1. Use the method of undetermined coefficients to find the general solution of each of the following ODEs.

   (a) $y'' + 2y' + 5y = 6\sin 2x + 7\cos 2x$

   (b) $y''' - 3y'' + 4y = 4e^{x} - 18e^{-x}$

2. Use variation of parameters to find the general solution of each of the following ODEs.

   (a) $y'' + 4y' + 5y = e^{-2x}\sec x$

   (b) $y'' + 3y' + 2y = \dfrac{1}{1+e^{x}}$

   (c) $x^2y'' - 6xy' + 10y = 3x^4 + 6x^3$; $y_1(x) = x^2$ and $y_2(x) = x^5$ are independent solutions of the corresponding homogeneous equation

3. Use reduction of order to find a second solution of each of the following ODEs.

   (a) $(2x+1)\,y'' - 4\,(x+1) + 4y = 0$; $y(x) = e^{2x}$ is one solution

   (b) $(x^3 - x^2)\,y'' - (x^3 + 2x^2 - 2x)\,y' + (2x^2 + 2x - 2)\,y = 0$; $y(x) = x^2$ is one solution