Math 320 (Smith): Quiz 3

Given

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

(a) verify that \( y_1(t) = 1 + t \) is a solution to the homogeneous problem.
(b) Find the general solution to the nonhomogeneous problem.

Hints
A. Reduction of order with \( y(t) = v(t)(1 + t) \) should give

\[ \frac{v''}{v'} = \frac{1 + t^2}{t(1 + t)} \]

B. Rewrite

\[ \frac{1 + t^2}{t(1 + t)} = 1 + \frac{1}{t} - \frac{2}{(1 + t)} \]

using partial fractions.