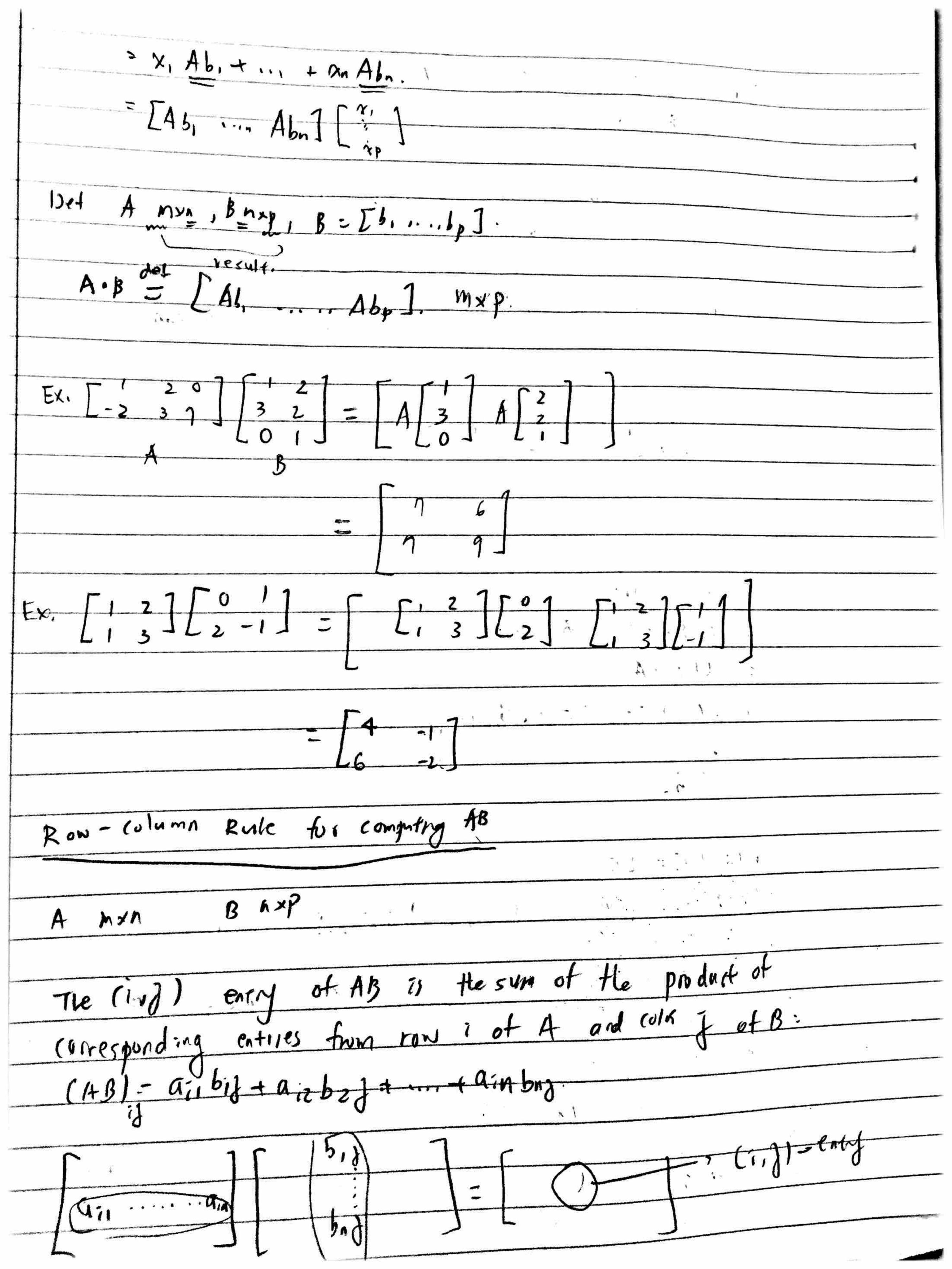
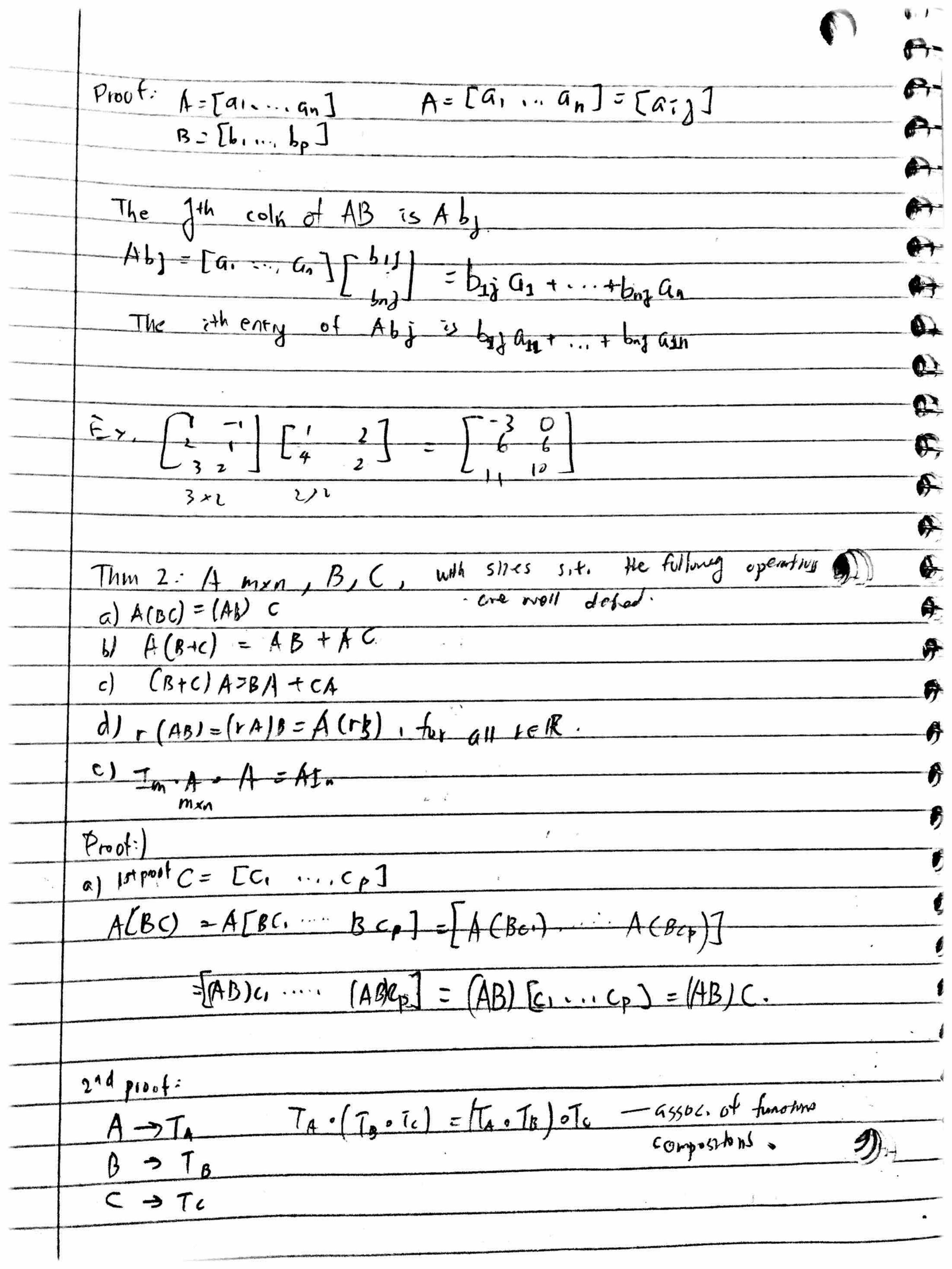
Math	18	Lecture	4	Aug 1	1
MATH	18	Lecture	4_	Aug 1	_

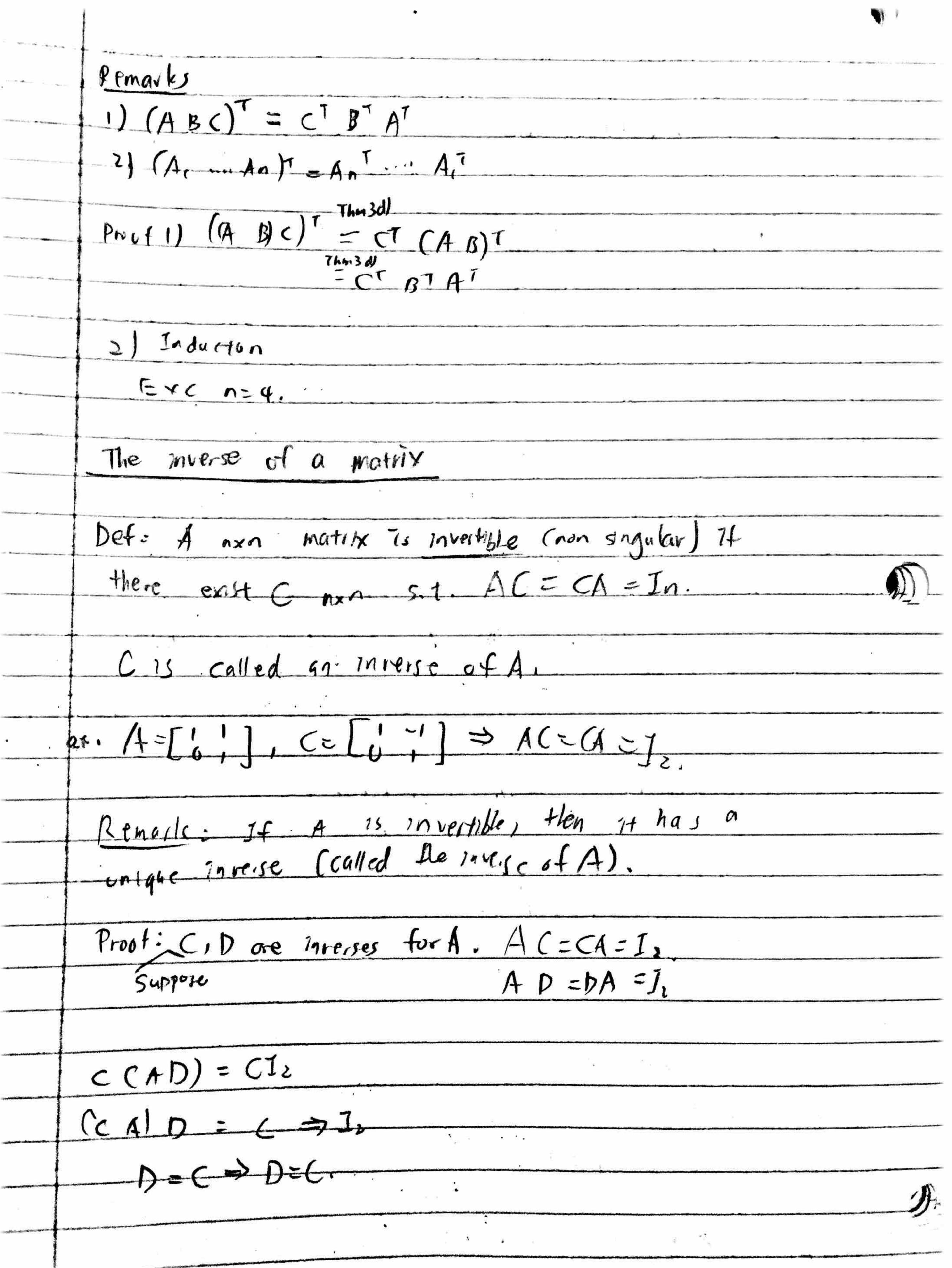
Math 18 Lecture 4 Aug 17	III: Eason
Thm 12: T: R" -> +R" I'mear tionsf,	TIM=AX.
=> a) T 1s onto 1ff the cold of	
b) 7 is one-to-one of A	17h independent
Proof: a) Tisomo det for all be Ry	there exist at least one
X & IR" 5.1. I(W-b.	
for all b ERIAX= to is cons	if ort.
That to wold of X 70 RM.	
Sec. 1.4	
b) Trace to one C=> for all	LERR 7 At must
one x e tR 1 s.t. T(n)=6	
=> T(x)=0 has usi que sol	
Axio has wight gol	
COLOF A one intep.	
$= \frac{\left[Ex, y + R^2 \rightarrow R^3 + \left(x_1 x_2 \right) - \left(x_1 + x_2 \right) \right]}{\left[Ex, y + R^2 \rightarrow R^3 + \left(x_1 x_2 \right) - \left(x_1 + x_2 \right) \right]}$	12x -x, (X,+3x2)
Tonto? T 1-12	
3 x 2 3>	ζ.
Sol6: A = [T([6]) T([9]]] = [2 -1] >	T(x)=Ax
A has max of 2 pruts Thuy secret colu	
$R' \Rightarrow T = Not onto.$	— # CV!!
Thu 12	
$\begin{bmatrix} \frac{1}{2} & \frac{1}{2} & \frac{1}{2} \\ \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \end{bmatrix} \Rightarrow coln' \text{ of } A \text{ one } lin$	Timp Tis 1-to 1.
1016 of A pot multiple of cuch other.	

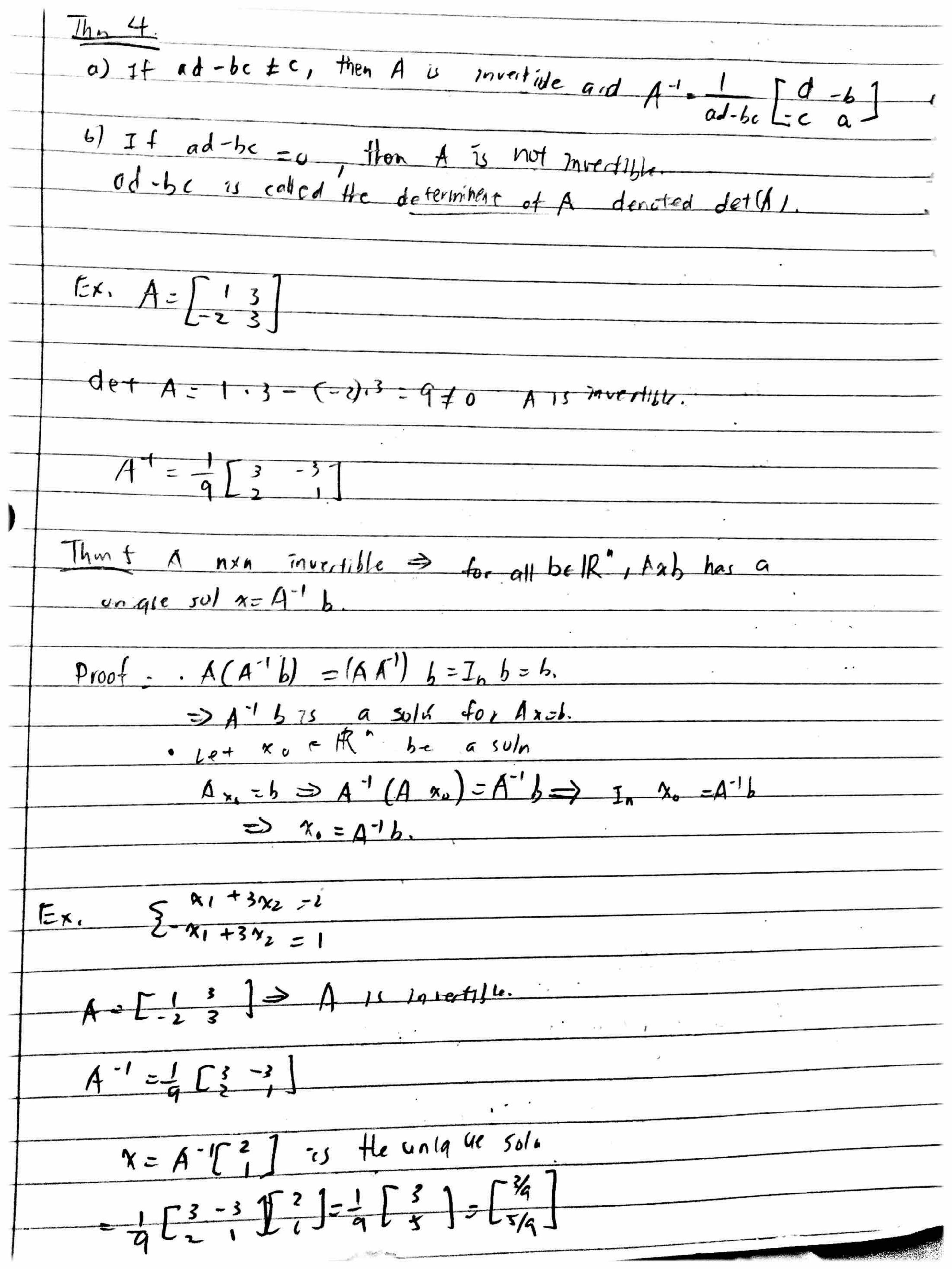
) T: R? >R\$, T(x) =Ax, A 5 M has 5 priors.
3-Tis onto & is not 1-1.
Matrix Operations: A mxn, A = [a, an], anorm
$A = \begin{bmatrix} a_{ij} \end{bmatrix} \text{where } a_{ij} \text{is the ith entry on the jth cold } a_{j},$ $A = \begin{bmatrix} a_{ij} & a_{i1} & \dots & a_{in} \\ a_{in} & a_{in} & \dots & a_{in} \end{bmatrix} \text{and} $
Gmi Gmz amn
If m=n 911,012, que are the diggeral entries of A.
Ais called a diagonal matrix if all its non-diagonal entities Ore zero.
$ex. \int_{0}^{\infty} $
Def = 1) A = [a, an] man
$B = [b, \dots, b_t] \leq xt$
$A \stackrel{\text{def}}{=} B \text{if } M = S \cdot n = t$ $a_1 = b_1 \cdot \dots \cdot a_n = b_n \cdot \dots$
id A, B mxn, A=[a,,,,,a,] A+B= [a,+5, an+bn] B=[b,,,,,bn]
mxn.

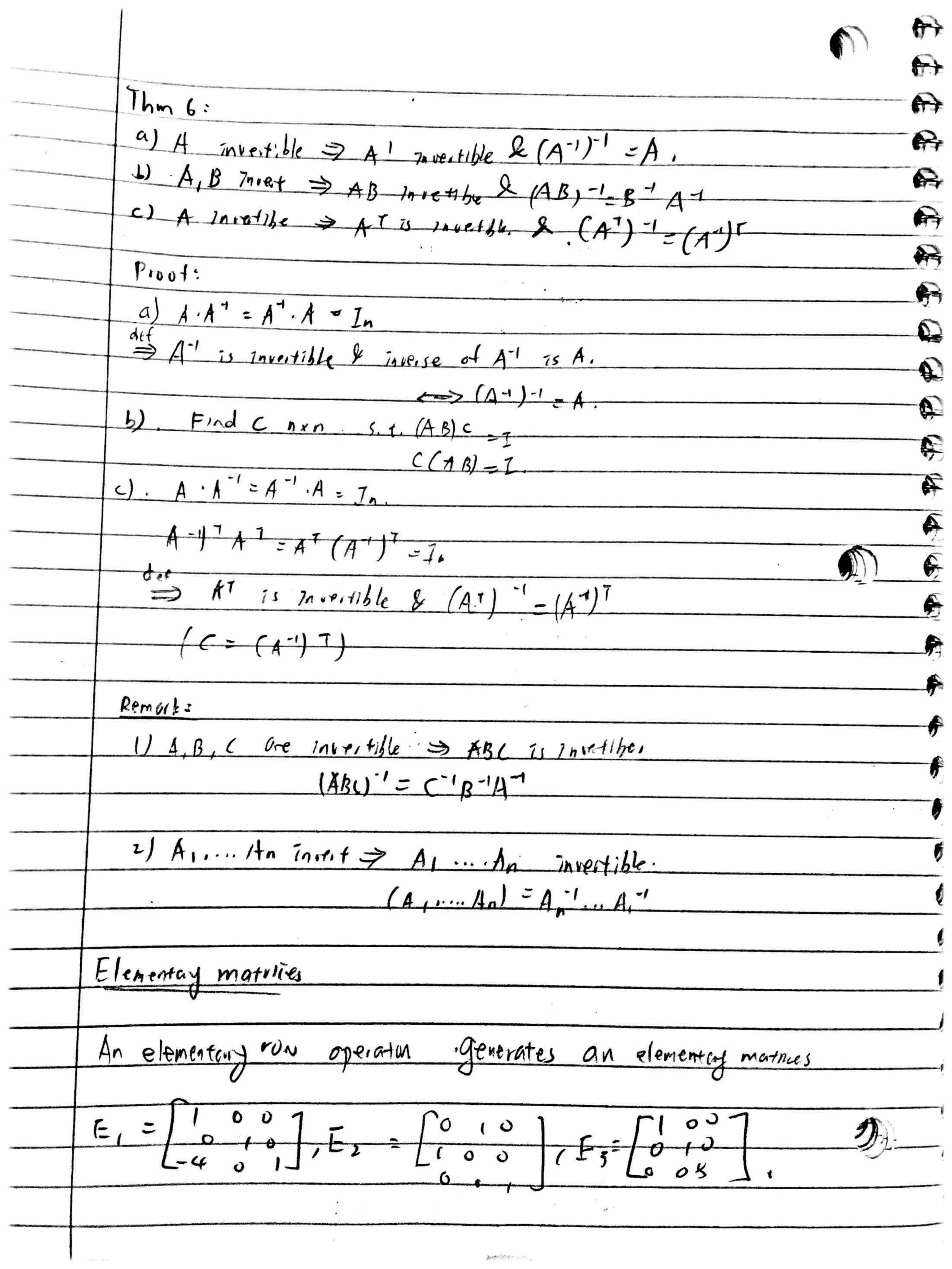




AB=[1] + BA:[1] 1) AB = 0 = 0 = 0 = 0 ex. [0][0]=[00] 3). A C = BC +> Det: A NVA, & posithe integer; A = A.A.... Det: A men, At is the new matrix whose collection are formed from the corresponding rows of A (called the transpose of A). MXA 1 = 14m 1= j = n Thin 3 A, B metrices,







$$A = \begin{bmatrix} a & b & c \\ g & h & i \end{bmatrix} \quad E_1 A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \quad (R_3 \rightarrow R_3 - 4R_1)$$

$$E_2 A = \begin{bmatrix} a & b & c \\ g & h & i \end{bmatrix} \quad (R_3 \rightarrow R_3 - 4R_1)$$

$$E_3 A = \begin{bmatrix} a & b & c \\ g & h & i \end{bmatrix} \quad (R_3 \rightarrow R_3 - 4R_1)$$

$$E_3 A = \begin{bmatrix} a & b & c \\ g & h & i \end{bmatrix} \quad (R_3 \rightarrow R_3 - 4R_1)$$

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$$Remail: Every elementary matrix is invertible.$$

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