

Quiz 13

1. (2 points) How many conditions must a set satisfy to be a vector space?

Your set needs to have 2 operations on its elements: addition & scalar multiplication, which then satisfy 10 rules (or conditions).

2. (2 points) How many conditions must a set satisfy to be a subspace of a vector space?

Each element of your set needs to be inside the given vector space, and then set must satisfy 3 additional conditions.

3. (2 points) How many elements are in the set $\{x \mid -2 \leq x < 5, x \in \mathbb{Z}\}$?

There are seven (7) elements in this set, and they are the integers: -2, -1, 0, 1, 2, 3, and 4.

4. (2 points) How many elements are in the set $\left\{ \begin{bmatrix} 2a - b \\ 4b \end{bmatrix} : a, b \in \mathbb{R} \right\}$?

There are infinitely many elements in this set since looking just at the second row of the vector (ie: "4b") we have as many possible values as there are in the set of real numbers (ie: \mathbb{R}). Note: there are finitely many real numbers in \mathbb{R} since we can say $\mathbb{R} = (-\infty, \infty)$.

5. (2 points) Is the zero vector in the set $\left\{ \begin{bmatrix} b - 3a \\ b + 1 \end{bmatrix} : a, b \in \mathbb{R} \right\}$?

Yes, because we can let $b = -1$ and $a = -1/3$