Spring and Mass Problem

1. A mass M moves toward a semi infinite spring with initial velocity v_0, as shown in Fig. 1. The spring has mass per unit length μ and spring constant times the spring length $K \equiv kL$. The mass and the spring collide at $x = 0$ and $t = 0$. Write down the velocity of the mass M after the collision as a function of time, and also write down the velocity of the mass M as a function of position.

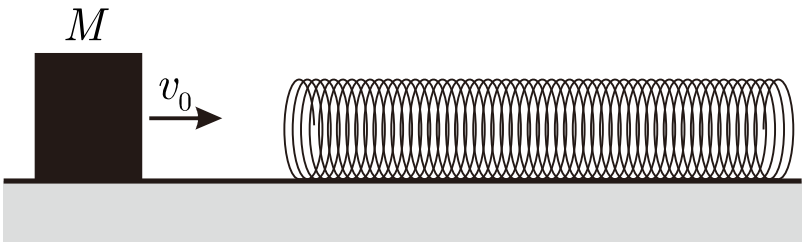

Figure 1:

2. For this part another mass m is placed at the other end of the spring. After the initial wave front from the collision of mass M with the spring reaches this mass, how long would it take for this mass to leave the spring? Also calculate the velocity of mass m when it leaves the spring. Assume the waves in the spring travel faster than the initial velocity of mass M but the spring is long enough so that when the mass m leaves the spring, the reflected waves from m have not yet returned to M.