## MA1140 ELEMENTARY LINEAR ALGEBRA ASSIGNMENT - 2

1. We for any matrix to form a vector space over R, it should solitise and multiplicative closure, associativity, commutativity and multiplicative distributivity, and additive identity & inverse.

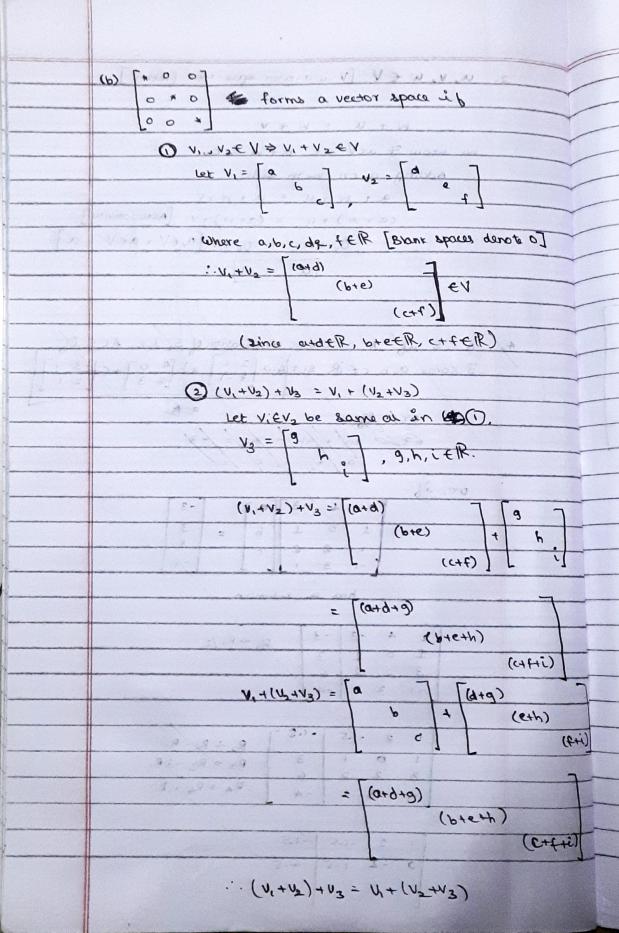
(a) \* \* \* \* does not soutsfy additive closure

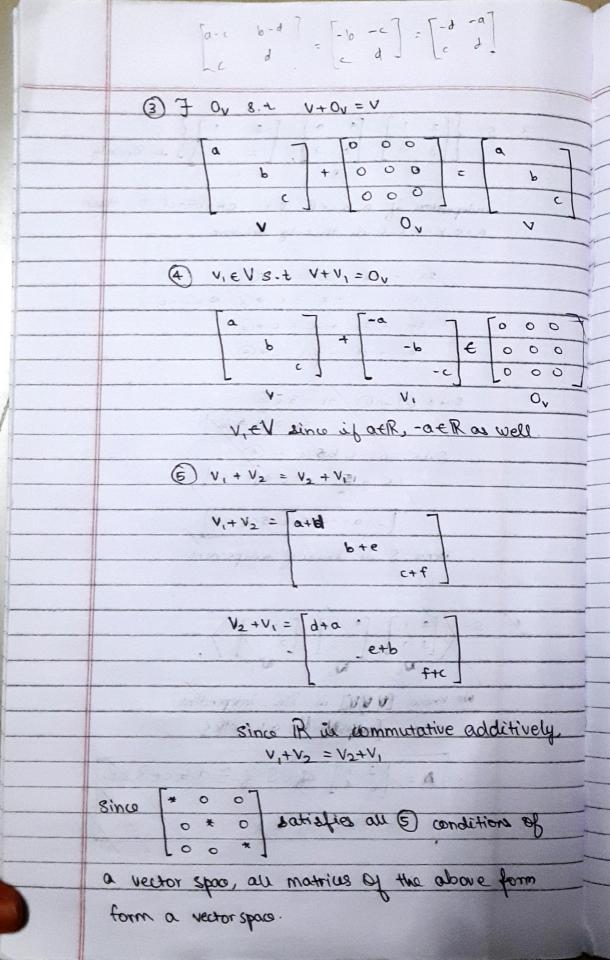
(eq) [1 2 1] \* [7 8 1] [8 10 2]

3 1 4 4 9 4 10 = [12 2 14]

1 5 6 1 1 11 12 2 16 18

Here matrices of the above form don't form a vector space over R.





2. 
$$u, v, w \in V$$
 [ $v$  is a vector expans over field  $F$ ]

$$W + u = w + v$$

We know  $\exists a \in V \text{ s.t. } a + w = o_v$ 

$$Adding a on both fides
$$a + w + u = a + w + v$$

$$(a + w) + u = (a + w) + v \text{ [Associativity]}$$

$$O_v + u = O_v + v \text{ [O_v \in V + a \in V = a]}$$

$$[u] = v$$$$

3. 
$$S = \{ \begin{bmatrix} 2 & 1 \\ 3 & -1 \end{bmatrix}, \begin{bmatrix} 4 & 0 \\ 2 & 3 \end{bmatrix}, \begin{bmatrix} 2 & 1 \\ 2 & 1 \end{bmatrix} \}$$
 is linearly

A B C

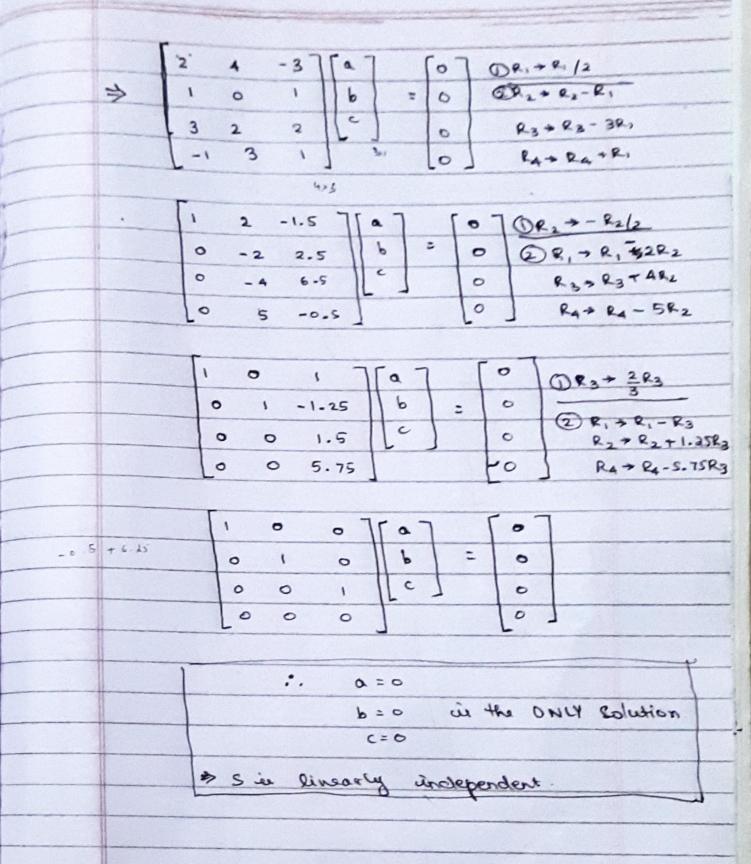
Independent if  $a, b, c \in \mathbb{N}$  S.t.  $aA + bB + cC = 0$ , there  $a = 0, b = 0, c = 0$  in the only solution.

$$2a + 4b - 3c = 0 \Rightarrow 0$$

$$a + c = 0 \Rightarrow 2 \Rightarrow a = -c$$

$$3a + 2b + 2c = 0 \Rightarrow 3$$

$$-a + 3b + c = 0 \Rightarrow 4$$



4.  $S = \left\langle \begin{bmatrix} 2 & i \\ 2 & -1 \end{bmatrix}, \begin{bmatrix} 1_1 & c \\ 2 & 3 \end{bmatrix}, \begin{bmatrix} -3 & i \\ 2 & 1 \end{bmatrix} \right\rangle$ S= (\$1, N2, N3}) = {av,+bv2+cN3; a, b, c+R3 : AES iff Fa, b, CER St. A= av, +bv2+cV2  $\Rightarrow \begin{bmatrix} -3 & 3 \\ 6 & -4 \end{bmatrix} = a \begin{bmatrix} 2 & 1 \\ 3 & -1 \end{bmatrix} + b \begin{bmatrix} 4 & 0 \\ 2 & 3 \end{bmatrix} + c \begin{bmatrix} -3 & 1 \\ 2 & 1 \end{bmatrix}$ O 2, - 2/2 (2) R2 - R2 - R1 RA - + RA + RI -1.5 DR2 - Re/2 4.5 BR+R1-2R2 Ry + Ry - SAZ 5 OR 3 3 7/8, 0 DR. + 4- Rg 4.5 5.75 0 -1 1 0 0

$$\Rightarrow a = 2$$

$$b = -1$$

$$c = 1$$

$$A = 2V_1 - V_2 + V_3 \Leftrightarrow A \in S$$

