**Music 170 Homework problem set 7 (due Nov. 10)**

1. A just intonation scale (starting at C; Rossing P. 179) is tuned so that the "A" is 440 Hz. What frequency does the lower "C" sound at?

2. A mass-on-a-spring vibrates at "A" 440. If we doubled the mass, without changing the spring constant, what new pitch would sound (in the western tempered scale)?

3. A piano string is stretched to 1/2 meter in length, and weighs 10 grams. How much tension must it have to reach the highest note of the piano (the 'C' 4 octaves above middle C)?

4. The highest-pitched string on a guitar sounds two octaves above the lowest-pitched one. If the two strings were made of the same material, and if they were strung at the same tension, how much larger would the diameter of the bottom string have to be than the top one (as a ratio)?

5. Supose you have a pipe one meter long, open at both ends, which therefore should sound at about 172 Hz. Suppose you then cut off a piece that sounds a perfect fifth higher than the original pipe did. At what frequency would the remaining length (the one you cut away from the original pipe to get the second one) sound?