

Sample Final Exam 2 Answers

1. (a) $y_h(x) = e^{-2x}(c_1 \cos x + c_2 \sin x)$

(b) $y_p(x) = x - \frac{4}{5}$

(c) $y(x) = y_h(x) + y_p(x)$

2. $y(x) = -1 + \left(\frac{1}{2}x^2 - x + 2\right)^3$

3. not applicable

4. $x^3y = \frac{1}{2}x^2 - 2$

5. $y(t) = e^{-2t} + 2te^{-2t} + e^{-2(t-2)}(t-2)u(t-2)$

6. $f(x) = \sum_{n=1}^{\infty} \frac{2}{n} (-1)^{n+1} \sin nx$

7. $x(t) = \frac{8}{7}e^{-t} + \frac{6}{7}e^{-8t}$, $y(t) = \frac{8}{7}e^{-t} - \frac{8}{7}e^{-8t}$

8. $u(x, t) = 6e^{-\pi^2 t/9} \sin \frac{\pi x}{3} + 4e^{-\pi^2 t} \sin \pi x - 7e^{-16\pi^2 t/9} \sin \frac{4\pi x}{3}$