MATH 420 – Linear Algebra
Homework 1

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Section: 01

Problem 1. Multiply the matrices A and B below:

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}, B = \begin{bmatrix} 3 & 2 \\ 0 & -1 \end{bmatrix}$$

Solution:

We have that

$$AB = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 3 & 2 \\ 0 & -1 \end{bmatrix} = \begin{bmatrix} 1(3)+0(0) & 1(2)+0(-1) \\ 0(3)+0(0) & 0(2)+0(-1) \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 0 & 0 \end{bmatrix}$$

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Problem 2. Suppose V is a vector space. Define what it means for a set $U \subseteq V$ to be a subspace of V.

Solution:

A set $U \subseteq V$ is a subspace of V if

1. $0 \in U$.
2. For all $x, y \in U$, we have $x + y \in U$.
3. For all $x \in U$ and $c \in \mathbb{R}$, we have $cx \in U$.

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