

Math 320 Linear Algebra Assignment # 3

1. For each of the following augmented matrices find the solution set in the form $\vec{p} + \text{span}(\vec{\beta}_1, \vec{\beta}_2, \vec{\beta}_3, \dots, \vec{\beta}_k)$.

(a)

$$\left[\begin{array}{ccccc|c} 1 & 4 & 2 & 0 & 0 & 2 \\ 0 & 0 & 0 & 3 & 0 & 12 \\ 1 & 4 & 2 & 3 & 0 & 14 \end{array} \right]$$

(b)

$$\left[\begin{array}{ccccc|c} 3 & 2 & 5 & 4 & 1 & 0 \\ 3 & 2 & 2 & 1 & 3 & 0 \end{array} \right]$$

(c)

$$\left[\begin{array}{ccc|c} 1 & 4 & 2 & 1 \\ 2 & 1 & 3 & 1 \\ 3 & 5 & 5 & 2 \\ -1 & 3 & -1 & 0 \\ 6 & 3 & 9 & 3 \end{array} \right]$$

2. Suppose that $\vec{u}, \vec{v} \in \mathbb{R}^m$ and $k \in \mathbb{R}$ show that:

(a) $\vec{u} \cdot \vec{v} = \vec{v} \cdot \vec{u}$

(b) $\vec{0}_m \cdot \vec{u} = 0$, where $\vec{0}_m \in \mathbb{R}^m$

(c) $k(\vec{u} \cdot \vec{v}) = (k\vec{u}) \cdot \vec{v} = \vec{u} \cdot (k\vec{v})$