1. [15 points] Find explicit, real-valued solutions to each of the following, as indicated. For this problem, **DO NOT use Laplace transforms**.

    a. [8 points] Find the solution $z(t)$ to the initial value problem $3z'' + 12z' + 39z = 6e^{-t}$, $z(0) = \frac{1}{5}$, $z'(0) = 0$

    b. [7 points] Find the general solution $y(t)$ to $y'' + 5y' + 6y = \cos(t)$.