CU Boulder

Math 2130

Sample-Test 2

Section 002 (Instructor Farid Aliniaeifard)

NAME (print):⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

                             (Family)   (Given)

SIGNATURE:⎯⎯

STUDENT NUMBER:⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

Instructions:

1. Time allowed: 50 minutes.

2. NO CALCULATORS OR OTHER AIDS

3. There are 5 questions on 5 pages. Last page is blank.

4. Questions can be solved in more than one way.

5. You are expected to write clearly and carefully. You will be graded for both content and presentation.

Question	Points	Marks
1	5	
2	5	
3	5	
4	5	
5	5	
Total	25	

1. (5 points) Diagonalize the following matrix.

$$\begin{bmatrix} 1 & 0 & 0 \\ -8 & 4 & -5 \\ 8 & 0 & 9 \end{bmatrix}.$$

2. (5 points) Let $\mathcal{B} = \{1 + t, 1 + t^2, 1 + t + t^2\}$ and $\mathcal{C} = \{2 - t, -t^2, 1 + t^2\}$ be bases for $\mathbb{P}_2$.

   (a) Find $\underset{\mathcal{B} \to \mathcal{C}}{\mathcal{P}}$.

   (b) Let $f = 2 + 4t + 3t^2$. Write $[f]_\mathcal{C}$.

3. (5 points) This question is about definitions.

4. (5 points) Suppose that $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ is an eigenvector of a matrix A corresponding to the eigenvalue 3 and that $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$ is an eigenvector of A corresponding to the eigenvalue -2. Compute $A^2 \begin{bmatrix} 4 \\ 3 \end{bmatrix}$.

5. (5 points) The last question will be True or False question.

The end. Have a great weekend