1. Assume a Tine with a mass of 0.1 kilograms, a springiness factor of 2, and a displacement of 0.01 meters. What is the force tending to push the tine back to center?

\[-kx = -2 \times 0.01 = -0.02 \text{ newtons}\]

2. Assume a Tine is exerting a force of 0.02 newtons and has a mass of 0.1 kilograms. What is the current acceleration?

\[F = ma, \text{ so } 0.02 = 0.1a, \text{ so } a = 0.2 \text{ meters per second squared (M/s}^2)\]

3. Suppose we have a sine wave with equation amplitude of 4, a frequency \(\omega\) of 200\(\pi\) radians per second. What is the value of the wave at time \(t=1\)?

\[4 \times \sin(200\pi \times 1) = 0\]

4. Suppose we have a sine wave with amplitude of 4, a frequency \(\omega\) of 200\(\pi\) radians per second and a phase \(\phi\) of \(\pi/2\). What is the value of the wave at time \(t=1\)?

\[4 \times \sin(200\pi \times 1 + \pi/2) = 4\]

5. Suppose a guitar string produces a frequency of 1046Hz (the note C). If I damp the string in the middle, what frequency would be produced instead? What is the vibration mode that is produced?

2092Hz, the second harmonic

6. The third harmonic of 400Hz is:

1200Hz