Answers for Sample Big Test #4
(not guaranteed correct)

1. \( y(t) = 4 - 2e^{-t} - 2te^{-t} \)

2. \( x(t) = y(t) = -\frac{1}{4}(1 - \cosh 2t) \)

3. \( y = A \sum_{n=0}^{\infty} \frac{x^{2n}}{2^n n!} + B \sum_{n=0}^{\infty} \frac{2^n n! x^{2n+1}}{(2n+1)!} \)

4. There was no problem #4.

5. a) \( \frac{s + 3}{(s + 3)^2 + 4} \) 
   b) \( \frac{2 e^{3s}}{(s + 1)^3} \) 
   c) \( \frac{s^2 + 2s + 2}{s^3} e^{-s} \)

6. a) \( \frac{1}{4} [1 - \cos 2t] \)
   b) \( \frac{1}{4} [1 - \cos 2t] \)

7. OOPS!!! I didn’t mean to say “continuous” in this problem. I copied that from the previous problem and then just pasted it. The function in this problem is only piecewise continuous on \([0, \infty)\). I bet most of you just ignored that anyways.

\( u(t - 1) \frac{1}{2} [1 - e^{-2(t-1)}] \)