Math 220, Quiz 1 Section 8

Name:_____

ID Number:_____

Instructions: Clearly answer each of the questions below. Remember to check the back side. Show your work and any formulas you employ. Simplify all answers as far as possible.

1. (1 pt) Is the solution set of the equation $x_1 + 2x_2 - x_3 = 4$ a point, a line, a plane, or a hyperplane?

   a plane

2. (1 pt) In order for matrix-vector multiplication to be defined, the vector's number of entries must be equal to the number of _____ in the matrix.

   columns

3. (1 pt) Which of the following is not like the others?

   (a) The linear system $A\mathbf{x} = \mathbf{b}$ is consistent.

   (b) The vector $\mathbf{b}$ is in the span of the rows of A.

   (c) The vector $\mathbf{b}$ is a linear combination of the columns of A.

   (d) When the augmented matrix $[A|\mathbf{b}]$ is transformed to reduced row echelon form, the last column is free of pivots.

   b

4. (3 pts) Calculate the following matrix-vector multiplication.

$$\begin{bmatrix} 2 & 3 & 1 \\ 6 & -2 & 0 \\ -4 & 0 & 5 \end{bmatrix} \begin{bmatrix} 5 \\ 1 \\ -2 \end{bmatrix}$$

$$\begin{bmatrix} 11 \\ 28 \\ -30 \end{bmatrix}$$

5. (2 pts) If A is a matrix and $\mathbf{x}$ and $\mathbf{y}$ are vectors such that $A\mathbf{x} = \begin{bmatrix} 2 \\ -3 \end{bmatrix}$ and $A\mathbf{y} = \begin{bmatrix} 4 \\ 0 \end{bmatrix}$, use the properties of matrix-vector multiplication to find $A(3\mathbf{x} + 5\mathbf{y})$.

$$\begin{bmatrix} 26 \\ -9 \end{bmatrix}$$