ECE 312 HW #3

1.

A LTI system is governed by

$$\frac{d^2y(t)}{dx^2} + 5\frac{dy(t)}{dx} + 4y(t) = x(t)$$

where

$$y(0) = \dot{y}(0) = 0$$

a) (2 points) find the unit step response
b) (2 points) find the impulse response
c) (1 points) find the transfer function *H(s)*

2. (3 points) Prove

$$x(t) * h(t) = h(t) * x(t)$$

3. (2 points) A system has an impulse response of

$$h(t) = \left(e^{-3t}\cos 5t\right)u(t)$$

Find the system unit step response.

4. (4 points)

$$x_1(t) = u(t) - u(t-2) = x_2(t)$$

plot

$$y(t) = x_1(t) * x_2(t)$$