Suppose a causal, linear, time-invariant, continuous-time system behaves according to the following differential equation:

\[
d\frac{d^2 y(t)}{dt^2} + 3 \frac{dy(t)}{dt} + 2y(t) = \frac{dx(t)}{dt} + 3x(t)
\]

where \( x(t) \) and \( y(t) \) are the input and output signals, respectively, to the system.

(a) Find the response \( y(t) \) of the system to the unit step function input \( u(t) \).

(b) Find the input \( x(t) \) to the system if the output is \( y(t) = te^{-t}u(t) \).

(c) Determine the magnitude of the frequency response of the system when \( f = 2/\pi \) Hertz.