Group :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Section : \_\_\_\_\_\_\_\_\_\_

**Please answer the following questions:**

1. One of the conditions of vector space is *additive identity*: there exists an element such that for all . Proof that every vector space has a unique additive identity.
2. Show that each of these is not a vector space. (Hint: Check closure by listing two members of each set and trying some operations on them.)
   1. Under the usual matrix operations,
   2. Under the usual polynomial operations,

where is the set of positive real numbers.

* 1. Under the inherited operations,

1. Show that the set ℜ+ of positive real numbers is a vector space when ‘’ is interpreted to mean the product of and (e.g. 2+3 is 6), and ‘’ is interpreted as the -th power of .
2. Which of these subsets of the vector space of 2x2 matrices are subspaces under the inherited operations? For each one that is a subspace, parameterize its description. For each that is not, give a condition that fails.
3. Which of these sets spans ℜ3? That is, which of these sets has the property that any three-tall vector can be expressed as a suitable linear combination of the set’s elements?
4. , (b) , (c) 