

**Due date:**

Friday, 2/21, by the end of class.

**Instructions:**

Students are encouraged to work together and discuss the homework problems, however each student must write up the solutions in their own words.

**Problems:**

**Problem 1.** Let  $S$  be a set  $\{(a_1, a_2) : a_1, a_2 \in \mathbb{R}\}$ . If  $(a_1, a_2)$  and  $(b_1, b_2)$  are elements in  $S$  and  $c \in \mathbb{R}$ , we define the addition and scaling by

$$(a_1, a_2) + (b_1, b_2) = (a_1 + b_1, a_2 b_2),$$

and

$$c(a_1, a_2) = (ca_1, a_2).$$

Is  $S$  a vector space with these operations? Justify your answer.

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**Problems in [1]:**

Page 81, problems 2.1.2,

Pages 85–86, problems 2.2.1, 2.2.4, 2.2.7, 2.2.8, 2.2.11, 2.2.12

Pages 91–92, problems 2.3.3(c), 2.3.4, 2.3.7, 2.3.8(a)

Page 97, problems 2.3.21(f–h), 2.3.28, 2.3.31, 2.3.32(a)

**References**

- [1] Peter Olver and Chehrzad Shakiban, Applied Linear Algebra, 2<sup>nd</sup> Edition