1. Consider an "RLC" circuit in which the capacitor charge $Q(t)$ satisfies $LQ'' + RQ' + C^{-1}Q = E(t)$ where L, R, C are the inductance (Henries), resistance (Ohms), and capacitance (Farads), and where $E(t)$ is a variable source of voltage (Volts). Suppose that $R = 2$ Ohms and $C = 1/5$ Farads, and that the voltage source is sinusoidal: $E(t) = \cos(5t)$.

   (a) (3 Points.) Find the steady-state periodic response, keeping the inductance L as a variable parameter in your answer.

   (b) (2 Points.) Find the amplitude of the steady-state periodic response from part (a), and then determine the value of inductance L that maximizes it.