Guitar Fret Problem

1. Determine the locations of the first 12 frets on a guitar.

   - Measure the length of a string, say, the low E.
   - The next twelve notes will be F, F#, G, G#, A, A#, B, C, C#, D, D#, and E.
   - The frequency of the upper E is twice the frequency of the lower E.
   - The frequency of each successive note is a certain constant, a, times the frequency of the preceding note.
   - The frequency of a note is inversely proportional to the length of the string.

2. One of your classmates observed that the spacing *between* two successive pairs of frets decreases by a constant ratio. Is this true? What is this ratio?

3. For each of the following fractions, find a note such that the ratio of the frequency of this note to the frequency of the low E is approximately equal to this fraction.

   (a) 2/1
   (b) 3/2
   (c) 4/3
   (d) 5/4
   (e) 6/5