

## 1 | Solve Equations

Operation timed out. Arithmetic errors. #todo

lin alg 9 sep now  
More systems and proofs

$$\begin{bmatrix} 2 & -1 & x \\ -2 & 1 & y \\ 1 & -1 & z \end{bmatrix} = \begin{bmatrix} 1 \\ 7 \\ 4 \end{bmatrix}$$

1. add (1) and (3) to (2)

$$\begin{bmatrix} 0 & 0 & 0 \\ 1 & -1 & z+1 \\ 1 & -1 & 2 \end{bmatrix}$$

2. subtract (1) from (2) to (2)

$$\begin{bmatrix} 0 & 0 & 0 \\ 1 & -1 & z+1 \\ 0 & 0 & 1 \end{bmatrix}$$

3. divide (2) by 2

$$\begin{bmatrix} 0 & 0 & 0 \\ 1 & -1 & \frac{z+1}{2} \\ 0 & 0 & 1 \end{bmatrix}$$

4. add (2) to (1)

$$\begin{bmatrix} 1 & -1 & \frac{z+1}{2} \\ 1 & -1 & \frac{z+1}{2} \\ 0 & 0 & 1 \end{bmatrix}$$

5. add (1) to (2)

$$\begin{bmatrix} 1 & 0 & \frac{z+1}{2} \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

6. multiply (2) by -1

$$\begin{bmatrix} 1 & 0 & \frac{z+1}{2} \\ 0 & 0 & -1 \\ 0 & 0 & 1 \end{bmatrix}$$

7. add (3) to (2)

$$\begin{bmatrix} 1 & 0 & \frac{z+1}{2} \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

8. divide (2) by  $\frac{z+1}{2}$

$$\begin{bmatrix} 1 & 0 & \frac{z+1}{2} \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

*Note: Just trying to get the identity. So 2 might as well find the inverse of the matrix, and just use that - I guess I'll finish doing this one w/ our ops... but it's really tedious.*

l.c. 7, 8, 10, 12, 14, 15, 16

## 2 | Read 1.B and 1.C

### 2.1 | General Notes

- The distributive property is extremely useful ### 1.35 Example
- 1. If  $b = 0$  then we can divide all  $x_3$  by 5 and combine the last two terms to get  $F^3$ , which is a vector space, without loss of generality. If not, then when you try to multiply by a scalar then you will find that the above reasoning breaks (i think).
- 1.  $f(x) = 0$  is continuous, so the additive identity exists. All sums of continuous functions result in continuous functions, so it is closed under addition. And all scalar multiples also work out.
- 1. slightly awkward: i don't actually know what a differentiable real valued function is. #todo-exr0n
- 1. (see previous)
- 1. what does it mean for a sequence of complex numbers to have a limit 0? but I think you can use the same argument that the missing elements are just "collapsed" into one invisible one. ### 1.40 Definition direct sum
- Something about uniqueness?

- If there is only one way to write zero then it works (1.44 Condition for a direct sum)

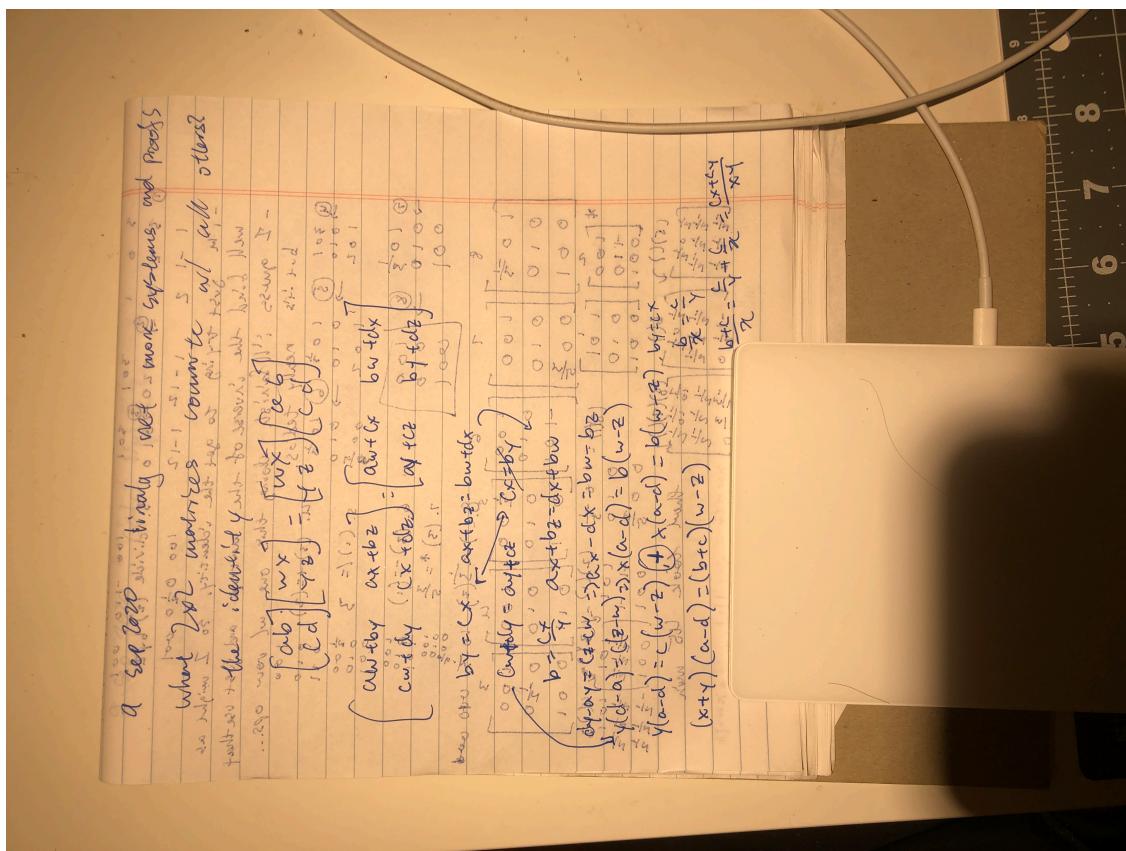
## 2.2 | Exercise to present

I would be interested in 7, 8, 10, 12, 14-19

## 3 | 2x2 Matrices that are Commutative

(under multiplication, with all other 2x2 matrices)

Starting with  $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} w & x \\ y & z \end{bmatrix} = \begin{bmatrix} w & x \\ y & z \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ , I got  $(x+y)(a-d) = (b+c)(w-z)$  and  $by = cx$ , but wasn't sure how to further develop it.



## 4 | Epilogue

Linear algebra homework always takes so long. Even though I skip like half of the problems. This is kind of an issue.