For each of the following systems, find the general solution, draw a phase portrait, and classify the fixed point. If an initial value is given, also solve the initial value problem.

1. $\mathbf{x}' = \begin{pmatrix} 1 & 1 \\ 4 & -2 \end{pmatrix} \mathbf{x}$

2. $\mathbf{x}' = \begin{pmatrix} -2 & 1 \\ -5 & 4 \end{pmatrix} \mathbf{x}, \quad \mathbf{x}(0) = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$

3. $\mathbf{x}' = \begin{pmatrix} 3 & 6 \\ -1 & -2 \end{pmatrix} \mathbf{x}$

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

(*note*: On number 4, only solve. The phase portrait is in 3 dimensions and difficult to draw.)