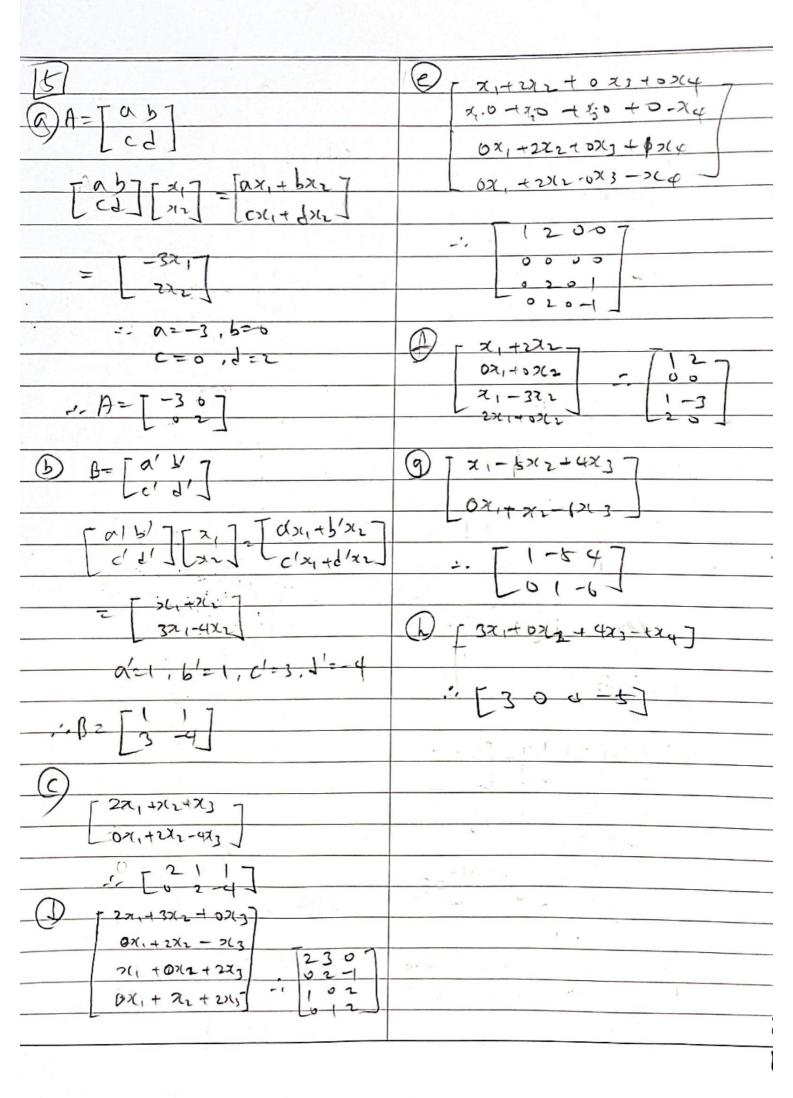
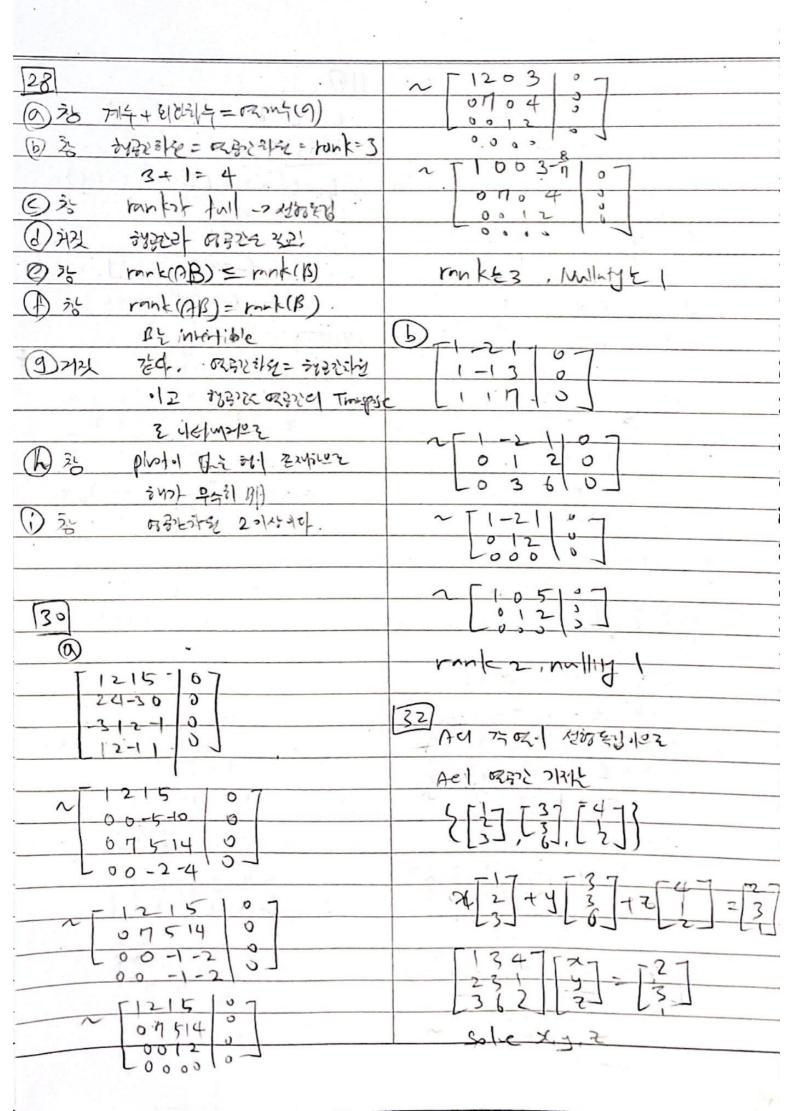
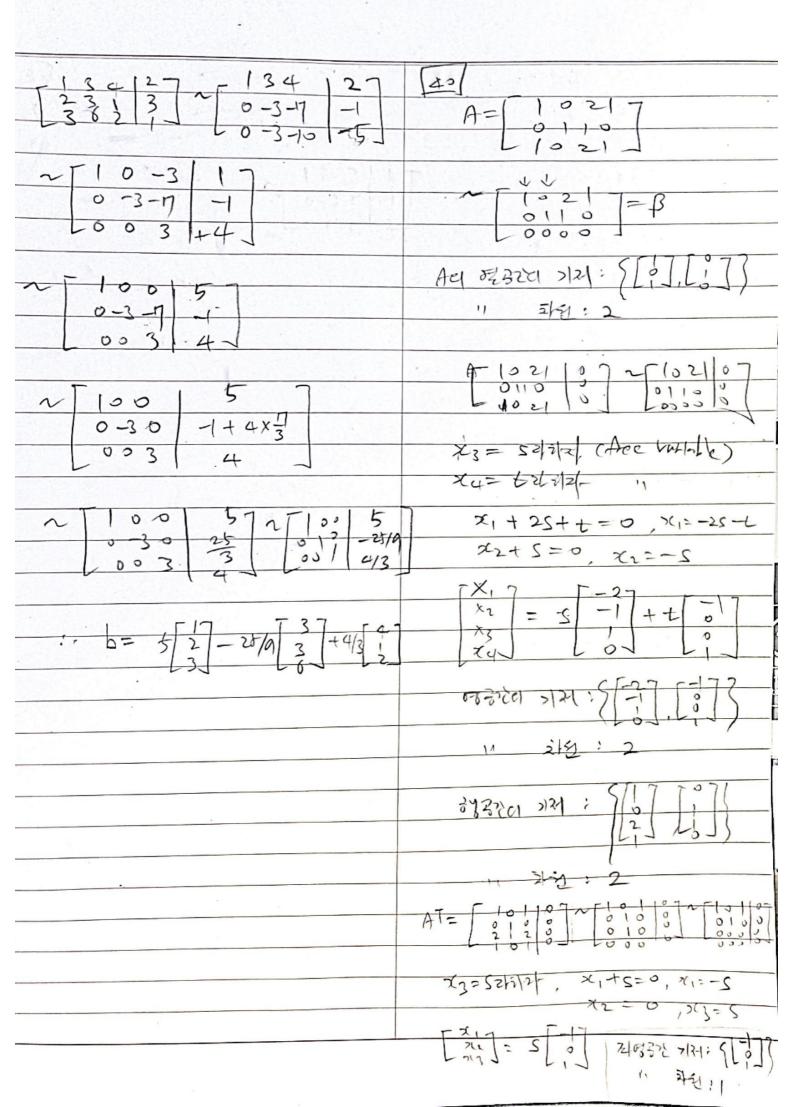
CHAPTER 11 Highward

CHAPTER M LEGATION	
[3]	(1) PL (2,+4,,24+12)
(i) L(u+v)=L(u)+L(v)	$= \left( x_1 + y_1, 2(x_1 + y_1)(x_1 + y_2) \right)$
(11) L(cw) = cl(u)	L(x1,312) + (cg1, y2)
The BOS - 1 Ker 3 Ker	=(x,+y,, 2x,21+2y,y)
(a) DL(x,+y,,>lztyz)	olay L(x,+), x,+ Ju) + ((x,7,4)
= (x1+y1+76+42,2×2+242)	+ (141, 12)
= 6(21,22) + 6(4, 1 /2)	- Q+ 133000 - 100
= (50,+>12,2>12)+(4,+12,242)	
= (>11+>(2+4,+1/2, 2>12+2/2)	(P) (   x,+1, ) = [12]   x,+1, ]   x,+1, ]   x,+1, ]
D L(0x,.(x) = (0x,+01, 20x)	( 234J3 ) 2313 ] 234J2
= cle >41 >cz) = c(>6,+>12,2>12)	
= ( CX + (X 2, 20X2)	= >C1+11+2x1+21+23+13 7
一一のたべかはな	32,+31,+22+92
(b) () L(ス)+サノスンナナン	= $         -$
= (2,+4,, 2,+4,+42, 322+342)	[2c3]/ Ly3]
= L(x)p(y)+L(x), y)	= [x, + 2x, +7]7 + [9, +242+43]
$=(x_1,x_1+x_2,3x_2)+(y_1,y_1+y_2,3y_2)$	321, 4212 \ 634, + 1/2 -
=(21+71, ×1+22+1,+42, 2×2+3/2)	@ 1/[cx,] = -12/7/2/X
@ L(Cx1) = (cx1, cx1+0(2,3cx2)	(2) - (cnc) = [310] x2xc
$= c(x_1) = c(x_1   x_1 + x_2, 3x_2)$	$= c_1(\overline{X}_1) = c_1(\overline{X}_1) = c_2(\overline{X}_1)$
ं किर एंद्र पर्ध	$= CL\left(\frac{x_1}{x_2}\right) = C\left[\frac{12}{313}\right] \frac{x_1}{x_2}$
	二色七世的野女
( ) ( LOCI+41, x2+1/2, >(3+4/2)	1 31-31-50
= (224+24, +>12+42, >2+1/2+323+3)	1 (40) 1 - 13 1 2
x1-11,+ 4x1+4+3)	×3-1/3 2×2+24 ×3-1/3 2×2+24
= (221+241+712+42, x2+1/2+3×1+1/2	= L/[7/17/+L/[3/7]=[2/1/x],[3/15/
, x, ty, t 4713 t 413)	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
3 LCOXICALICKS)= (201,+01, 01+30/3,	D + (X,1) = (X + (X) =
O(1 + 41(3)	(CX) 2(X)
= L(>11, xe, x)) K( = C(O(1+ x1, x2+3/3)	= c L([x]) = [ 24/12]
x1-473)	= (4) L Langer 3x3
00	



[6]	119
Les Beilore Artifu-	L2. L, 2.
Ax V3x1 0/ 2x1 4414,)02	P3 6 1
At 2x3 metrlx	L20 4 = (2(2×17, 2+24)
A= [ a b ( 7	
A= [ab (7 2+5)2h	= (-2x-y+x+2y, 2x+4)
TA > = = [ ] 7	= (-x+y, 2)+4y)
[def][0]=(a)=(2)	(ASA) 5
$A \left[ \begin{array}{c} 0 \\ 1 \end{array} \right] = \left( \begin{array}{c} b \\ e \end{array} \right) = \left( \begin{array}{c} 2 \\ 1 \end{array} \right)$	Az Wel Zsizuz
[ [ e ] [ [ ] ]	(2x+y) -> A=[2]
A (3) = (4) = (-1)	155 12 11
-: A = [ 2 2 1]	(-x+1) -> B[-1]
Q L(1,2,3)	BA-[-1][2]]
[ 3   -1 ] [ 2 ] = [ 2+4+3 ]	=[-2+1-1+2]
	= = 0+2 0+4
$= \begin{bmatrix} 9 \\ 2 \end{bmatrix} = 19,2$	= [2 4]
	2 4
	·· (->C+4, vitus)
[ ] - (1,4)	[20]
	Linkel zzinze BA-101
C [31-1][3]=[4+(+1]=[1]-	BA= [3][23]
(11/8)	
1 [3 1-1] [x] = [2x-1y+2]	= [-2+2 -3+8]
: = (2×1+2y+2, 3x+1-2)	· = [7]3]





```
import numpy as np
def pprint(msg, A):
    print("---", msg, "---")
    (n,m) A,shape
    for i in range(0, n):
        line = ""
        for j in range(0, m):
            line += "{0:,2f}",format(A[i,j]) + "\t"
        print(line)
a = np, array([[1,2,1,5],
              [2,4,-3,0],
              [-3,1,2,-1],
              [1,2,-1,1]]);
pprint("a", a)
print("rank(A) =", np.linalg.matrix_rank(a))
print("Nullity(A) =",a,shape[1]-np,linalg,matrix_rank(a))
b = np.array([[1,-2,1],
              [1,-1,3],
              [1,1,7]]):
pprint("b", b)
print("rank(B) =", np,linalg,matrix_rank(b))
print("Nullity(B) =",b,shape[1]-np,linalg,matrix_rank(b))
1.00 2.00 1.00 5.00
2.00 4.00 -8.00 0.00
1.00 2.00 -1.00 1.00
1.00 -2.00 1.00
1.00 1.00 7.00
rank(B) = 2
```