#ref #disorganized #incomplete #hw

---

1 | Problem 12!

```
title: the problem

Supposed V is finite-dimensional with $\dim V \gt 0$< and suppose $W$ is infinite-dimensional. Prove tha
```

the set of all linear maps.. which are just a bunch of transformations like matrices.

we can do.. proof by ~induction?

ie. prove that we can do $T(a_1, a_2, \dots, a_n) = (a_1, a_2, \dots, a_n, 1)$ and therefore, we can extend it to infin and prove that it works

to do so, we need to prove that each linear map is: - associative - homogeneity

no! instead, we can do: $T(a_1, a_1, \dots, a_n) = (a_1, a_2, \dots, 1_j, a_n, 0_1, 0_2, \dots, 0_\infty)$

essentially, have an inf len list of zeroes at the end, then set the first index to 1, then the next, then the next, ect.

OR!

we can show that an inf len transformation works, and prove that therefore the whole thing needs to be inf len.

```
inf dimensional:
if there is no spanning set
```

len list LID <= len span list

prove that every new vec is linearly indpendent inf list of LID lists

2.15: def inf dimensional 2.10: finite dimensional 2.23: len of LID list <= len spanning list 2.17: linearly indipendent

define a transformation - prove inf dimensional - prove not finite dimensional - prove that there isnt a spanning list - len LID <= len spanning list, inf len LID list means no spanning list - thus, we can say it's inf dimensional

□((□□≠)→□)

for all b except

if where b_k = a_1 and

all b = 0, b_k b = 0, for all b_j, b = 0. if = k, b = a_1

all b except b_k = 0. b_k = a_1

$$\forall b \mid b \in (b_1, b_2, \dots) □ b \neq b_k,\ b = 0.\ b_k = a_1$$

b_j = 0 if j = k, b_j = a_1

{{b_1, b_2, b_3, $\cdots$ | b_i = $\left\{ \{0\& \ a_1 \& i = k\}\}\right\} \{b_1, b_2, \cdots | b_j = \left\{ \begin{array}{ll} a_1 & \text{if } j = k \\ 0 & \text{otherwise} \end{array} \right\} \}$

$$yeee$$