Some review problems
1. a) Solve $y'' - 6y' + 10y = 0$.
   b) Find the solution to a) satisfying $y(0) = 1, y'(0) = 2$.
   In c)-h) below do not calculate the solution!
   c) Write the form of a particular solution to $y'' - 6y' + 10y = 3$.
   d) Write the form of a particular solution to $y'' - 6y' + 10y = 3t$.
   e) Write the form of a particular solution to $y'' - 6y' + 10y = 3e^t$.
   f) Write the form of a particular solution to $y'' - 6y' + 10y = 3te^t$.
   g) Write the form of a particular solution to $y'' - 6y' + 10y = 3 \cos(3t)$.
2. For the problems c)-h) above:
   a) Calculate a particular solution to the problems, then check your answer by substituting in the equation.
   b) Write the general solution.
   c) Find the solution satisfying $y(0) = 0, y'(0) = 1$.
3. a) Solve $y'' - 3y' + 2y = 0$.
   b) Solve $y'' - 3y' + 2y = 2t$ by way of finding a particular solution.
   c) Solve b) using the variation of parameters.
4. a) Find the differential equation satisfied by the Wronskian of two independent solutions of $(t + 1)y'' + t^2y = 0$.
   b) Calculate the Wronskian of two solutions $y_1, y_2$ of the equation in a) which satisfy $y_1(0) = 1, y_1'(0) = 0$, respectively $y_2(0) = 0, y_2'(0) = 1$.
   c) Are the solutions in b) linearly independent?
5. a) Solve $t^2y'' + ty' - y = 0$.
   b) Solve $t^2y'' + ty' - y = 1$.
   c) Solve $t^2y'' + ty' - y = 1/t$. (Use the variation of parameters.)
6. Consider the differential equation
   $$x^2 (2x + 1) \frac{d^2}{dx^2} y(x) - x (4 + 7x) \frac{d}{dx} y(x) + 2 (5x + 3) y(x)$$
   a) Show that $y(x) = x^2$ is a solution of the equation.
   b) Find the general solution of the equation.