MATH 308 – 518, 519, 520   **Homework 7**   **Spring 2014**

Due Thursday, March 20 at the beginning of class.

1. A mass weighting 2 lb stretches a spring 6 in. If the mass is pulled down an additional 3 in and then released, and if there is no damping, find

    (a) the position y of the mass at any time t.

    (b) frequency, period, and amplitude of the motion.

    (c) How long does it take for the mass to pass the equilibrium point?

2. A series circuit has a capacitor of 10^{-5} F, a resistor of $3 \times 10^2 \Omega$, and an inductor of 0.2 H. The initial charge on the capasitor is 10^{-6} C and there is no initial current. Find the charge Q on the capasitor at any time t.

3. A mass weighting 8 lb is attached to a spring hanging from the ceiling and comes to rest at its equilibrium position. At $t = 0$, an external force $F(t) = 2\cos 2t$ lb is applied to the system. If the spring constant is 10 lb/ft and the damping constant is 1 lb-sec/ft, find the steady-state solution for the system. What is the resonance frequency for the system?