3. [14 points] Use Laplace transforms to solve each of the following.

    a. [7 points] $y'' + 4y' + 4y = 2e^{-2t}$, $y(0) = 1$, $y'(0) = 0$.

    b. [7 points] $y'' + 3y' = \begin{cases} 12, & 0 \le t < 2 \\ 0, & t \ge 2 \end{cases}$, $y(0) = 0$, $y'(0) = 0$.