An oscillator performs a steady state motion $x(t) = X_0 \sin(\omega t)$, and the driving force is $F = F_0 \cos(\omega t)$, where $X_0$ and $F_0$ are constants. What is the damping coefficient for this oscillator? The mass of the oscillator is $m$. 

A rod of mass $m$, length $l$, and cross-section $S$ is being pulled horizontally by one end, so that its acceleration is $a$. The Young modulus is $Y$. There are no oscillations within the rod. By how much did the length of the rod increase?

A string is vibrating in a superposition of the first seven normal modes. A person touches the string with her finger one third of the way from the end. Which harmonics will still be heard?