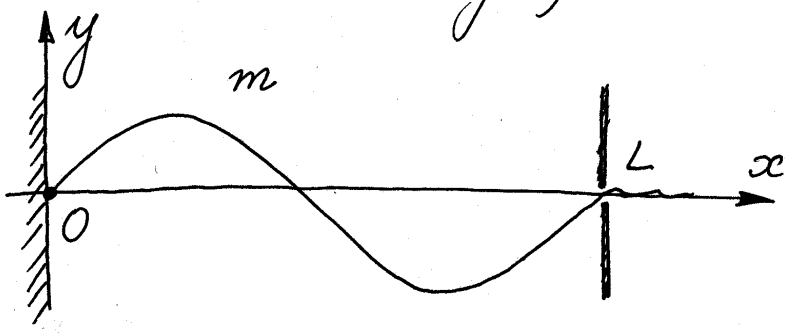
(5) PROBLEM # 5:

This problem takes us (in some more details) through the derivation of the E. of M. for a string under tension (the WAVE EQUATION) done in class.

Consider a string fixed at both ends:



The motion of the string is described by a STANDING WAVE SOLUTION to the wave equation:

$$y(x,t) = A\sin(kx)\cos(\omega t), \qquad (5)$$

with $kA \ll 1$.

As in class, many of the relations we are about to derive will depend on the string TENSION, T, and the MASS DENSITY, μ. Since we are not directly given either quantity, we start