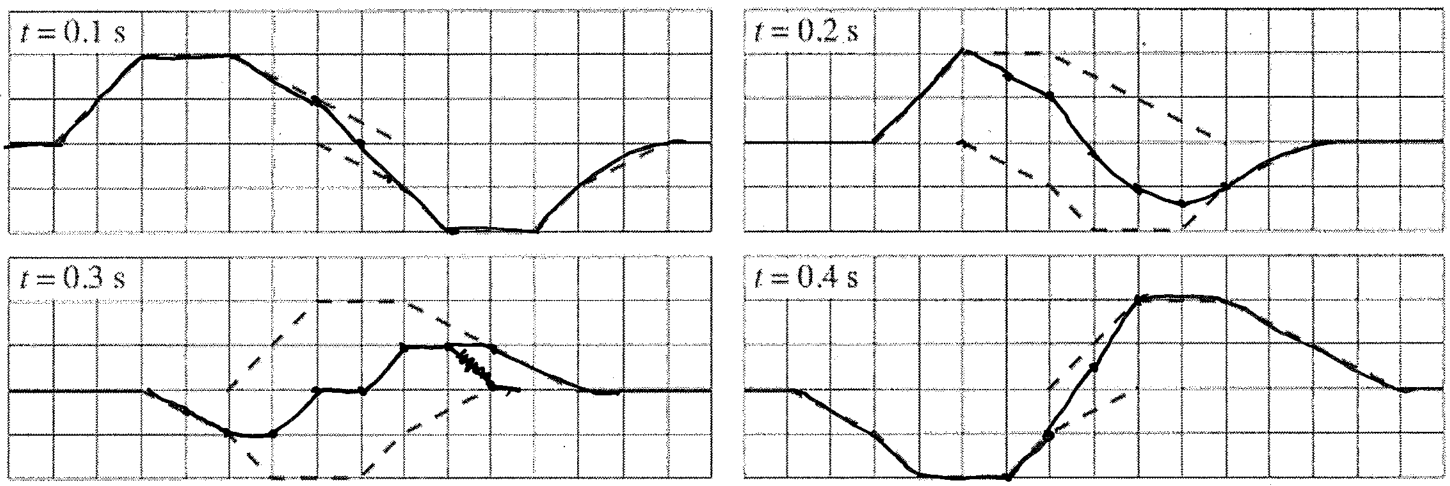
} the frequencies are close to the frequencies of notes.

Name:

Question 5 – Drawing Superposition

Two pulses on opposite sides of a spring are moving toward each other. The diagrams below show the pulse locations at four successive instants. One each diagram, sketch the shape of the spring for the instant shown



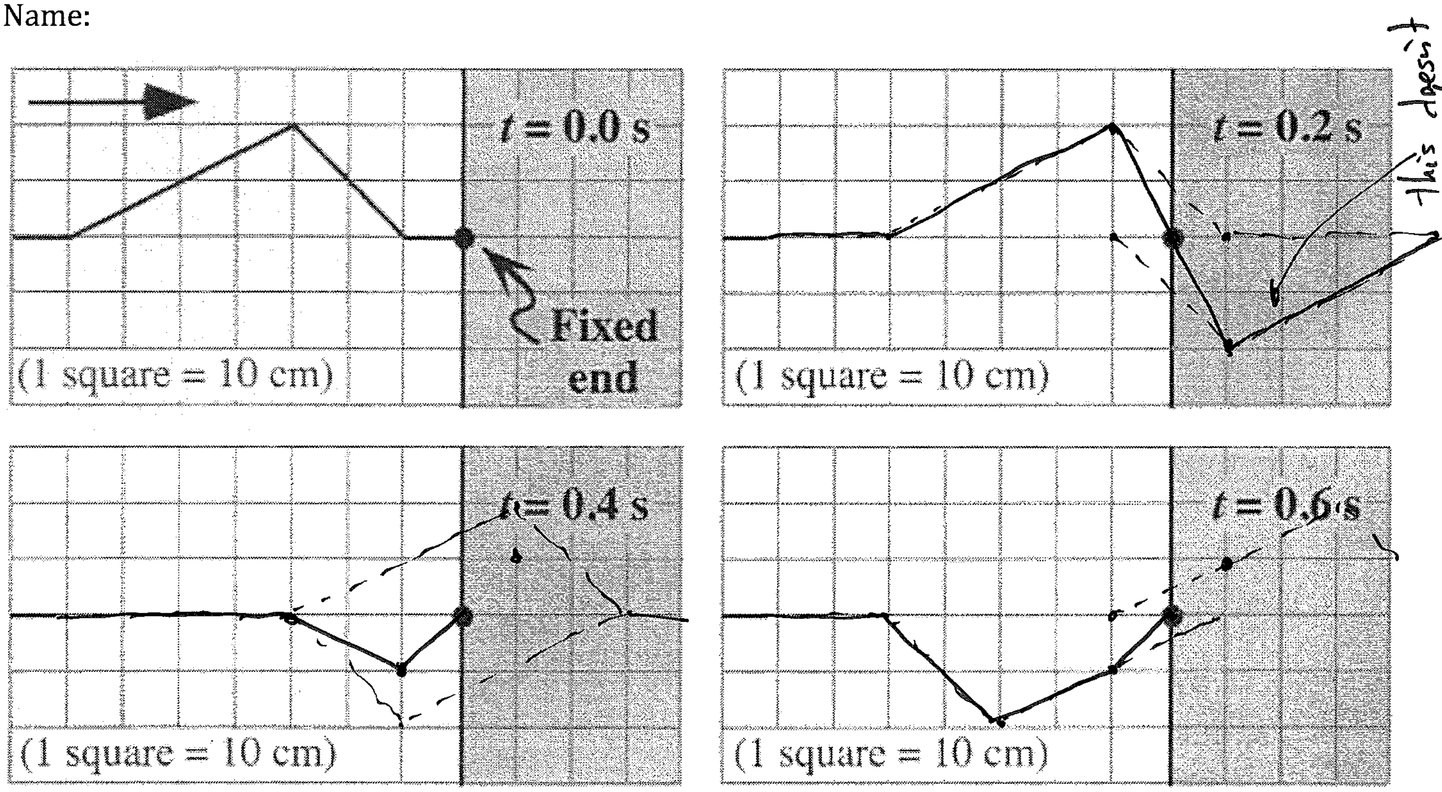


Question 6 – Visualizing Reflection

a) A pulse on a spring with speed 1.0 m/s is incident on a fixed end. Determine the shape of the spring at t = 0.2 s, 0.4 s and 0.6 s. Remember that the end of the spring must remain fixed. A model for hard reflections is that the spring extends past the fixed end and we send a pulse along the imaginary portion (the grey area beyond the fixed end) toward the fixed end. We choose the shape, orientation and location of the imagined pulse so that as it passes the incident pulse, the end of the spring *remains fixed.*

See next page for the graph!

Name:



b) At $t = 0.0$ s a pulse on a spring with speed 1.0 m/s is incident on the free end of a spring as shown. Determine the shape of the spring at $t = 0.2$ s, 0.4 s and 0.6 s. Just like in the fixed end case, we imagine that the spring extends past the free end. We then imagine sending a pulse with the appropriate shape and location of the imaginary portion of the spring (beyond the free end) and have these pulses pass each other. Remember that in the case of the free end, the pulse is *not* inverted.