1. Let
$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$$

Let
$$A = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$$
(a) How many solutions are there to the equation $A\vec{x} = \vec{0}$?

Proof: Solution and Solution are there to the equation $A\vec{x} = \vec{0}$?

There is a unique solution.

(b) Let
$$\vec{\mathbf{b}} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$
. How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{b}}$?

(c) Let
$$\vec{\mathbf{c}} = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$
. How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{c}}$?

(d) How many solutions are *possible* to $A\vec{\mathbf{x}} = \vec{\mathbf{d}}$, when considering all vectors $\vec{\mathbf{d}} \in \mathbb{R}^3$? You must justify your answer.

Name: _____

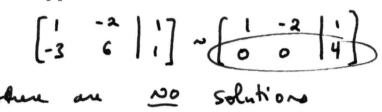
Section:

2. Let
$$A = \begin{bmatrix} 1 & -2 \\ -3 & 6 \end{bmatrix}$$

(a) How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{0}}$?

there are so-many solutions

(b) Let $\vec{\mathbf{b}} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$. How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{b}}$?



(c) Let $\vec{\mathbf{c}} = \begin{bmatrix} 5 \\ -1 \\ \mathbf{5} \end{bmatrix}$. How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{c}}$?

there are so-many slow

(d) How many solutions are *possible* to $A\vec{\mathbf{x}} = \vec{\mathbf{d}}$, when considering *all* vectors $\vec{\mathbf{d}} \in \mathbb{R}^2$? You must justify your answer.

there are either 20-many on Nome solutions
see column 2
locks a pivot
a pivot

Name: _____

Section:

3. Let
$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

(a) How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{0}}$?

[1 2 3 0] ~ [0 2 3 1 0]

there are so-many two pivot

(b) Let $\vec{\mathbf{b}} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$. How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{b}}$?

[1 2 3 1] ~ [1 2 [3: 1]

[4 5 6 | 1] ~ [0 3 :-6: 1-3]

there are so-many

Solution

(c) Let $\vec{\mathbf{c}} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. How many solutions are there to the equation $A\vec{\mathbf{x}} = \vec{\mathbf{c}}$?

[1 2 3 | 1] ~ [1 2 ; 3 | 1] 4 5 6 | 2] ~ [0 (3 ; -6 | -2] ** No pivot there are so-many solution

(d) How many solutions are *possible* to $A\vec{\mathbf{x}} = \vec{\mathbf{d}}$, when considering *all* vectors $\vec{\mathbf{d}} \in \mathbb{R}^2$? You must justify your answer.

there are the so-many solutions. market

Because no pivot in both rows =) always has a sharp h