

Mini Homework 1

Math 117 - Summer 2022

1) (2 points) Let \mathbb{F} be a field and let $a, b \in \mathbb{F}$. Prove that if $ab = 0_{\mathbb{F}}$ then $a = 0$ or $b = 0$

Solution:

2) Let V be a vector space over some field \mathbb{F} .

(a) (2 points) Prove that the additive inverse for an element $v \in V$ is unique

(b) (1 point) Prove that $0_{\mathbb{F}}v = 0_V$ for all $v \in V$ (where $0_{\mathbb{F}}$ is the “0 element” in \mathbb{F} and 0_V is the “0 vector” in V)

(c) (1 point) Prove that $a0_V = 0_V$ for all $a \in \mathbb{F}$

Solution:

3) Prove or disprove with a counter example the following:

(a) (2 points) Every vector space over \mathbb{R} is also a vector space over \mathbb{C}

(b) (2 points) Every vector space over \mathbb{C} is also a vector space over \mathbb{R}

Solution: