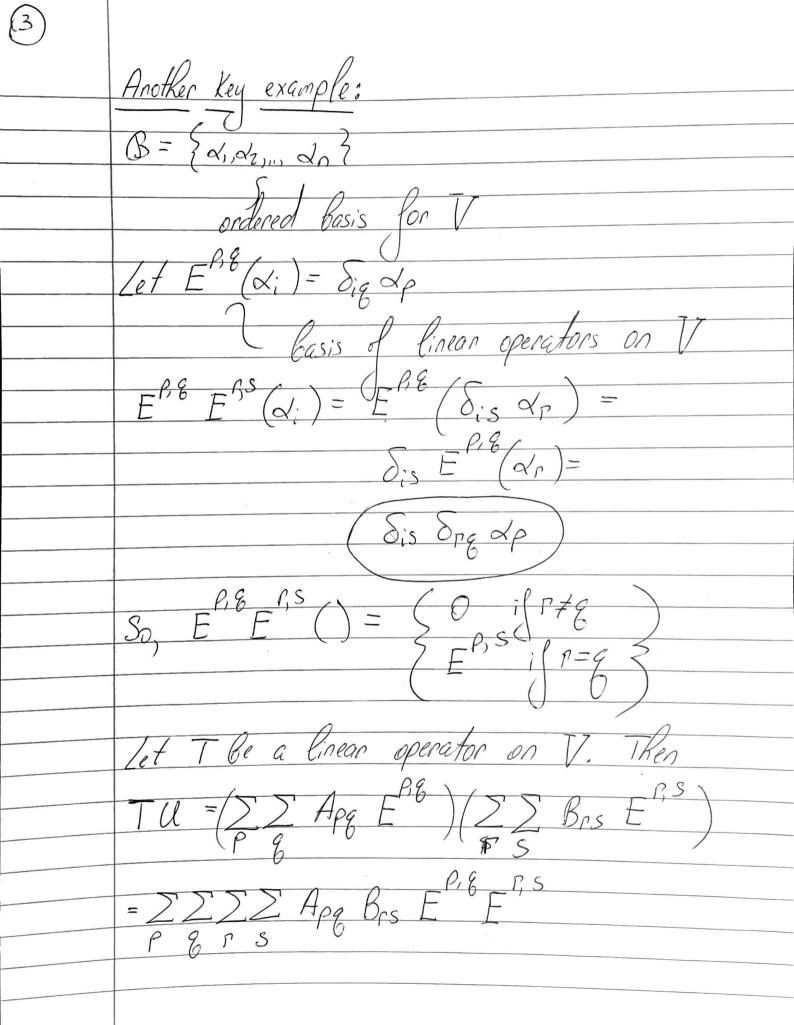
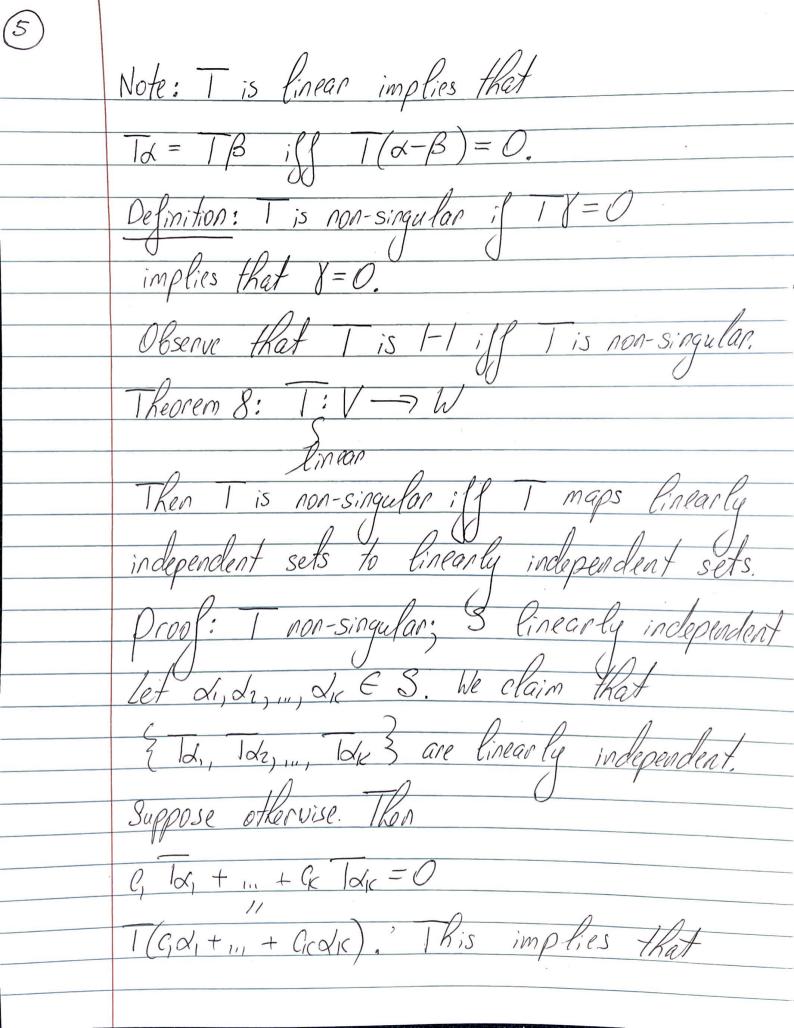


Lemma: V vector space over F. U, Ti, Tz linear operators on V: CEF, a)IU=UI=UB)U(1+4)=U1,+U1; (1,+T2)U=1,U+12U. $e)e(U_{1})=(cU)_{1}+U(c_{1})$ Example: A mxn over F T(X) = AX 1: F - > F B = pxm matrix over F U(Y) = BY $U: F \longrightarrow F$ T)(X)=U(TX)=U(AX) = B(AX) = (BA)Xmatrix multiplication



$$\frac{1}{S} = \sum_{i} \sum_{j} \sum_{i} \sum_{j} \sum_{j}$$



Codition + Crok = O since T is 1-1,	
and it follows that $c_1 = c_2 = c_1 = c_2 = c_3$ as desired.	
as desired	
Convenent success that I don't do	
Conversely, suppose that I: independent—) independ	Ven F
Let & be a non-zero vector > TX = 0. But	_
then T maps independent set 3x3 to a	
dependent set 503. Contradiction!	
Example: V polynomials over IR	
$1 = \{(x) = \{(x), Then T maps constants$	
to 0 mot inver	1.001
10 0 —) not inver	tible.

7	
	Theorem 9: V. Wygcfor spaces over F.
	If T:V->W TFAE Slinear
	i) T is invertible
	ii) I is non-singular iii) I is onto!
	Proof: $n = dim V = dim \overline{W}$
	We have rank (T)+ nullity (1)=n
	T is non-singular iff nullity (1) = 0, in
	rank (1) = n, It follows that T is non-singular if I(V) = W 2