Math 54 Sample Quiz 6 October 2, 2015

You have 20 minutes to complete this quiz.

Name: _____

1. (5 points) Use Cramer's Rule to solve the system:
$4x_1 - 3x_2 = -3$
$-6x_1 + 2x_2 = 4$

$A = \begin{bmatrix} 4 & -3 \\ -6 & 2 \end{bmatrix}$. $b = \begin{bmatrix} -3 \\ 4 \end{bmatrix}$ $A_1(b) = \begin{bmatrix} -3 & -3 \\ 4 & 2 \end{bmatrix}$ $A_2(b) = \begin{bmatrix} 4 & -3 \\ -6 & 4 \end{bmatrix}$
det(A)= -10, det($A_1(b)$)= 6, det($A_2(b)$)= -2

$x_1 = \frac{6}{-10} = \frac{-3}{5}$, $x_2 = \frac{-2}{-10} = \frac{1}{5}$

2. (5 points) Find a basis for the span of the following polynomials in the vector spaces of all polynomials:
$\{x^2 - 1, 2x - 3, x^2 + 1, 4\}$
$v_1 = \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}$, $v_2 = \begin{bmatrix} -3 \\ 2 \\ 0 \end{bmatrix}$, $v_3 = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$, $v_4 = \begin{bmatrix} 4 \\ 0 \\ 0 \end{bmatrix}$
$A = \begin{bmatrix} -1 & -3 & 1 & 4 \\ 0 & 2 & 0 & 0 \\ 1 & 0 & 1 & 0 \end{bmatrix} = \begin{bmatrix} -1 & -3 & 1 & 4 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 2 & 4 \end{bmatrix}$
Pivots in the first, second, and third columns mean the basis =
$\{x^2 - 1, 2x - 3, x^2 + 1\}$