3. [16 points] For $t > 0$, consider the differential equation $L[y] = y'' - 3t^{-1}y' - 5t^{-2}y = 0$.

a. [4 points] Determine which of $y_1 = t^{-1}$, $y_2 = 1$, $y_3 = t$, $y_4 = \frac{1+t^6}{t}$, and $y_5 = t^5$ are solutions to $L[y] = 0$.

b. [4 points] Write a general solution to $L[y] = 0$. Explain why your solution is correct.

c. [4 points] If you were solving $L[y] = 5t^5$, what forms could the particular solution take (that is, what could you guess for y_p)? Why?

d. [4 points] Find y_p.