Name_____

Student I.D._____

Math 2250-4
Quiz 12
April 19, 2013

1) Find the general solution $\left[x_1(t), x_2(t)\right]^T$ to the homogeneous system of second order differential equations, which could result from a "train" of two cars coupled with a single spring, in the absence of friction (see picture below).

$$x_1''(t) = -2x_1 + 2x_2$$
$$x_2''(t) = 3x_1 - 3x_2 .$$

(8 points)

2) If the Hooke's constant for the spring connecting the two cars is $k = 6000\ \frac{N}{m}$, then what are the masses m_1, m_2 of the two cars in order that their displacements $x_1(t), x_2(t)$ from respective equilibrium points be governed by the system of differential equations above?

(2 points)