1. Find the general solution $y_h$ for each of the following.
   a) $y'' + 3y' - 18y = 0$
   b) $9y'' + 6y' + y = 0$
   c) $y'' - 4y' + 5y = 0$
   d) $y'' + y' - y = 0$

2. Consider the problem (see more homework problems)

   \[ x^2y'' - x(x + 2)y' + (x + 2)y = 0 \]

   a) Show that $y = x$ is one solution.
   b) Find the second solution.

3. Solve the IVP using two methods. (see more for sect. 3.4 and 3.5)

   \[ y'' + 4y' = 36t^2 + 34t \]
   \[ y(0) = 0 \]
   \[ y'(0) = 0 \]

4. Consider the problem

   \[ y'' - cy' + y = 0 \]

   for some constant $c$. Describe how the behavior of this solution changes as $c$ varies.