(1) Use the method of undetermined coefficients to find the form of a particular solution $y_p$ to the following ODEs. **Do not solve the equation!**

   (a) $y'' - 2y' + 2y = e^t$
   (b) $y'' - 2y' + 2y = te^t \cos(t) + t^2 e^t \sin(t)$
   (c) $y'' + 4y' + 4y = e^{-2t}$
   (d) $y'' + 4y' + 4y = e^{-2t} + e^t$

(2) Find the general solution to the following ODE for $t < 0$.

\[ t^2 y'' + 4ty' + 2y = \sin(t) \]

(3) If $y_1, y_2$ are solutions to $y'' + t^2 y' + e^t y = 0$ on $(-\infty, \infty)$ can $W[y_1, y_2](t) = t$ be their Wronskian?

(4) Verify that $y_1(t) = t$ is a solution to

\[ (1 - t^2)y'' - 2ty' + 2y = 0. \]

Then find the general solution to that ODE for $t > 1$.

(5) Solve the IVP

\[ y'' + 5y' + 6y = \sin(t) \quad , \quad y(0) = 1, y'(0) = -1. \]