Homework: Non-harmonic oscillations Name _____

1. A cart of mass m is attached to a spring with constant k and oscillating back and forth. Using operator algebra as we did in class *($D = d/dt$),* find an equation for $x(t)$ for the cart if it is pulled back from equilibrium and released from rest at x_0 at time $t = 0$. (*Hint:* Think of using complex numbers in your factoring.)

2. A flat metal mass is attached to a spring which is oscillating back and forth on a platform. There is essentially no friction in this situation. But, the object is very light (weighing only 50 g) and experiences air friction (v-dependent, not v^2-dependent). It oscillates back and forth twice per second, with the amplitude of oscillation slowly decaying. After 100 sec, the amplitude is half what it originally was.

   a. What is the net force on the object? Write out the equation of motion for this object.

   a. What are the values for ω? γ? For c? k?