Quiz #5 for Math 250:1 & 5

3/9/2011

Name ____________________________  Section (please circle one)  1  5

This information is shown on both sides of this page.

\[
\begin{bmatrix}
3 & -2 & 6 & 4 & a \\
5 & 3 & 2 & 1 & b \\
1 & -7 & 10 & 7 & c \\
12 & 11 & 0 & -1 & d \\
\end{bmatrix}
\]

is (after row ops)

\[
\begin{bmatrix}
1 & 0 & 22/19 & 14/19 & 2/19b + 3/19a \\
0 & 1 & -24/19 & -17/19 & 3/19b - 5/19a \\
0 & 0 & 0 & 0 & -2a + b + c \\
0 & 0 & 0 & 0 & a - 3b + d \\
\end{bmatrix}
\]

This problem discusses the following system of linear equations:

\[
\begin{cases}
3x_1 - 2x_2 + 6x_3 + 4x_4 = a \\
5x_1 + 3x_2 + 2x_3 + x_4 = b \\
x_1 - 7x_2 + 10x_3 + 7x_4 = c \\
12x_1 + 11x_2 - x_4 = d \\
\end{cases}
\]

In these problems, you need not supply verification of your answers.

1. (2) Find specific numbers for which this system has no solution.

\[
\begin{cases}
a = \\
b = \\
c = \\
d = \\
\end{cases}
\]

2. (3) Consider the collection of all possible \[
\begin{bmatrix}
x_1 \\
x_2 \\
x_3 \\
x_4 \\
\end{bmatrix}
\]

which are solutions for the associated homogeneous system. Write a generating set of linearly independent vectors for this span.
This problem discusses the following system of linear equations:

\[
\begin{align*}
3x_1 - 2x_2 + 6x_3 + 4x_4 &= a \\
5x_1 + 3x_2 + 2x_3 + x_4 &= b \\
x_1 - 7x_2 + 10x_3 + 7x_4 &= c \\
12x_1 + 11x_2 - x_4 &= d
\end{align*}
\]

3. (2) Find specific numbers \textit{(not all 0!)} for which this system has a solution, and display one specific solution.

\[
\begin{align*}
a &= \underline{\quad} \\
b &= \underline{\quad} \\
c &= \underline{\quad} \\
d &= \underline{\quad}
\end{align*}
\]

If \[
\begin{align*}
a &= \underline{\quad} \\
b &= \underline{\quad} \\
c &= \underline{\quad} \\
d &= \underline{\quad}
\end{align*}
\]

then one solution is \[
\begin{align*}
x_1 &= \underline{\quad} \\
x_2 &= \underline{\quad} \\
x_3 &= \underline{\quad} \\
x_4 &= \underline{\quad}
\end{align*}
\]

4. (3) Consider the collection of all possible \[
\begin{bmatrix}
a \\
b \\
c \\
d
\end{bmatrix}
\]

for which this system has a solution.

Write a \underline{generating set of linearly independent} vectors for this span.