

2. [15 points] Solve each of the following, finding explicit real-valued solutions as indicated.
- a. [8 points] Find the solution to the initial value problem $x' = x + 2y$, $y' = 4x + 3y$, $x(0) = -1$, $y(0) = 8$.¹

b. [7 points] Find the general solution to $\begin{pmatrix} x_1 \\ x_2 \end{pmatrix}' = \begin{pmatrix} 2 & -2 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$.

¹The original exam copy had $y'(0) = 8$; a correct solution may be obtained applying this as well.