Standing Waves on a String

Review the Textbook on Standing Waves

- Phys 1402: Serway/Vuille: Sections 13.8, 13.9, 14.8
- Phys 2426: Serway/Jewett: Sections

1. For a certain ocean wave, the distance between two successive crests is 1.2m and seven crests crash the pier along the direction of travel every 48 s. Calculate the wave speed. (0.15 m/s)

2. G string of a guitar has linear mass of 1.14 g/m. If a tension of 72 N is applied to this string, what would be the speed of a wave produced in this string? (251 m/s)

3. What are the frequency of first three harmonics that could be produced on 1.2 m long string under tension from a mass of 250 g, if the linear mass of this string is $1.15 \times 10^{-4} \text{ kg/m}$? (61Hz, 122Hz, 183Hz)

4. In Figure 1, the E string on a certain guitar 68.0 cm long and has a fundamental frequency of 329 Hz. When a musician presses down on that string at 3^{rd} fret, the string plays a G note of frequency 392 Hz. How far is the 3^{rd} fret from the nut (see the picture below)?

(11 cm)



Figure 1. Diagram of a Guitar for Question 4.

5. In figure 2, one end of a string 82 cm long is connected to a frequency generator and another is pulled over a pulley with a mass suspended from it, see the picture below. When frequency generator outputs a frequency of 51 Hz, 3 large segments are formed on the string. If the linear density of the string is 1.15×10^{-4} kg/m, how much mass is suspended from the string? (9.1 g)

