WebAssign
**CH 4.2 (Homework)**

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MA 265 Spring 2013, section 132, Spring 2013
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**Current Score :** 20 / 20 **Due :** Thursday, February 14 2013 11:40 PM EST

**The due date for this assignment is past.** Your work can be viewed below, but no changes can be made.

**Important!** Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension View Key

**1.** 6.66/6.66 points | Previous Answers KolmanLinAlg9 4.2.002.

Let $V$ be the set of all $2 \times 2$ matrices $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ such that the product $abcd = 0$. Let the operation $\oplus$ be standard addition of matrices and the operation $\odot$ be standard scalar multiplication of matrices.

(a) Is $V$ closed under addition?

- ( ) Yes
- (•) No

(b) Is $V$ closed under scalar multiplication?

- (•) Yes
- ( ) No

(c) What is the zero vector $O$ in the set $V$?

$$O = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

(d) Does every matrix $A$ in $V$ have a negative that is in $V$?

- (•) Yes
- ( ) No

(e) Is $V$ a vector space?

- ( ) Yes
- (•) No

**2.** 6.66/6.66 points | Previous Answers KolmanLinAlg9 4.2.008.

The given set together with the given operations is not a vector space. List the properties of the definition that fail to hold. (Select all that apply.)

The set of all ordered pairs of real numbers with the operations

$$(x, y) \oplus (x', y') = (x + x', y + y')$$

and

$$r \odot (x, y) = (x, ry).$$

- [ ] (a) If **u** and **v** are any elements in $V$, then $\mathbf{u} \oplus \mathbf{v}$ is in $V$. (We say that $V$ is **closed** under the operation $\oplus$.)
- [ ] (1) $\mathbf{u} \oplus \mathbf{v} = \mathbf{v} \oplus \mathbf{u}$ for all **u**, **v** in $V$.
- [ ] (2) $\mathbf{u} \oplus (\mathbf{v} \oplus \mathbf{w}) = (\mathbf{u} \oplus \mathbf{v}) \oplus \mathbf{w}$ for all **u**, **v**, **w** in $V$.
- [ ] (3) There exists an element **0** in $V$ such that $\mathbf{u} \oplus \mathbf{0} = \mathbf{0} \oplus \mathbf{u} = \mathbf{u}$ for any **u** in $V$.
- [ ] (4) For each **u** in $V$ there exists an element $-\mathbf{u}$ in $V$ such that $\mathbf{u} \oplus -\mathbf{u} = -\mathbf{u} \oplus \mathbf{u} = \mathbf{0}$.
- [ ] (b) If **u** is any element in $V$ and $c$ is any real number, then $c \odot \mathbf{u}$ is in $V$ (i.e., $V$ is closed under the operation $\odot$).
- [ ] (5) $c \odot (\mathbf{u} \oplus \mathbf{v}) = c \odot \mathbf{u} \oplus c \odot \mathbf{v}$ for any **u**, **v** in $V$ and any real number $c$.
- [x] (6) $(c + d) \odot \mathbf{u} = c \odot \mathbf{u} \oplus d \odot \mathbf{u}$ for any **u** in $V$ and any real numbers $c$ and $d$.
- [ ] (7) $c \odot (d \odot \mathbf{u}) = (cd) \odot \mathbf{u}$ for any **u** in $V$ and any real numbers $c$ and $d$.
- [ ] (8) $1 \odot \mathbf{u} = \mathbf{u}$ for any **u** in $V$.
- [ ] None of the above

**3.** 6.68/6.68 points | Previous Answers KolmanLinAlg9 4.2.010.

The given set together with the given operations is not a vector space. List the properties of the definition that fail to hold. (Select all that apply.)

The set of all 2 × 1 matrices $\begin{bmatrix} x \\ y \end{bmatrix}$, where $x \le 0$, with the usual operations in $R^2$

- [ ] (a) If **u** and **v** are any elements in $V$, then **u** $\oplus$ **v** is in $V$. (We say that $V$ is **closed** under the operation $\oplus$.)
- [ ] (1) **u** $\oplus$ **v** = **v** $\oplus$ **u** for all **u**, **v** in $V$.
- [ ] (2) **u** $\oplus$ (**v** $\oplus$ **w**) = (**u** $\oplus$ **v**) $\oplus$ **w** for all **u**, **v**, **w** in $V$.
- [ ] (3) There exists an element **0** in $V$ such that **u** $\oplus$ **0** = **0** $\oplus$ **u** = **u** for any **u** in $V$.
- [x] (4) For each **u** in $V$ there exists an element −**u** in $V$ such that **u** $\oplus$ −**u** = −**u** $\oplus$ **u** = **0**.
- [x] (b) If **u** is any element in $V$ and $c$ is any real number, then $c \odot$ **u** is in $V$ (i.e., $V$ is closed under the operation $\odot$).
- [ ] (5) $c \odot$ (**u** $\oplus$ **v**) = $c \odot$ **u** $\oplus$ $c \odot$ **v** for any **u**, **v** in $V$ and any real number $c$.
- [ ] (6) $(c + d) \odot$ **u** = $c \odot$ **u** $\oplus$ $d \odot$ **u** for any **u** in $V$ and any real numbers $c$ and $d$.
- [ ] (7) $c \odot (d \odot$ **u**) = $(cd) \odot$ **u** for any **u** in $V$ and any real numbers $c$ and $d$.
- [ ] (8) $1 \odot$ **u** = **u** for any **u** in $V$.
- [ ] None of the above