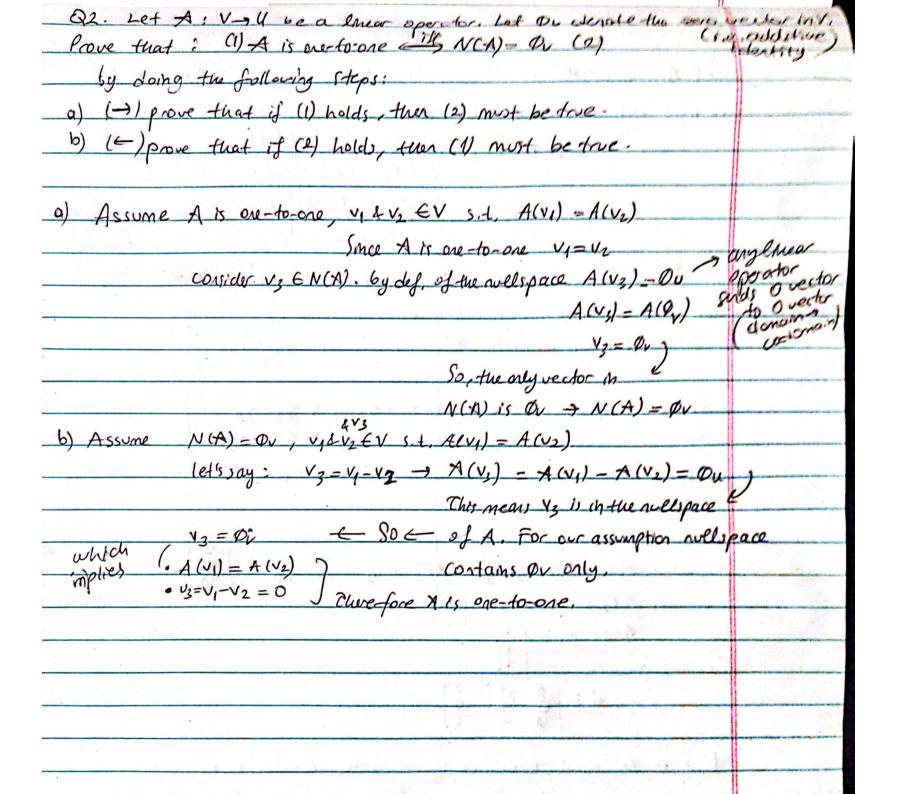
Courk Pabla cet A: R3 -> R3 be almor operator defined as Ax; = y; for QI i= 1,2,3 and xi,y; defined below {x1, x2, x3} = \[\bigcolum_{1}^{0} \], \[\bigcolum_{2}^{-1} \] a) This the matrix rep. of A using the standard basis for R3. thint: try writing the standard basis interms of X; Standard bour for R3: e1=[1] le=[0] e3=[0] e, in terms of x; : e1 = d1 x, + d2 x2 + d3 x3 = 73 - x1 " : c= b, x, + b2 x, + b3 x3 = 2x1 - x2 " " e3 = C1X1 + C2 X2 + C3 X3 = X1 Since Axi = y: Ae1 = A(x3-x1) = Ax3-Ax1 = 43-41 = 1-1 Al2 = 241-42 = -57 Ae3 = 41 = [2] A = 2 -5 -2 b) Find the matrix representation of A in the X = [x1/x2/x3] basis. $A_X = \times^{-1} A \cdot X$

$$A = \begin{bmatrix} -1 & -5 & -2 \\ 2 & 7 & 4 \end{bmatrix}$$

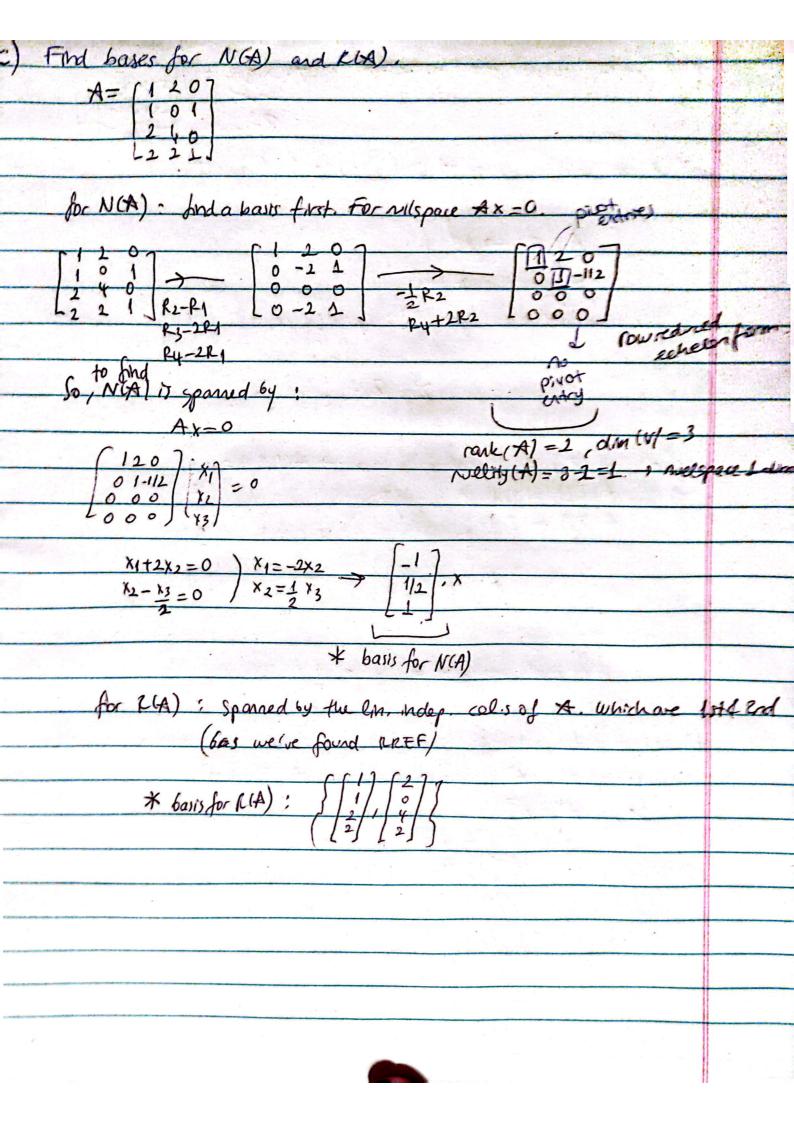
$$X = \begin{bmatrix} 0 & 0 & 1 \\ 1 & -1 & -1 \end{bmatrix} \longrightarrow \text{I used online solver for -two inverse.}$$

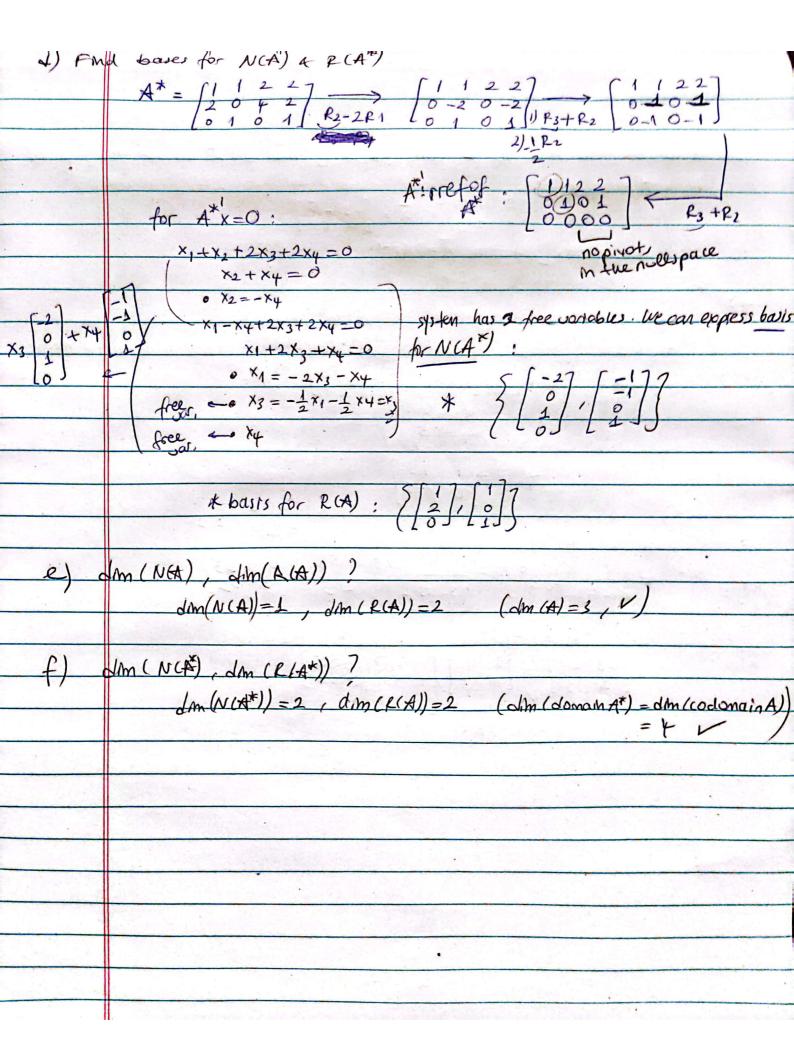
$$X = \begin{bmatrix} 0 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$$

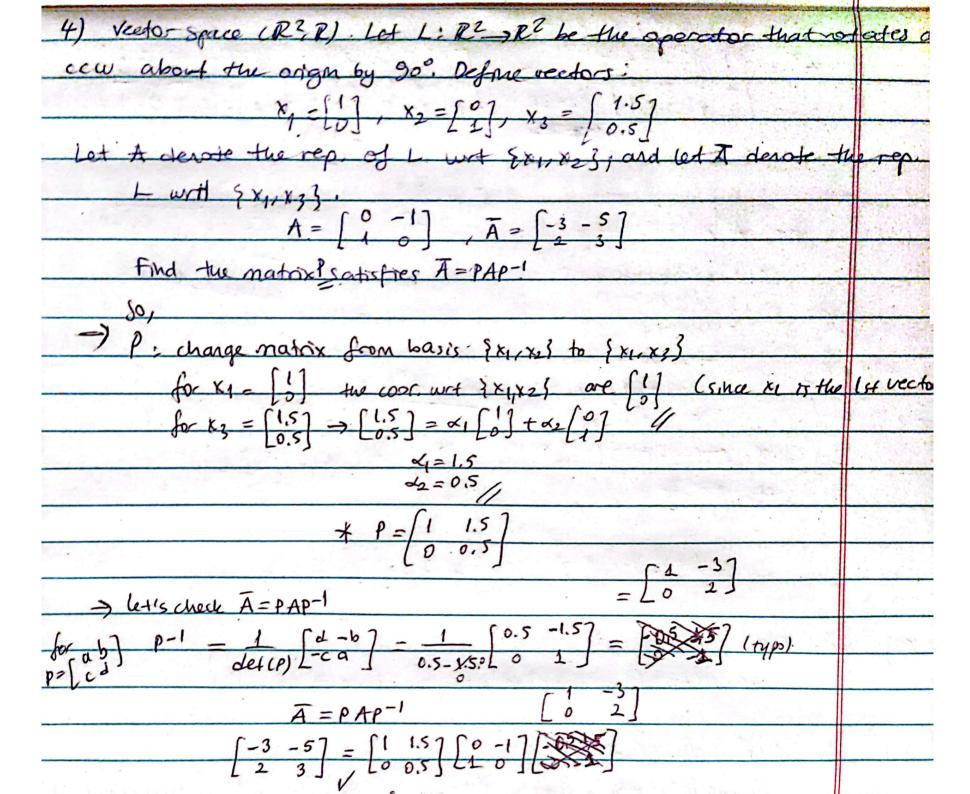
$$AX = \begin{bmatrix} 9 & 2 & 5 \\ -2 & -2 & -3 \\ -2 & 1 & 0 \end{bmatrix}$$

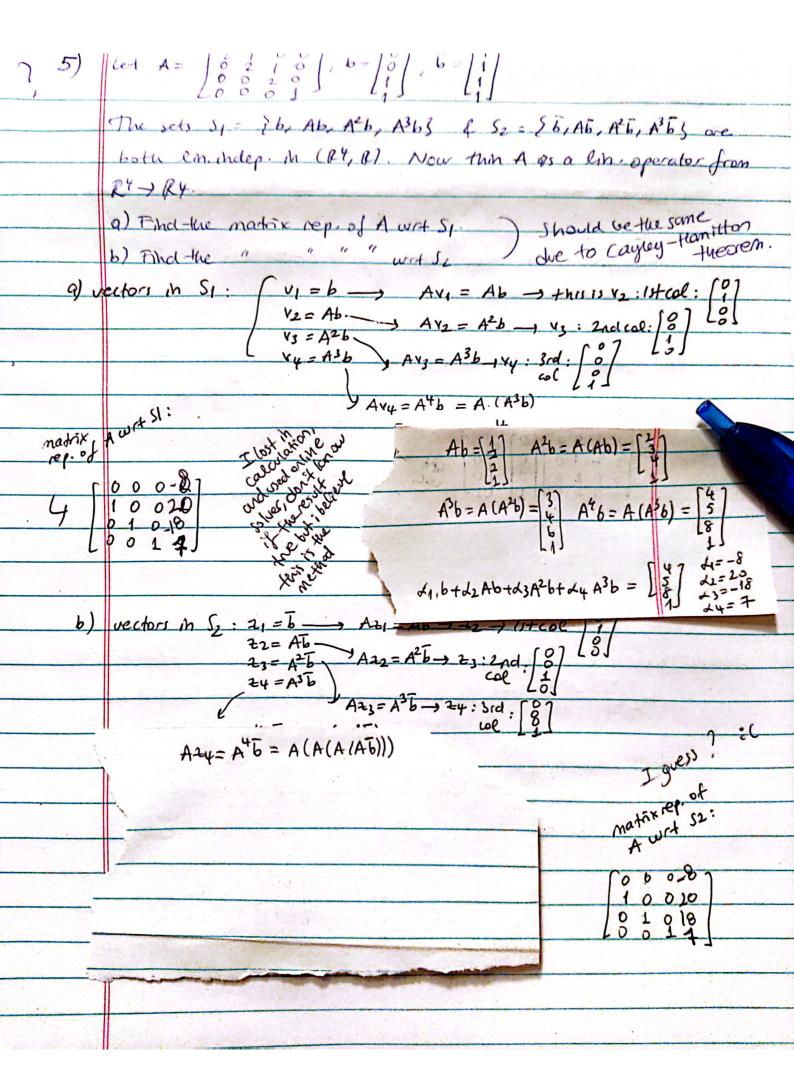


<u> </u>	For XER, consider the lin. operator $A(x,y,z) = \begin{bmatrix} x+2y \\ x+2y \\ 2x+4y \end{bmatrix}$
	a) Find the matrix rep. of A wat the standard bases. Hint: Think about donain & co don
	$A: \mathbb{R}^3 \to \mathbb{R}^4$
	A: $\mathbb{R}^3 \to \mathbb{R}^4$ A takes 3 comparents (1) (0) (0)
43	The standard basis for R^{4} : $e_{1} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$, $e_{2} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$, $e_{3} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$, $e_{4} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$
	$\mathbb{R}^{3}: \overline{e}_{1} = \begin{bmatrix} 1 \\ 8 \end{bmatrix}, \overline{e}_{2} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \overline{e}_{3} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$
	So, $A(\bar{e}_1) \Rightarrow 1st col. of matrix \rightarrow A(1,0,0) = \begin{bmatrix} 1\\1\\2 \end{bmatrix}$ $A(\bar{e}_2) \Rightarrow 2d$ ""
	$A(\overline{e_3}) \Rightarrow 3rd$ " $A(0,1,0) = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$
	So, $A(\overline{e}_1) \Rightarrow 1st col. of matrix \rightarrow A(1,0,0) = \begin{bmatrix} 1\\1\\2\\2 \end{bmatrix}$ $A(\overline{e}_2) \Rightarrow 2rd \qquad \qquad$
	So matrix rep of $A = \begin{bmatrix} 1 & 0 & 1 \\ 2 & y & 0 \\ 2 & 2 & 1 \end{bmatrix}$
	b) Let A be the matrix you found from a. If A is a real matrix, then the
	adjoint of A, A, is the transpose of A. Find A*
	So, $A^* = A^T$
	$A^* = \begin{cases} 1 & 1 & 2 & 2 \\ 2 & 0 & 4 & 2 \\ 0 & 1 & 0 & 1 \end{cases}$
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6. Let (X, F) and (Y, F) be weeter spaces, 4 x, 26 X. Let L	X->Y be
a linear operator	
a) Prove that if the set & L(x), L(2) is In Indep. , then Ex, 23 is	also
lihearly hidep-	
b) is the converse true? (if \$x,25 lin. hole => {UX, L(2)} lin. shop	p.)
a) Assume {L(x), L(x)} (in indep. let's say a, b excelors.	
1 a. L(x) +b. L(4) =0	TANK TO SERVICE
a=b=0 is the only robution.	
Now sepose {x,2} is like dependent (for contradiction) (2)	
Man - d. V + d. 2 - 0 both the and to an not some	
Then -> d, x + d, 2 - 0 both x1 and x2 are not zero. this means apply lin quator L to both sixtes	
apply In gerator L to both sites	77.05
1 L (a1x + d2+) = L(0)	****
d1. L(x) + d2. L(x) = 0 -> this contradicts our assurpti	01 (1).
of Sign (521) 1	prof
	ne.
The tues (x,2) is also line indep.	
b) Assume {x,+3 is lin. independent. Let's define lin. sporator L: (from R2.	-1RY
$L\begin{bmatrix} x \\ t \end{bmatrix} = \begin{bmatrix} 6 \\ 0 \end{bmatrix}$ — for any vectors $x \in L(x) \in L(x)$ with be	tero vector
Therefore LCX) 4 LCAI are Rin. indep.	
let's choose x = [o], 2=[i] - lin indip.	
Now the lin oper L is not zero vector for them.	
So the converse is not the	
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	and the same of the same of
	-
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	The second secon