

Source: [KBe2020math530refExrOnRetIndex](#)

## Solve Equations

Operation timed out. Arithmetic errors. #todo

Linear algebra 9 sep 2020 More Systems and Proofs

$$\begin{bmatrix} 2 & -1 & | & x \\ 3 & 2 & | & y \\ 1 & -2 & | & 4 \end{bmatrix} \xrightarrow{\text{1. add (1) and (3) to (2)}} \begin{bmatrix} 1 & 0 & | & 1 \\ 3 & 0 & | & 7 \\ 1 & -2 & | & 4 \end{bmatrix} \xrightarrow{\text{2. subtract (1) from (2)}}$$

$$\begin{bmatrix} 1 & 0 & | & 1 \\ 3 & 0 & | & 7 \\ 1 & -2 & | & 4 \end{bmatrix} \xrightarrow{\text{3. divide (2) by 3}} \begin{bmatrix} 1 & 0 & | & 1 \\ 1 & 0 & | & \frac{7}{3} \\ 1 & -2 & | & 4 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & | & 1 \\ 1 & 0 & | & \frac{7}{3} \\ 1 & -2 & | & 4 \end{bmatrix} \xrightarrow{\text{4. } R_3 - R_1} \begin{bmatrix} 1 & 0 & | & 1 \\ 1 & 0 & | & \frac{7}{3} \\ 0 & -2 & | & 3 \end{bmatrix} \xrightarrow{\text{5. } R_3 \rightarrow R_3 / (-2)} \begin{bmatrix} 1 & 0 & | & 1 \\ 1 & 0 & | & \frac{7}{3} \\ 0 & 1 & | & -\frac{3}{2} \end{bmatrix}$$

I guess I'll finish doing this one w/ row ops... but this really tedious

Just trying to get the identity, so I might as well find the inverse of the matrix and just use that

I C. 7, 8, 10, 12, 14, 15, 16

## Read 1.B and 1.C

### General Notes

- The distributive property is extremely useful ### 1.35 Example
- a) 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).
- $f(x) = 0$  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.
- slightly awkward: I don't actually know what a differentiable real valued function is. #todo-exr0n
- (see previous)

- e) 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)

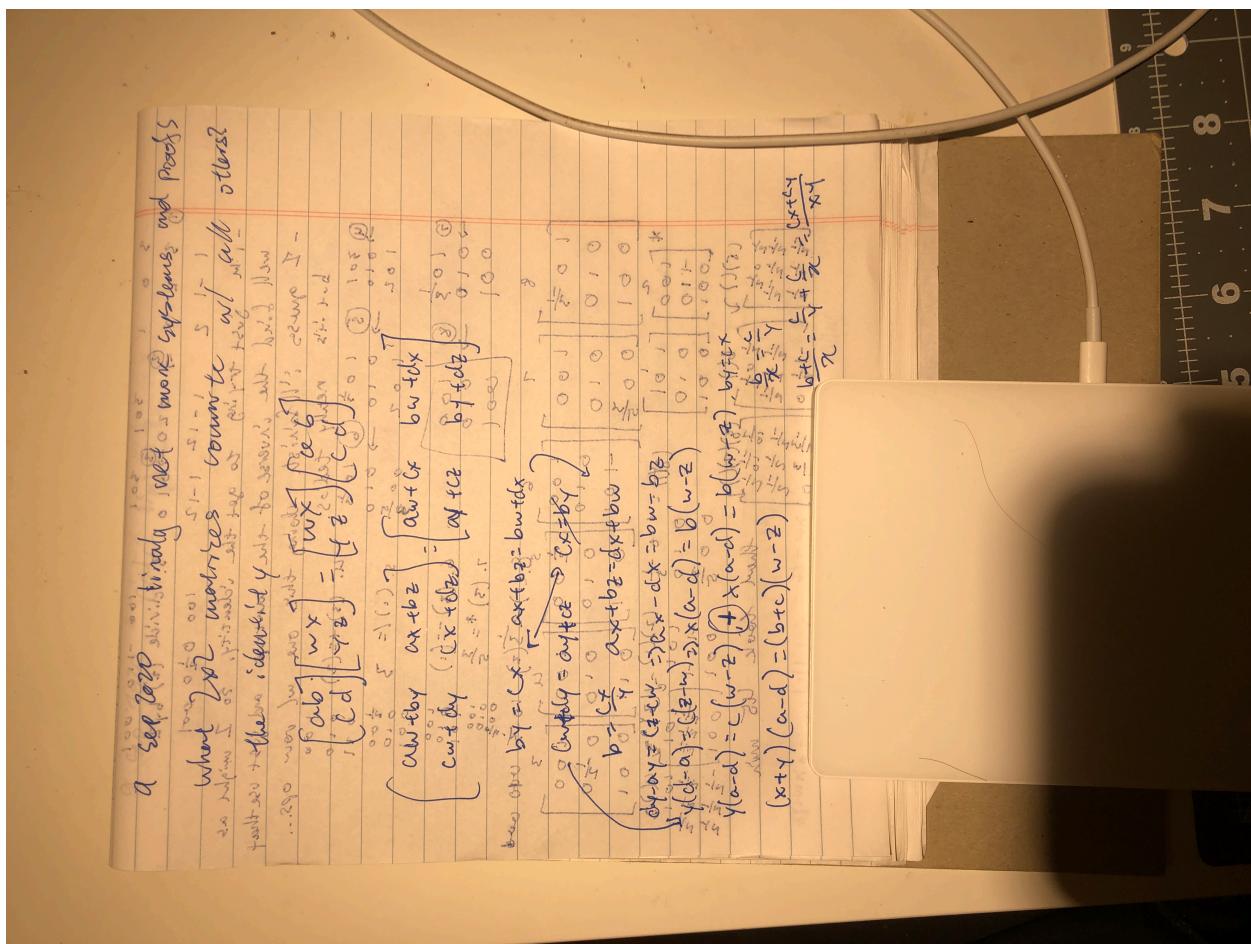
### Exercise to present

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

## 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.



### Epilogue

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

