Unit 5 Chapter 13 Homework #2

13) $m_1 = .01kg$
$m_2 = 2kg$
$k = 19.6 N/m$
$\Delta x = ?$
$v_0 = 300 m/s$

$m_1 v_0 = v_f(m_1 + m_2)$
$.01(300) = v_f(.01+2)$
$v_f = 1.49 m/s$

* Energy isn't conserved * in this inelastic collision

$\frac{1}{2}mv^2 = \frac{1}{2}kx^2$
$\frac{1}{2}(.01+2)(1.49)^2 = \frac{1}{2}(19.6)x^2$
$x^2 = .22767$
$x = 0.48m$

15) $E_{tot} = 47J$
$x_{max} = .24m$

A) $U_s = \frac{1}{2}kx^2$
$47 = \frac{1}{2}(k)(.24)^2$
$k = 1631.94 N/m$

B) $E_{tot} = K$
47J

C) $K = \frac{1}{2}mv^2$
$47 = \frac{1}{2}m(3.45)^2$
$m = 7.90kg$