

**ME 513 Fall 2017 – Homework No. 2 – Due Oct. 4, 2017 – (off-site: emailed before midnight on the 4th) – note that this homework cannot be completed in one or two nights**

From Kinsler, Frey, Koppens and Sanders:

2.4.1

2.8.1

2.8.2

2.9.2

2.9.3 Note: do Part (a) only, and assume that the driving force is  $F e^{j\omega t}$ , and that it is applied at  $x = L/4$  rather than at the midpoint of the string: i.e., calculate the input mechanical impedance at  $x = L/4$ .

2.11.1 And also, a guitar string has a linear density of  $8 \times 10^{-4}$  kg/m, a tension of 50 N and a length of 0.66 m. Find the first natural frequency for the of a fixed-fixed string. And find the minimum stiffness of the transverse string required to ensure that the first natural frequency is reduced by no more than 1 percent.