Math 216 - Quiz 8

Name _____

November 17, 2010

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) A 1-kg mass is attached to a spring with stiffness 10 N/m. The damping constant for the system is 2 N-sec/m. The mass is moved 2 m to the left of equilibrium (compressing the spring) and released from rest. Find the equation of motion of the mass. Write your final result in terms of a single trigonometric function with a phase shift. When does the mass pass through equilibrium for the first time?

2. (5 points) The oscillations of a mass on a spring are described by the initial value problem

$$0.2\frac{d^2x}{dt^2} + 1.2\frac{dx}{dt} + 2x = 5\cos 4t, \qquad x(0) = 0.5, \quad x'(0) = 0.$$

Find the equation of motion, and identify the transient and steady-state terms.