MATH 308-519 Spring 2011 Answers for Practice Test III

1. Find the general solution of the equation:

   (a) $y(x) = C_1 e^x + C_2 e^{2x} + (0.1x - 0.12)\cos x - (0.3x + 0.34)\sin x$

   (b) $y(x) = C_1 + C_2 e^{9x} + \left(\frac{1}{36}x^2 + \frac{5}{216}x + \frac{7}{864}\right)e^{-3x} + \left(\frac{1}{102}\sin 3x + \frac{5}{306}\cos 3x\right)e^{-3x}$

   (c) $y(x) = e^x(x \ln|x| + C_1 x + C_2)$

2. $y(x) = C_1 x^3 + C_2 x^2$

3. $y_2(x) = x^{-3}$

4. $\mathcal{L}\{f(t)\}(s) = \frac{1}{s^2}e^{-2s} + \left(\frac{1}{s} - \frac{2}{s^2}\right)e^{-s} + \frac{1}{s^2}$

5. $\mathcal{L}\{t\cos t + e^{3t}\sin 2t + t^5 e^{2t}\} = \frac{s^2 - 1}{(s+1)^2} + \frac{2}{(s-3)^2 + 4} + \frac{120}{(s-2)^6}$

6. $\mathcal{L}^{-1}\left\{\frac{3s + 2}{(s^2 - 4)(s+1)}\right\} = \frac{2}{3}e^{2t} - e^{-2t} + \frac{1}{3}e^{-t}$

7. $y(t) = (2t^2 + t + 2)e^{-t}$