**Source**: 2020MATH530/KBe2020math530floIndex.md

#flo #disorganized #incomplete

# 1 | **Administrative bits**

- Will present problems from 2.B and/or 2.C next week
- Mini quiz, stop yourself after an hour
- and give your subconscious a chance to think about things
- **No need to say "clearly", "obviously", "evidently"**

# 2 | **#icr Axler2.C**

#source Axler Linear Algebra Done Right 2.C ## Polynomials are vectors - because you can add and scale them and they are kind of nice in general ## The box under 2.38 - You can't understand a vector space just by knowing the vectors inside - you also need to know the field that you are in - See 2.A ex5 - The field that you are over changes your dimension: usually we think of $\mathbb{C}$ as a vector space over $\mathbb{R}$, but in this class we think of it as over $\mathbb{C}$, which means dim $\mathbb{C} = 1$

## 2.1 | **Axler2.41**

- It's my question! See ⟦**KBe20math530floQuestions**⟧

## 2.2 | **Axler2.42**

- #tip If it's a spanning list that's the right length, then it's a basis and therefore linearly independent.
- If it's a linearly independent list and it's the right length, then it's a basis and therefore spanning.

## 2.3 | **Axler2.43 Dimension of a Sum**

### 2.3.1 | **An Example**

- If you have two planes in 3 space, and they intersect at exactly one line, then you can't just add the dimension of the two planes (2+2 = 4 which is more than 3 space can allow).
  - If the planes are parallel, and both subspaces, then we know they both go through the origin and thus are the same plane.

### 2.3.2 | **Some tips**

- Usually easiest to get a basis of a subspace by building on instead of taking out
  - for example if you have a slanty plane in 3 space, and you start with standard basis, then you won't even get the slanty plane.

### 2.3.3 | **The span is $U_1 + U_2$**

- Because it's a double containment

- $span \subset U_1 + U_2$
- $v \in span \implies v = a_1 u_1 + \ldots + a_m b_m + b_1 v_1 + \ldots$

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