

## Fall, 1998 – Exam 2 Answers

1. (a)  $y(x) = c_1x^{-4} + c_2x^{-4} \ln x$   
(b)  $h(t) = 2 - 2e^{-t}$
2. (a)  $\frac{24}{(s+10)^5} + 2e^{-2s}$   
(b)  $e^{-t}(\cos 3t - \sin 3t)$   
(c)  $f(t) = \frac{1}{7} [e^{-(t-2)} - e^{-8(t-2)}] u(t-2)$
3. (a)  $y(x) \approx a_0(1 + 2x^2) + a_1 \left( x + \frac{1}{3}x^3 + \frac{1}{30}x^5 \right)$   
(b) don't worry about this
- 4.

$$\frac{dx}{dt} = -5x + y + 4u(t-2)$$

$$\frac{dy}{dt} = 3x - 3y$$

$$Y(s) = \frac{3s + 12e^{-2s}}{s(s^2 + 8s + 12)}$$