Worksheet 1
Friday, January 20th, 2023
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logistics

1. My office is Evans 1066. Office hours TBD.

If you can't make office hours, you can also reach me at `c_h_bae@berkeley.edu`

linear stuff

2. Recall the definition of a vector space over a field F. A vector space is a set V along with an addition on V and a scalar multiplication on V such that the following properties hold.

- Addition is commutative and associative.

- Scalar multiplication is associative.

- There exists an additive identity element $0 \in V$. That is, $v + 0 = v$ for all $v \in V$

- Every element $v \in V$ has an additive inverse. That is, for each $v \in V$, there exists a $w \in V$ such that $v + w = 0$.

- $1v = v$ for all v.

- Multiplication distributes over addition. That is, $(a + b)(u + v) = au + av + bu + bv$ for all $a, b \in F$ and $u, v \in V$.

a) Define the notation "$-v$" to denote the additive inverse of v. Show that $-(-v) = v$. You may use the fact that the additive inverse of a vector is unique.

b) Is the empty set a vector space? Explain.