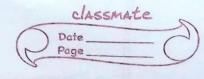
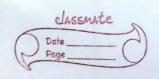
	Raunak Leksaria 2023113019 Linear Algebra Assignment 3
21.	For the product of matrices I & C, BC to be defined,
	# of columns of $E = \#$ of court of C Let b be of order $n \times p$ b C be of order $p \times q$ s. that $n, p, q \in Z^{\dagger}$, $n, p, q \times 1$; n, p, q are finite
	For the product of motsices ABB to be defined,
	# of columns of A = # of neutr of B : Bis of order nxp, A must be of order mxn for some m >, 1, m \(\mathcal{E}^{+} \), m finite.
	= Amon, boxp, Cpxq are the matrices.
	$[A(BC)] = \sum_{n=1}^{\infty} A_{in} (BC)_{n,j} \qquad [i,j \in Z^{1}]$ $= \sum_{n=1}^{\infty} A_{in} \sum_{s=1}^{\infty} A_{s} C_{s,j}$
	= E E Ain Bas Csj
	At this juncture, we mad note the following: in, g are both finite, the double summation &
	has finite terms hence, it converges to a finite value. We also note that the individual summations in a
	double summation are interchangeable so long as the summation converges to a finite value.
	: \$\in bas C_{\si} = \frac{5}{5} \frac{8}{5} Ain Bas C_{\si}, 1 = 1 \frac{8}{5} Ain Bas C_{\si}
	$= \sum_{g=1}^{p} \left(\sum_{k=1}^{m} A_{ik} b_{kg} \right) C_{ij}$
	= \(\frac{1}{25} \) (A) \(\frac{1}{25} \) (
	$= (AB)C)_{ij}$



-	
-	$[ACBC]_{ij} = [(AB)C]_{ij}$
-	Oto (AS)
	$\forall i, j \in \mathbb{Z}, 1 \leq i \leq m, 1 \leq j \leq q$ — ①
	with him and a second a second and a second
	i We know order of A(BC) of (AB)C is mxq or Maig that, we note from @ that every element in A(BC) is exactly equal to every element in (AB)C
	exactly equal to give the every element in A (BC) is
	element in CAB)C
	Hence,
	A(EC) = (AR)C
3 3	2/22



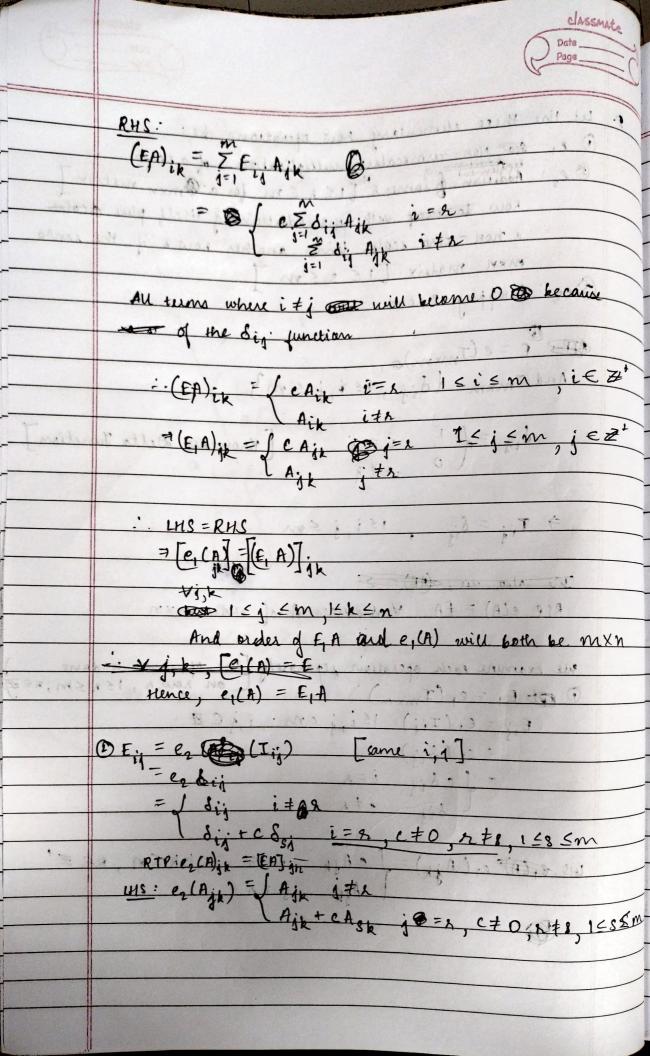
2. Let the three elementary sow operations be: De: Mon-reso scalar multiplication of a sow

De: Addition of some & [1 \le 1 \le m for a @mxn matrix] now to itely with the addition of itself plus scales a non-zero scalar times another nows of the same mxn matrix [15 s < m] (3) ez : Swapping 2 sout And Imam = (dij, 1= i, j < my dij = { i = j [Kroneker Delta Function] $\frac{1}{2} = \frac{1}{2} = \frac{1}$ RTP elA) = EA + matrices A of order mxn We examine each operation regarately the operation is done

DEDE = e, (Imxm)

The examine of the operation is done

on now n, 1 \le n \le m, n \in \frac{1}{2} Eij = e, (Iii) 15i, j cm., i, j E Z = e, (8;;) $= \begin{cases} cdij & i=k. \\ dij & i\neq k. \end{cases}$ $= \begin{cases} cdij & i=k. \\ dik & j\neq k. \end{cases}$ $= \begin{cases} cdij & i=k. \\ dik & j\neq k. \end{cases}$



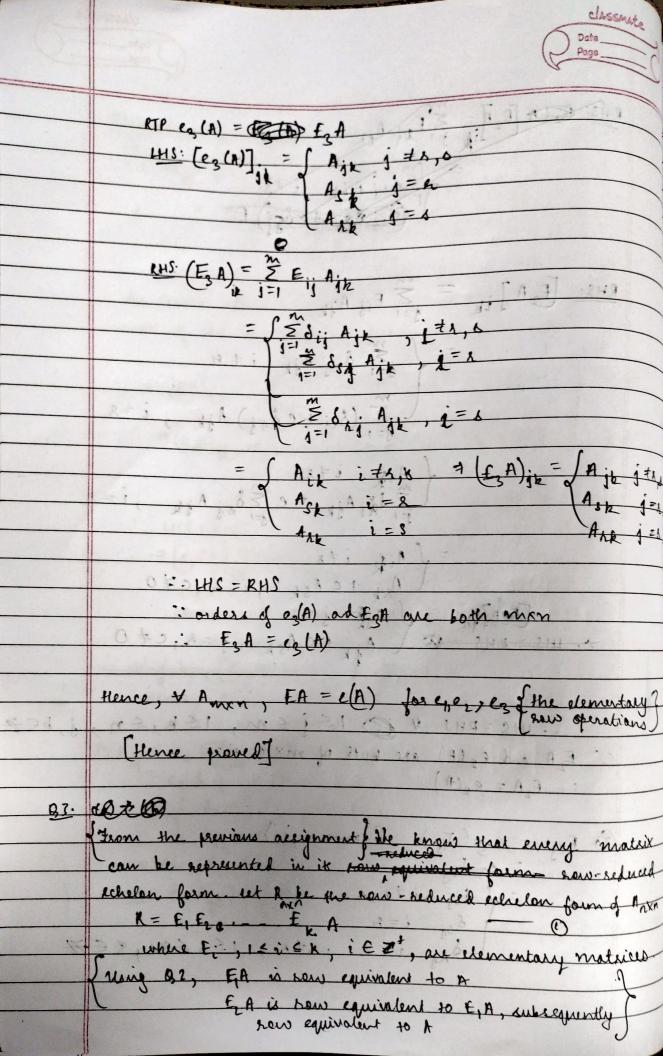
RHS:
$$[E,A]_{ik}$$
 $=$ $\sum_{j=1}^{\infty} E_{ij} A_{ik}$

$$= \int_{a_{i+1}}^{\infty} A_{ij} A_{ik} i \pm \epsilon$$

$$= \int_{a_{i+1}}^{\infty} A_{ij} A_{ij} A_{ik} i \pm \epsilon$$

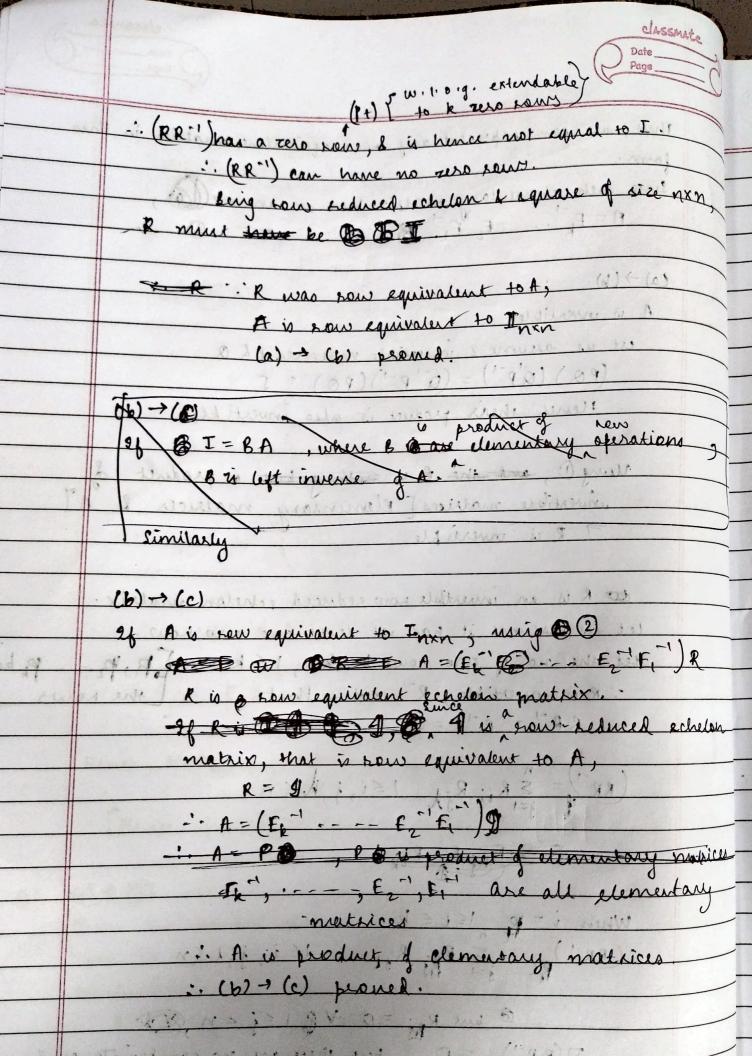
$$= \int_{a_{i+1}}^{\infty} A_{ik} A_{ik} i \pm \epsilon$$

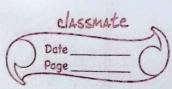
$$= \int_{a_{i+1}}^{\infty}$$





-	Company of the state of the sta
-	Thus, we can represent any new equivalent mateix in this
	form.
-	since each elementary matrix has an inverse of, $A = E_{k} \cdot \dots \cdot E_{2} \cdot F_{1} \cdot G \cdot R \cdot \dots \cdot R$
-	A=EkEE
-	
The sand or other Designation	(a) → (b) A of the law in the same of the
-	A is invertible
-	cet us assume 2 investible matrices P& Q
-	(PQ) (Q'P') = (Q'P-1)(PQ) = I
-	Hence there product is also invertibles
-	marianta protessario de la sura A9-TB/18
-	ming D, and the Ris mothing best a product of
	univertible matrices [Plementary matrices & A]
	→ R is invertible.
	& R is an invertible sow reduced schelon matrix.
	Let us rassume it has not least one zero how.
	Let the no of zero roun be ik! I = k < n 1 k, 10 19 be
	: R is investible, R'exist s. that . The rows
-	RRH = RHR = II
The second	MARKIN, WAR is son aguitaling to A
	$ \frac{\left(RR^{-1}\right) = \sum_{j=1}^{n} R_{ij} R_{jk} 1 \leq i, j, k \leq n $
	1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1000	When $i = \mathbf{r} \le k$
1000	(RR^{-1}) = $\sum_{i=1}^{\infty} R_{i}$, R_{i} , $R_$
STATE OF THE PERSON NAMED IN	· homos (0) (- (d)
Service Service	but RM = 0 + C 1 < j < n, Sol
CONTRACTOR CO.	= (RP) = 0 but there are no constraints on R
The state of the s	=(RR-1)=0 +B1=1 = n





-	(c) → (a)
	O A is a product of elementary matrices.
-	ut A = PI [while P = E, E2 Fk]
-	k i finite
	& : DE, 1=t=k, always invertible.
1	Le Company of the second
1	$\frac{1}{3 \cdot \text{that } PB = R^{-1}} = \frac{1}{3 \cdot \text{that } PB = R^{-1}}$
-	3. that PB=QP=
	Product of invertible matrices is also invertible Product of invertible matrices is also invertible A = PI = P = IP [I is commutative]
-	=> p-1. px ist. A = PI = p = IP [I is commutative]
	A = PI $A = IP$ $S = IP$
	APT = I
	= p-'in left universe p-' is right inverse; of A.
	stormandided was not be heart and the set in fallow the
	: L. Inverse = k. Inverse
	A is invertible
	:. (c) -> (a) proved.
	northings to the addition to the
-	: (a) -> (b), { are from!
-	(b) -> (c) (a) (c) (c) has been
-	(cs -> (a) ponel
-	To long as the landham are continued or
-	1911 ig xuana de antique de la contriera
	Anom matrix. By vector with real entries
-	$AX = B \left(X \in \mathbb{R}^m \right)$
-	BAX = B has a unique solution, there
48	A A MALE VICE IV

