

Sample 2 – Exam 2 Answers

1. $y(x) = c_1 \sin x + c_2 \cos x + \sin x \ln |\sin x| - x \cos x$

2. (a)

$$\begin{aligned}\frac{dx}{dt} &= -5x + y, & x(0) &= 1 \\ \frac{dy}{dt} &= 3x - 3y, & y(0) &= 0\end{aligned}$$

(b)

$$\begin{aligned}x(t) &= \frac{1}{4}e^{-2t} + \frac{3}{4}e^{-6t} \\ y(t) &= \frac{3}{4}e^{-2t} - \frac{3}{4}e^{-6t}\end{aligned}$$

3. $y(t) = [3 - 3e^{-3(t-1)}] u(t-1) - [3 - 3e^{-3(t-3)}] u(t-3)$

4. not applicable