

### Answers

Please email me if you find any mistakes.

(1)

$$A(t) = (2\sqrt{2} + 2)e^{(-1/2+\sqrt{2}/4)t} - (2\sqrt{2} - 2)e^{(-1/2-\sqrt{2}/4)t}$$
$$B(t) = (2\sqrt{2} + 4)e^{(-1/2+\sqrt{2}/4)t} + (-2\sqrt{2} + 4)e^{(-1/2-\sqrt{2}/4)t}$$

(2)

$$y(t) = \frac{1}{12}e^{2t} + C_1e^{-t} \cos(\sqrt{3}t) + C_2e^{-t} \sin(\sqrt{3}t)$$

(3)

$$y(t) = u(t-3) \left( \frac{1}{6} - \frac{1}{6}e^{-6(t-3)} \right) - \frac{1}{4}e^{-6t} - \frac{3}{2}t^2 + \frac{5}{4}$$

(4)

$$y(t) = 2 - 2 \cos t$$

(5)

$$K = \left( \frac{2n+1}{4} \right)^2, \text{ for } n = 0, \pm 1, \pm 2, \dots$$

(6)

$$\sum_{n=1}^{\infty} \frac{1}{\pi} \left( \frac{-2}{n} + 2 \frac{(-1)^n}{n} \right) \sin(nx)$$

(7)

$$\sum_{n=1}^{\infty} \frac{1}{\pi} \left( \frac{(2-4\pi)(-1)^n - 2}{n} \right) \sin\left(\frac{nx}{2}\right)$$

(8)

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