

Find the general solution to the following:

1. $\vec{x}' = \begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix} \vec{x}$

2. $\vec{x}' = \begin{pmatrix} 4 & -2 \\ 8 & -4 \end{pmatrix} \vec{x}$

Find the solution to the given initial value problem.

3. $\vec{x}' = \begin{pmatrix} 1 & -4 \\ 4 & -7 \end{pmatrix} \vec{x}, \quad \vec{x}(0) = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$