Name: ID #: Section #:

(**1**) Consider the set vectors $S = \{\langle x, y, z\rangle | x - 2y + 3z = 0\}$.

(**a**) [3pts] Show that S is a ***subspace*** of $\mathbb{R}^3$.

(**b**) [3pts] Find a ***basis*** and the ***dimension*** of S.

(**2**) (**a**) [1pt] When does a ***homogeneous*** linear system have ***nontrivial*** solutions?

(**b**) [3pts] Use Gauss-Jordan elimination to solve the system

$$\begin{aligned} x_1 + x_2 + x_3 &= 3 \\ x_1 - x_2 - x_3 &= -1 \\ 3x_1 + x_2 + x_3 &= 5 \end{aligned}$$

Name: ID #: Section #:

(**1**) Consider the set vectors $S = \{\langle x, y, z\rangle | 2x - y + 4z = 0\}$.

(**a**) [3pts] Show that S is a ***subspace*** of $\mathbb{R}^3$.

(**b**) [3pts] Find a ***basis*** and the ***dimension*** of S.

(**2**) (**a**) [1pt] When does a ***homogeneous*** linear system have ***nontrivial*** solutions?

(**b**) [3pts] Use Gauss-Jordan elimination to solve the system

$$\begin{aligned} x_1 - 2x_2 + x_3 &= 2 \\ 3x_1 - x_2 + 2x_3 &= 5 \\ 2x_1 + x_2 + x_3 &= 1 \end{aligned}$$