MATH 246 Groupwork 3.2 **Name:** _____

1. Find the eigenvectors for the following matrices. You found the eigenvalues yesterday.

   (a) $A = \begin{bmatrix} 4 & 6 \\ -2 & -4 \end{bmatrix}$

   (b) $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$

   (c) $A = \begin{bmatrix} 2 & -1 \\ 1 & 4 \end{bmatrix}$

   (d) $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$

2. Consider the system:

$$\bar{x}' = \begin{bmatrix} t^2 & 2t - t^4 \\ 1 & -t^2 \end{bmatrix} \bar{x}$$

(a) Show that the following form a fundamental pair:

$$\{\bar{x}_1, \bar{x}_2\} = \left\{ \begin{bmatrix} 1 + t^3 \\ t \end{bmatrix}, \begin{bmatrix} t^2 \\ 1 \end{bmatrix} \right\}$$

(b) Write the general solution.

(c) Solve the IVP with:

$$\bar{x}(1) = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$