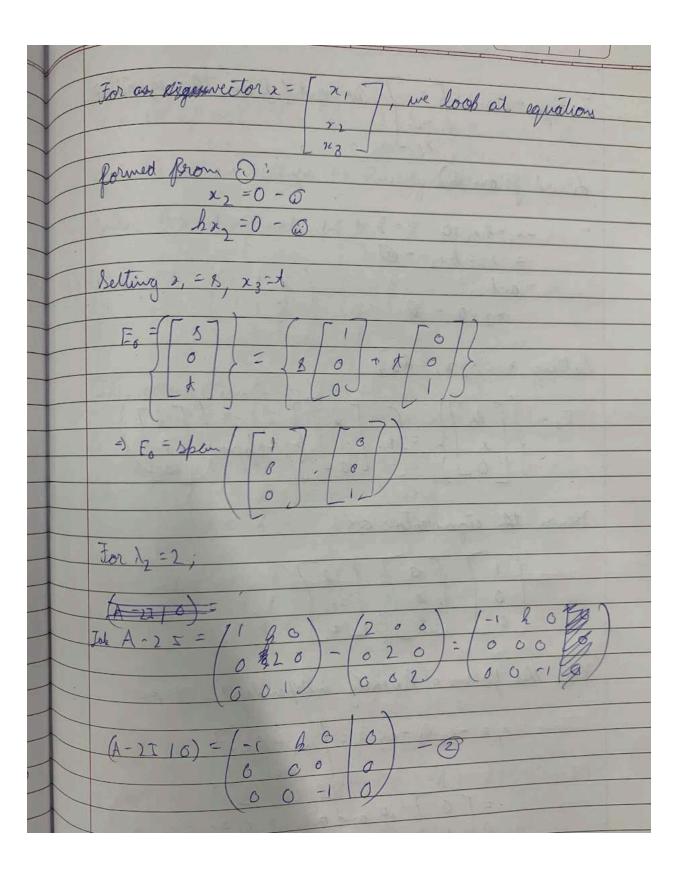
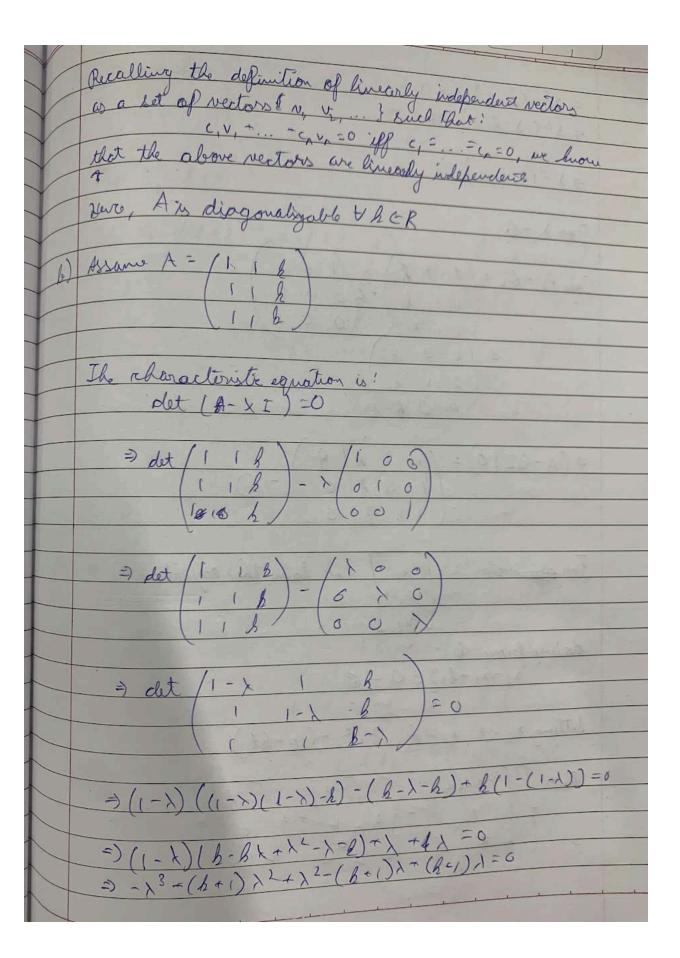
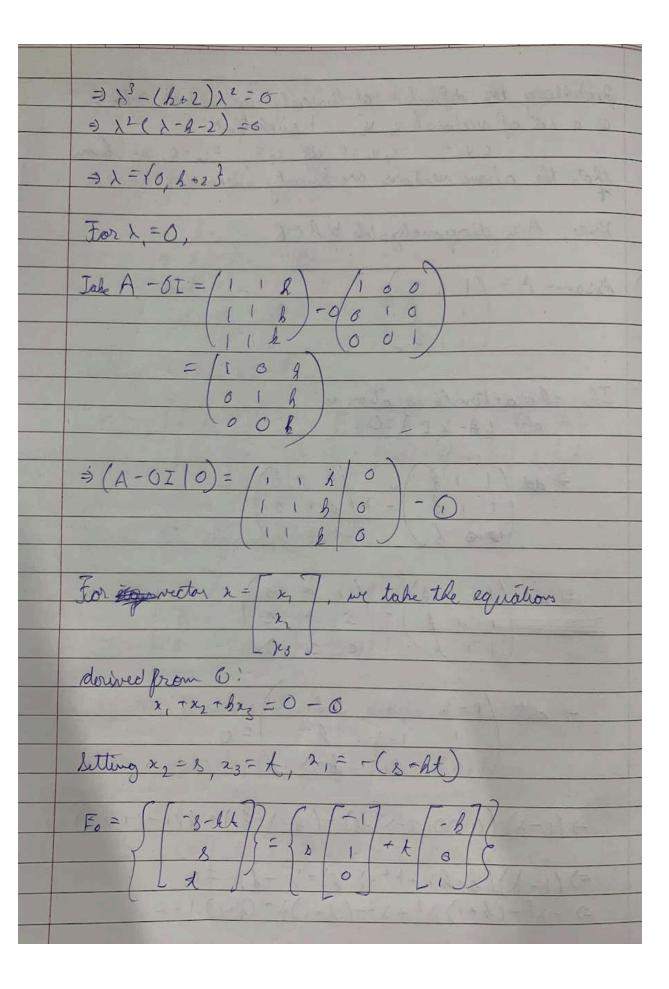
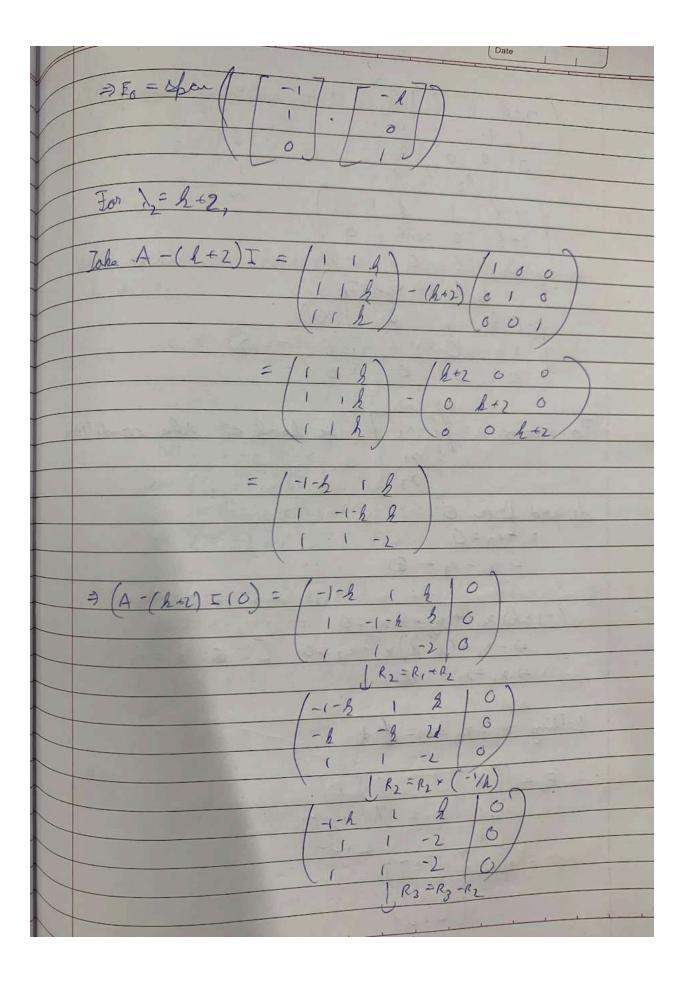
	ISMAAN ROWS ASSIGNMENT - 4 2023114011 Page No. Date
1)a	Assume the matrix BAA = (1 × 0)
	Let us take A-XI.  The characteristic equation is det A-XI =0
	$\frac{3}{60} \frac{1}{0} 1$
	$\frac{\Rightarrow}{0} \frac{1}{0} \frac{1}$
	\$ det (1-x & 0) =0  (B 2+0 =0)
	$\frac{\partial}{\partial x} \left(1 - \lambda\right) \left(2 - \lambda\right) \left(1 - \lambda\right) = 0$ $\frac{\partial}{\partial x} \left(1 - \lambda\right) \left(2 - \lambda\right) \left(1 - \lambda\right) = 0$
	Forl, = 1,
	(A-I 10) = 10 R 0 0 0 12 = (1 R 0 1,00) 0 1 0 0 0 : (026 - (010) - 0) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

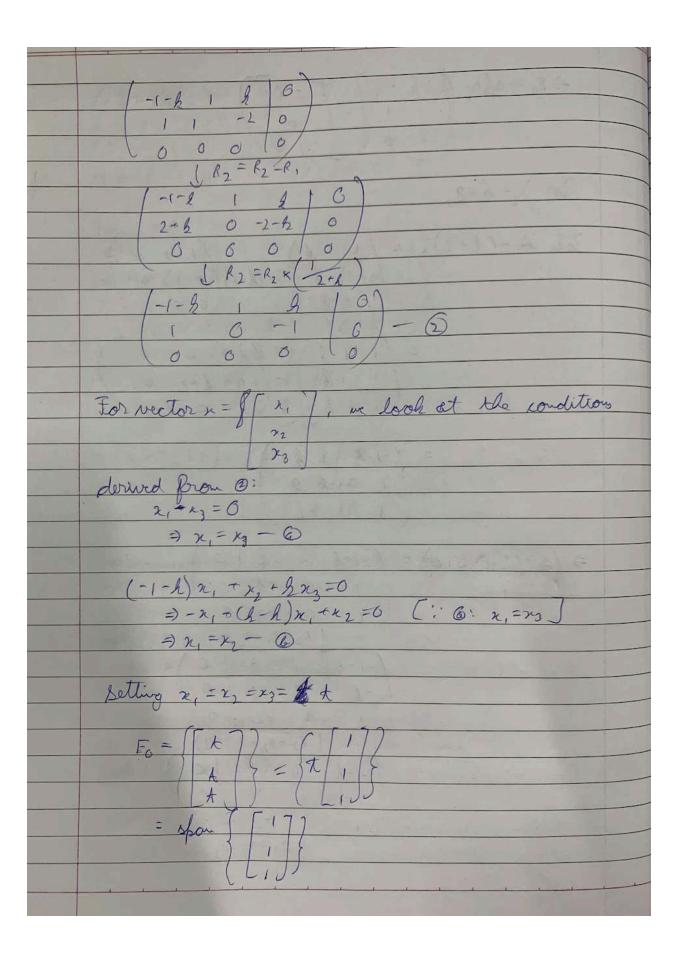


For appenvector x = [2,], we get (from the equations  *2  *3
72
×3 J
derived from D:
$-x_1 + h x_2 = 0$ $\Rightarrow x_1 = h x_2 - \Theta$
⇒ x,=h2, -@
and
~3=0-0
Setting 2, 08, 2, = 88,
$ \begin{bmatrix} E_0 = \begin{cases} R_3 \\ S \end{bmatrix} = \begin{cases} S \\ S \end{bmatrix} = \begin{cases} S \\ S \end{bmatrix} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \\ S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \\ S \end{cases} = S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \end{cases} = S \\ S \end{cases} = S \end{cases} = S \begin{cases} S \\ S \end{cases} = S \end{cases} = S \\ S \end{cases} = S \end{cases} = S \begin{cases} S \\ S \end{cases} = S$
8 = 18. 1 = spon 1/
[0] (10)
3/ +1 = T
Henre, the eigenvectors are:
HR The Robert A 1111
AB, this forms a linearly independent set as
10 ns 1 ts n = [c 1 ]
(, 2, + c, l, + c, 2, =   C, + A c, 3
(3)
= [6] ip = dol' p = = =
= [6] if and only if c, = c3=0







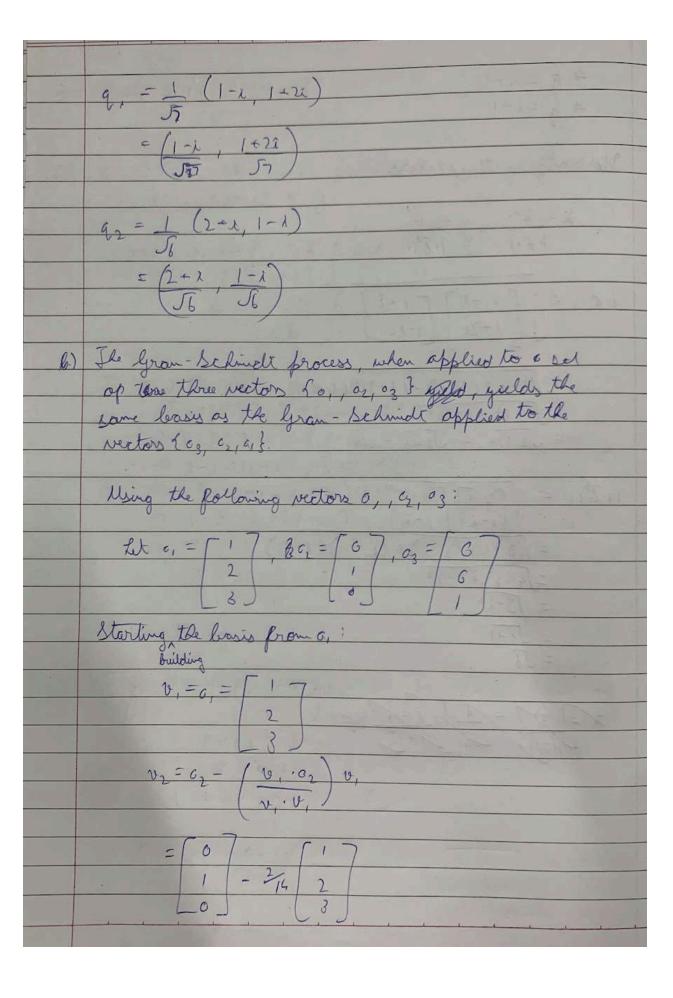


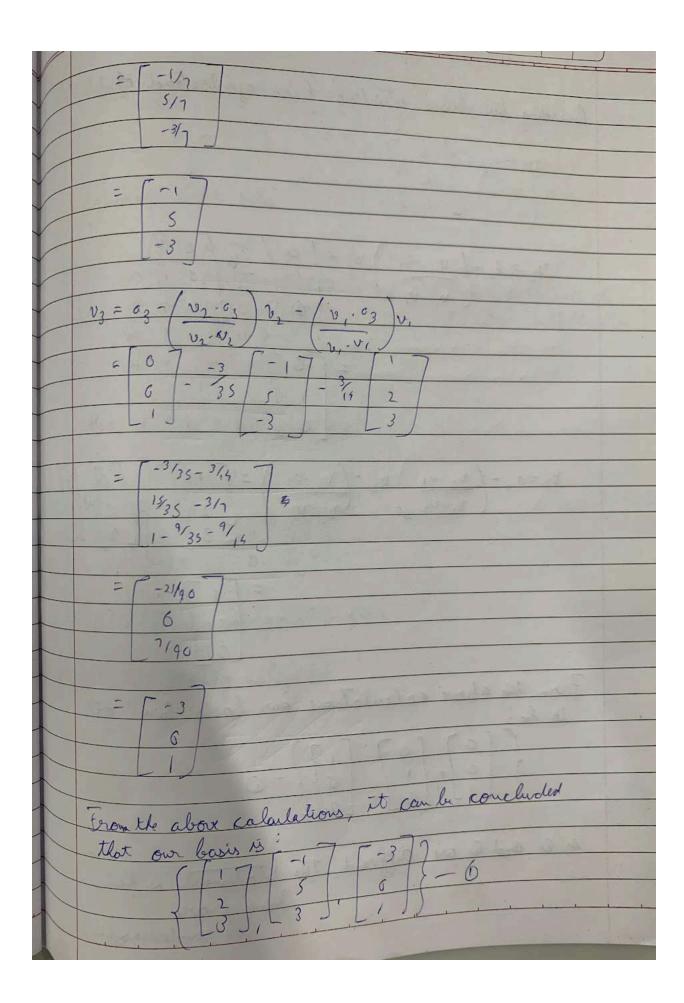
1	
/	Ile given eigenvertors would be :
//	The state of the s
/	0=[-1]
/	1 - 2 - 2 , 23 = [ ]
	$21 = \begin{bmatrix} -1 \\ 2 \end{bmatrix} $
	LOJ (II)
	Dre again, ve check for the linear independence of
	the again, we there for be livear independence of
	2, 21, 23
	(, \$, \$ (, e, -13 e3= \ - (, - h, +(3) \ = \ 0 \ \
_	
	L 5 + 13 U -
	5) (3=-(,=-(, =-(, = -(,
	and her +2 (2 = 0
	and his +213=6 => 2=-2 and 13=-(1=12
	on h = - 2 and (1 = (2 = (3 = 6
<u> </u>	60 4 + - 1 and (1 2 - 3 - )
<u> </u>	2 1. 1. 1. 1 Sout
	· if & ± - ), El, (ez, 13) is linearly independent
	Cy C1=C2=G5C1
	Hence, for A to be diagonalizable,
	Hence for A to be may
1	
1	ler-1-23
1	
1	The state of the same was
1	A LA TELL MANAGEMENT OF THE PARTY OF THE PAR

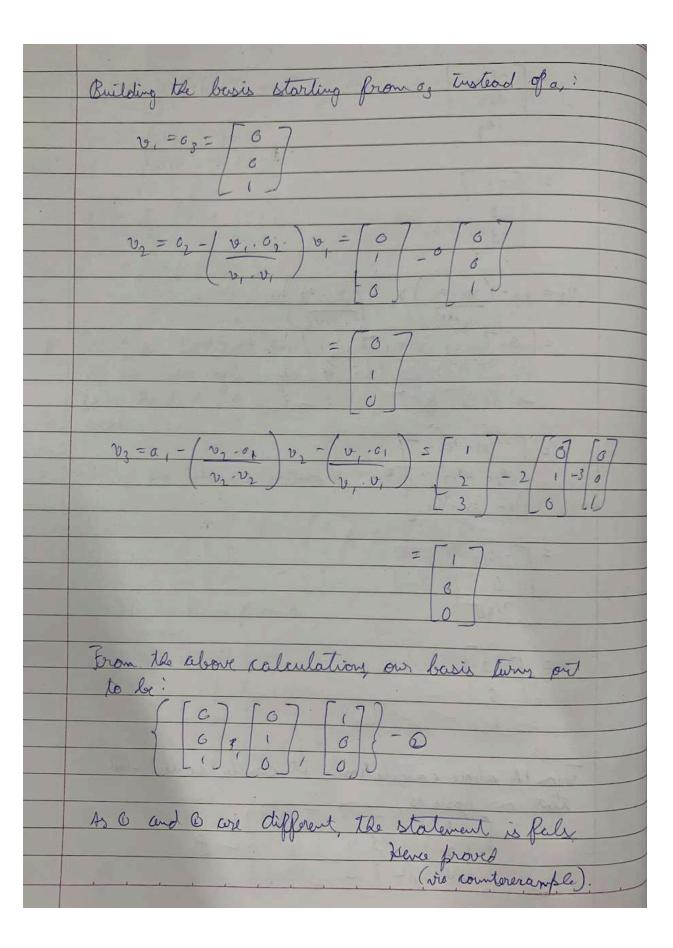
2a)	Consider a watrix A to be diagonalizable
Wanter of	
	ERecalling that for A to be diagonalizable, the ingenspace of A must consist of a linearly independent vectors
	eigenspace of A must covisit of a linearly
	independent vectors
7 34	
	Rousider was to be an eigenvector with & as its
	Rousider was to be an eigenvector with to as its eigenvalue. Then, by, definition,
	A &vo = >o vo
-	Multiplying both sides by A',
	(A-1, A) no = 26 (A-100)
	$ \begin{array}{c} (A^{-1},A) = \lambda_{0} (A^{-1} v_{0}) \\ =)  I \cdot v_{0} = \lambda_{0} (A^{-1}, 2 v_{0}) \\ =)  1 \cdot 19_{0} = A^{-1}, v_{0} \\ \lambda_{0} \end{array} $
-	=) 1.10, = A-1.10 () > FOZ
	ho had a second a sec
	ALER STORY AND COLUMN TO A STORY OF THE STOR
	Similarly eigenvectors of A are same as of A with corresponding > = 0.
	corresponding > = 0.
	The state of the s
	For $\lambda = 0$ ,
	det (A-0)=0
	=> dut A=0
	2
	However, A is invertible and we know that if A is
-	provertible, det A +O.
	Hero, & Fopor A.

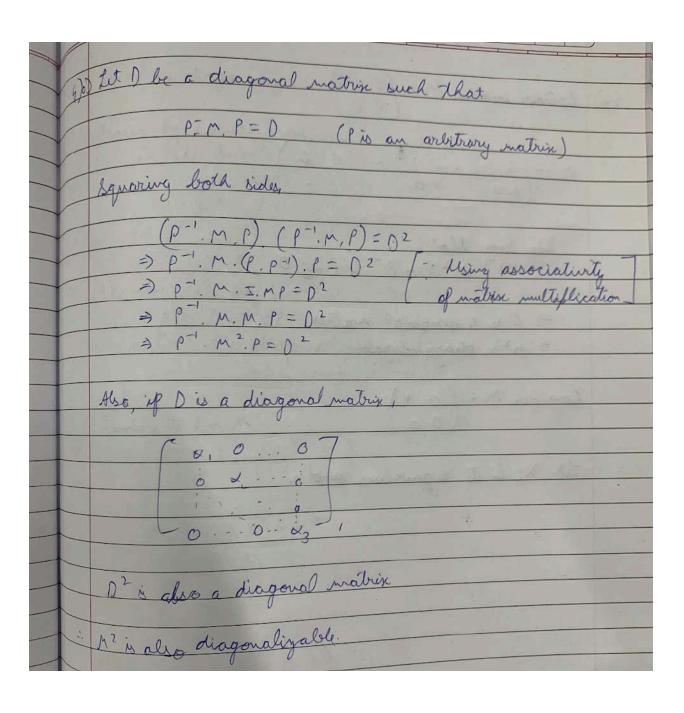
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- 27	1 to the to the transit dollars
- sa)	given that the inner product (2, y) is defined as
	the dot product x, y.
THE E	A 0 c = [1 - 1 ] and
	Assume Given a = (1-i and 1+2i)
	b= [2+2]
	2
	CONTRACTOR ASSESSMENT
	Fo Rind the inner product,
	(1-i) (2+i)+(1+2i)(5)=0
	$=)(1-\lambda)(2-\lambda)+(1+2\lambda)(2)=6$
	=> 2-2-2i+12+ (+2i)(2)=0
	=) 12-32+2+(1+26)(2)=0
	= -1 - 3i + 2 + (1 + 2i)(i) = 6
	=> =3; +1+ (1+2)(I)=0
	<u> 7 = 3i - 1</u>
	DT: 105
	Rotionalizing,
	$\frac{7}{3} = \frac{3i-1}{2i-1} \times \frac{2i-1}{2i-1}$
	= 622-5+1
	2 422-1
	$=6\lambda^2-5i-1$ $-5$
	-5
	= -5-50
	-5









Date braving by countermanple

we take M = (0) $M^2 = \left(\begin{array}{c} 0 & 0 \\ 0 & 0 \end{array}\right)$ The ran take any invertible matrix P,

P'm' P = P'OP = 0

as CO] is a diagonalizable matrix,

M' is diagonalizable Finding P for M:  $M-\delta I = \begin{pmatrix} -\lambda & 1 \\ 0 & -\lambda \end{pmatrix}$ det (M- ) = 12 x, =0, 1,=0 Johny x =6: (M-GI 10) = (0110 E has basis [ t] = span

At the olgobraic and geometric multiplicity of \(\lambda = 0\) are not equal ic. there is only one corresponding eigenvector the matrix M is not diagonalizable although M' is.

Hence, the statement & is forts.

Hence provid.