Exercise 4.6

1. Hint: you may need the integration table to solve this problem.
   Solution: $y = c_1 \cos x + c_2 \sin x + \cos x \ln |\cos x| + x \sin x$.

12. Hint: Integration table, again.
   Solution: $y = c_1 e^x + c_2 xe^x - (1/2)e^x \ln(1 + x^2) + xe^x \tan^{-1}x$.

27. Solution: $y = x^{-1/2} [\, c_1 \cos x + c_2 \sin x + 1]$.

34. Solution: $y = c_1 e^x + c_2 xe^x + 4x^2 + 16x + 21 + xe^x \ln x$.

Exercise 4.7

21. Hint: To find u_1, use integration by parts first, then solve the recurrence equation.
   Solution: $y = c_1 x + c_2 x \ln x + x(\ln x)^2$.

41. Hint: Let $x_0 = -2$.
   Solution: $y = c_1 \cos(\ln(x+2)) + c_2 \sin(\ln(x+2))$.

Exercise 4.10

8. Solution: $y = c_1 e^{c_2}x - 1$.

16. Solution: $y = -\ln |c_1 - x^2| + c_2$.