slightly short for 25 min

allowed 25 min
started to leave @ 10 (4)
med = 16
... @ 15 (4)
4 past 20 min
... @ 22

MATH 332
Quiz 2
September 28, 1994

Name Key

$\bar{X} = 24.9$ $m = 25.5$

I. Give a complete definition:

The set of vectors $v_1, v_2, \ldots, v_n$ is called <u>linearly independent</u> if and only if

4 17

II. Problems:

1. Is the vector $\begin{bmatrix} 3 \\ 8 \\ -11 \end{bmatrix}$ in the set spanned by the vectors $\begin{bmatrix} 2 \\ 4 \\ -6 \end{bmatrix}$ and $\begin{bmatrix} 1 \\ 4 \\ -5 \end{bmatrix}$?

16

$$x_1\begin{bmatrix} 2 \\ 4 \\ -6 \end{bmatrix} + x_2\begin{bmatrix} 1 \\ 4 \\ -5 \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \\ -11 \end{bmatrix}$$

6

$$\left[\begin{array}{cc|c} 2 & 1 & 3 \\ 4 & 4 & 8 \\ -6 & -5 & -11 \end{array}\right] \rightarrow \begin{bmatrix} 2 & 1 & 3 \\ 0 & 2 & 2 \\ 0 & -2 & -2 \end{bmatrix} \rightarrow \begin{bmatrix} 2 & 1 & 3 \\ 0 & 2 & 2 \\ 0 & 0 & 0 \end{bmatrix}$$ yes

2. Compute, if possible:

a. $3(1,2,3) + 2(1,-2,0) =$ $(5, 2, 9)$ all

4 b. $\begin{bmatrix} 1 & 2 & -2 \\ 0 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix} =$ $\begin{bmatrix} -9 \\ 1 \\ -1 \end{bmatrix}$ all but 2

3. Write the system of equations:

$2x_1 + x_2 - x_3 = 6$

$x_1 - 2x_2 = 5$

$2x_1 - x_2 + 4x_3 = 0$

4 a. As a matrix equation ($Ax = b$).

$$\begin{bmatrix} 2 & 1 & -1 \\ 1 & -2 & 0 \\ 2 & -1 & 4 \end{bmatrix} \underline{x} = \begin{bmatrix} 6 \\ 5 \\ 0 \end{bmatrix}$$

left out or [A|b] — almost all

b. As a vector equation

$$x_1\begin{bmatrix} 2 \\ 1 \\ 2 \end{bmatrix} + x_2\begin{bmatrix} 1 \\ -2 \\ -1 \end{bmatrix} + x_3\begin{bmatrix} -1 \\ 0 \\ 4 \end{bmatrix} = \begin{bmatrix} 6 \\ 5 \\ 0 \end{bmatrix}$$ all

4. Do the following vectors span R^3?

6 $\begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}, \begin{bmatrix} 2 \\ 6 \\ -8 \end{bmatrix}, \begin{bmatrix} 3 \\ 9 \\ -8 \end{bmatrix}$

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 6 & 9 \\ -3 & -8 & -8 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & -2 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 0 & 0 & 4 \end{bmatrix}$$ 21

Yes, sol for all b

17 missed
9 only this

5. Are the following vectors linearly independent? These vectors are in $\mathbb{R}^4$. 8

6 $\begin{bmatrix} 2 \\ -6 \\ 0 \\ 2 \end{bmatrix}, \begin{bmatrix} 3 \\ -7 \\ 4 \\ 3 \end{bmatrix}, \begin{bmatrix} 1 \\ -3 \\ 0 \\ 1 \end{bmatrix}$

$$\begin{bmatrix} 2 & 3 & 1 \\ -6 & -7 & -3 \\ 0 & 4 & 0 \\ 2 & 3 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 2 & 3 & 1 \\ 0 & 2 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 2 & 3 & 1 \\ 0 & 2 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

no

x2 why?