Quiz 1

1. Suppose that you are playing music written in the early 1700's, where the fundamental frequency of middle A (written A_4) is 420 Hz instead of 440 Hz as it is in modern music.[1] What are the fundamental frequencies of the notes:

   (a) A_2 (two octaves below)

   (b) A_3 (one octave below)

   (c) A_5 (one octave above)

   (d) A_6 (two octaves above)

   (e) E_5 (a fifth, seven half-steps, above)

2. We say that musical intervals are "equally-spaced", in the sense that all half-steps (or octaves, or fifths, or any interval) on the piano keyboard are the same size. However, in looking at the answers to the above, this might not seem to be the case. For instance, the difference in Hz between the fundamentals of A_3 and A_4 is much smaller than the difference in Hz between A_6 and A_7.

   How can you reconcile these two statements?

3. If I hit a piano string with a hammer, it sounds harmonious. If I hit a randomly-shaped chunk of metal, like the fire extinguishers we used in class, it doesn't sound "musically useful" or harmonious. What about the frequencies that they produce causes this?

[1] The most common tuning for Baroque music is $A_4 = 415$ Hz, but this makes the math harder for you all to do in your heads. :)