Exam 2– MATH 332 – Summer 2005

Directions: Make sure to show all necessary work to receive full credit. If you need extra space please use the back of the sheet with appropriate labeling. Buena suerte.

Answer problems 1. thru 3. either true or false (circle your answer).

1. When $\mathbf{u}$ and $\mathbf{v}$ are nonzero vectors, Span$\{\mathbf{u},\mathbf{v}\}$ contains the line thru $\mathbf{u}$ and the origin.

2. If the equation $A\mathbf{x}=\mathbf{b}$ is inconsitent, then $\mathbf{b}$ is not in the set spanned by the columns of $\mathbf{A}$.

3. If a set in $\mathbb{R}^n$ is linearly dependent, then the set contains more than n vectors.

4. Fill in the answer to the following problem:

   The product of a $m \times n$ matrix with a $n \times k$ matrix results in a _____ matrix.

5. Fill in the answer to the following problem:

   "If A is an $m \times n$ matrix, then the colums of A are linearly independent if and only if the reduced echelon form matrix of A has _____ pivot columns.

6. Explain a way of determining whether a given set of vectors in $\mathbb{R}^n$, say $\{\mathbf{v}_1, \cdots, \mathbf{v}_k\}$, is linearly independent.

7. Determine whether the given set of vectors spans $\mathbb{R}^3$. Explain your answers.

a) $\{\begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 4 \\ 5 \end{bmatrix}\}$.

b) $\{\begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix}, \begin{bmatrix} 0 \\ -3 \\ 8 \end{bmatrix}\}, \begin{bmatrix} 4 \\ -1 \\ -5 \end{bmatrix}\}$.

8. Determine whether the given set of vectors spans $\mathbb{Z}_5^3$. Explain your answers.

$$\{\begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 4 \\ 3 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}\}$$

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