QUIZ 5 FOR MATH 304-06, 10/23 YOUR NAME _____

(1) Let $A = \begin{bmatrix} 2 & 1 \\ 2 & 1 \end{bmatrix}$. Does $\mathbb{R}^2$ have a basis that consists of eigenvectors of A? (Hint: Yes.)

(a) (10 points) Find such a basis. Let's call your basis $\mathscr{B}$.

(b) (5 points) Find the coordinates of $\mathbf{u} = \begin{bmatrix} -4 \\ 3 \end{bmatrix}$ with respect to $\mathscr{B}$.

(c) (5 points) Find the vector $A^{100}\mathbf{u}$. It is okay to give your answer as a linear combination of baisis vectors in $\mathscr{B}$.

(2) (10 points) Let $C = \begin{bmatrix} 0 & -1 \\ 2 & 0 \end{bmatrix}$. Does $\mathbb{R}^2$ have a basis that consists of eigenvectors of C? Does C have any eigenvectors? (Justify your answer, of course. It's a math class!)