Exam 1 Through Section 2.3

Definitions 6 ← verbatim
Short Answer 6
Proofs 12 ← know complete statements of general results

Summary of Results / concepts to now

Ch 1 – Mathematical Statements and Quantifiers

- "for all"
- "there exist"
- "If ... then" → converse, → contrapositive

] negations

– Sets

"carving out"

$\{ x \in A : P(x) \}$

"parameterizing"

$\{ f(x) : x \in A \}$

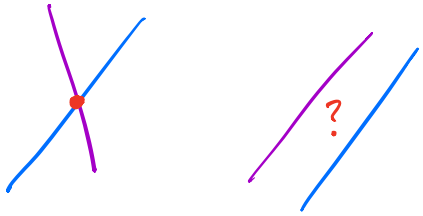
- set containment and double containment proofs
- operations on sets "$\cup$" "$\cap$" "Δ" "$\setminus$" "$-$" ...
- Functions and equations
  - 1-1
  - onto
  - solution sets

Ch 2

- Solution sets and lines:

the system $\begin{aligned} ax + by &= j \\ cx + dy &= k \end{aligned}$ has the solution set

$$S = \left\{ \left(\frac{dj - bk}{ad - bc}, \frac{ak - cj}{ad - bc} \right) \right\}$$



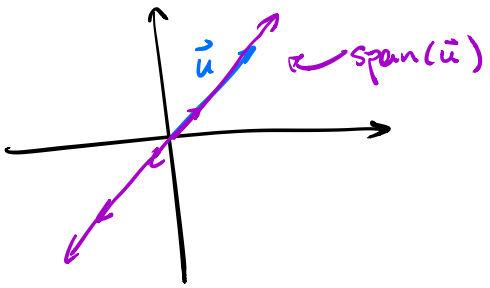
- vectors

arrows that give us directions in space

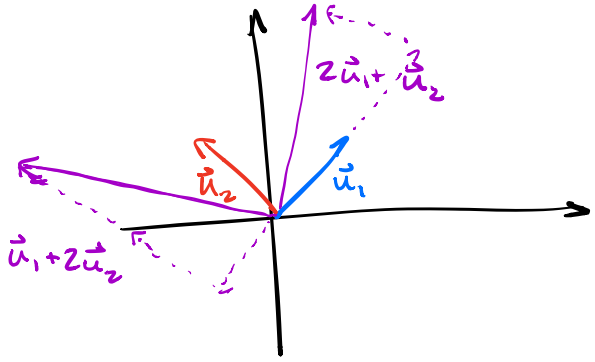
- add vectors together
- scale vectors by real numbers

- Spans

$$\text{Span}(\vec{u}) = \{ c\vec{u} : c \in \mathbb{R} \}$$



- $\text{Span}(\vec{u}_1, \vec{u}_2) = \{ c_1\vec{u}_1 + c_2\vec{u}_2 : c_1, c_2 \in \mathbb{R} \}$



- Spans are "closed" under: vector addition
  scalar multiplication

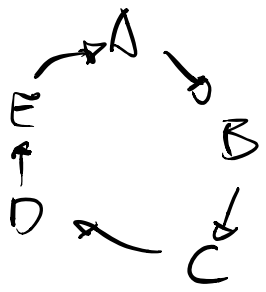
- Questions about spans:

  When is $\text{Span}(\vec{u}_1) = \text{Span}(\vec{u}_1, \vec{u}_2)$?
  $\neq$?

- When does $\text{Span}(\vec{u}_1, \vec{u}_2) = \mathbb{R}^2$?

Theorem 2.3.10 (us 07)

$A \Rightarrow B$
$B \Rightarrow C$
$C \Rightarrow D$
$D \Rightarrow E$
$E \Rightarrow A$



TFAE.