

### Part I Problems

In the following two problems, find a fundamental matrix of the given system and then use it to find the specific solution of the system which satisfies the given initial condition.

**Problem 1:**  $\mathbf{x}' = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} \mathbf{x}$ ,  $\mathbf{x}(0) = \begin{bmatrix} 3 \\ -2 \end{bmatrix}$

**Problem 2:**  $\mathbf{x}' = \begin{bmatrix} 2 & -5 \\ 4 & -2 \end{bmatrix} \mathbf{x}$ ,  $\mathbf{x}(0) = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$

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18.03SC Differential Equations  
Fall 2011

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