Assignment-4

(1-- 1,1)= (1) = Q-B (2+) = 2H) AI

RTF: - Find which axioms for the vector space are satisfied by PCR, D. --,s) B((1--,t)).

Proof: = (5- 5) @ (C-- (0) =

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(11--1) D (1--1) D (1--1) En & For Ope Di

Commutative: $\overline{\alpha} \oplus \overline{\beta} = \overline{\alpha} - \overline{\beta}$ Not formulative; $\overline{\beta} \oplus \overline{\alpha} = \overline{\beta} - \overline{\alpha}$

Associative (= - (md - ma) =

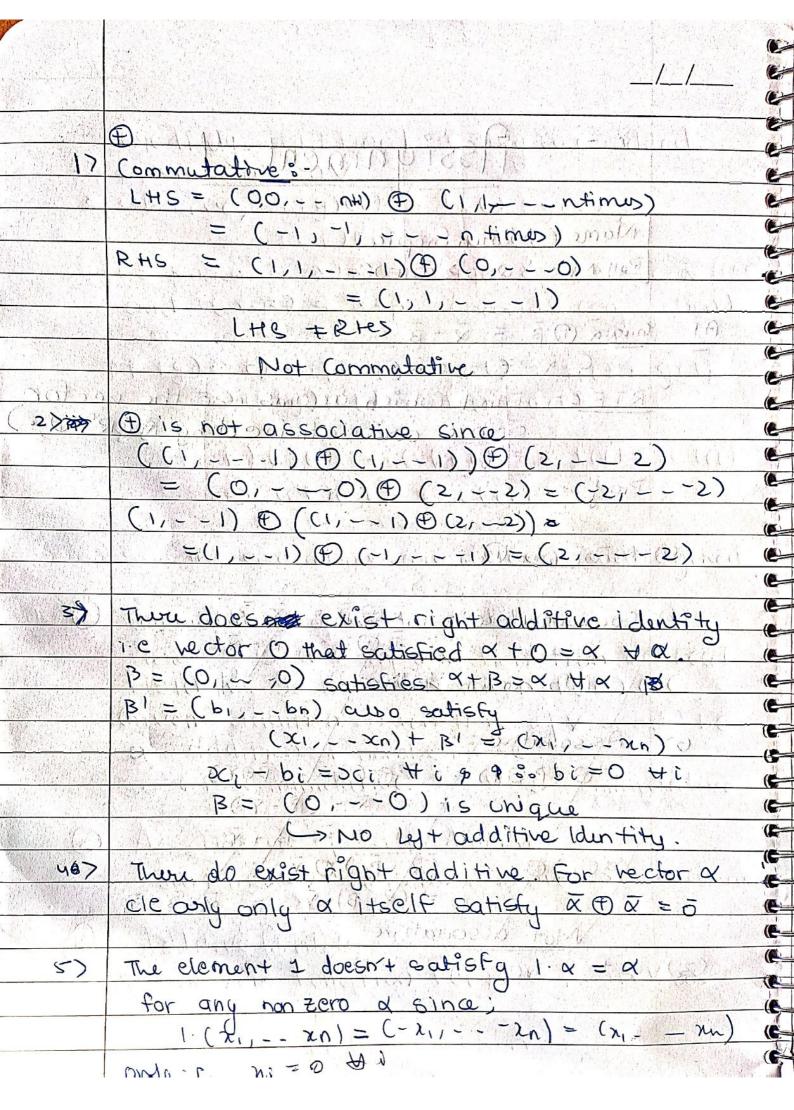
2 € (BEY) \$ 20 (BEZ)

(adb) = (x-B) + 7)

= (x-B)-y= 2-B-7

Mot associative

(3) het è bouteire - nous à l'anne



6,7,16C102) 1X1= 101/(C2,1X) doesn't hold sing -5 CCIC2) x = (- CIC2) xd Englosses 8 (C)(C(2x)) = C(-102x) = (-101)(-100x) -Maria (+) + (C(C)) = + (C(C)) = + (C(C)) = -9 -HTholds 8 CECK DB) = (& D. C) 311 1 90) MHO DOOC (X D. B) = (8 (X-B) (= - C (X + B)) --H) D C. R) O C.B (= K3 CX) (F) (FCB) (= (FCX)-(FCB) -(4) DA # (4) P = (+) (0 #+) (= -ca+cB -It does Kt hold (C(+Ce)-x= (C(-x) (D (CS-x) = (1) }) [(1+32) &= -(C(1+Cs) &=)-C1a-C2a -C1-0 (C1-0) (C-(C1-0)) (D) (C-(C1-0)) -= - C1x + C2x -So the operations are indeed out define --Que Given 32 it as wist set of all complex valued functions f. / x) (ma))) of for a conjugate --Given addition on tractions of y wall we -RTP:- (a) (V with operation: (f+g) (+) = f(H+g(+) svitor minos ex Mand Ccf. CED issa 1 vector space oner the field R (b) Greianbezampre of a funtion to how miser 21 / which it's not meal - graduled it it tent - > pritable switish A (D) 1 Proof: (a) Before we show that I satisfies the eight 1 properties of vector sporce, we must show that vector addition & 3 calon multiplication

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5344	are truly well defined ine they are indeed
	operations on V.
R	Observe, (f+g)(t) = f(t) +g(t) &
	We Know; (CF) lt) = CF(t) We Know; (X+B) = (X+B) & RCX = C.X (CEE)
	We Know; MX+B = 1x+B & RCX = C. & (CEE)
	and (x-B) = x-B (parins conjugation)
/ 343	
	(++g) (+t) (= +(+t) + g(+) + g(+) + g(+)
	82 (1) (x 1) = x
(A	Q2(1)(x)) = (C(F(C+)) = C(F(C+))
	CCCVC-EN - CCCCC
	so the operations are indeed, well-defined
2	Compartative of avector addition:
***************************************	Commutative of avector addition == 0
***************************************	Commutative of avector addition: 27. Commutative of avector addition: 27. Complex function on real effect (R. So if t GR then fet) EC
***************************************	Commutative of avector addition: 57.0 (File of IR. So if toR then forther considered of the Given addition on functions of y would be
***************************************	Commutative of exector addition: 7. (French on real exector) of is a complex function on real extitle (R. So if t GR then fort) EC (Field (R. So if t GR) then fort) EC (Fiven addition of number in C.
(culming	Commutative of awector addition: 27.0 Here f is a complex function on real field IR. So if t GR then fct) EC Given addition on functions of y would be a addition of number in C. So (is Commutative => V is Commutative
((() [1]	Commutative of avector addition: Here fis a complex function on real field (R. So if t GR then f(t) EC Given addition on functions of y would be a addition of number in C. So Cis Commutative > V is Commutative
(culming	Commutative of anector addition: Here of is a complex function on real effect (R. So if toR then tot) EC Given addition on functions of y would be a addition of number in C. So (is Commutative of vector Addition:
((() [1]	Commutative of avector addition: Here fis a complex function on real field (R. So if t GR then f(t) EC Given addition on functions of y would be a addition of number in C. So Cis Commutative > V is Commutative
100 (00) (00) (00) (00) (00) (00) (00) (Commutative of avector addition: Here fis a complex Function on real effect (R. So if t GR then fort) EC Given addition on functions of y would be a addition of number in C. So (is Commutative => V is Commutative expectative of vector Addition: Tust like (2) (is associative >> V is assala)
(4)	Commutative of avector addition: Here f is a complex function on real field IR. So if t GR then f(t) CC Given addition on functions of y would be a addition of number in C. So C is Commutative => V is Commutative of Associative of Vector Addition: Tust like (2) (is associative >> V is associative Additive Identity:-
100 pur (100)	Commutative of exector addition: Here fis a complex function on real field IR. So if toR then fort) EC Given addition on functions of y would be a addition of number in C. So (is Commutative => V is Commutative & Associative of Vector Addition: Tust like (2) (is associative => V
tilos	Commutative of avector addition: Here f is a complex function on real field IR. So if t GR then f(t) CC Given addition on functions of y would be a addition of number in C. So C is Commutative => V is Commutative of Associative of Vector Addition: Tust like (2) (is associative >> V is associative Additive Identity:-

Cftg)f = f(t) + g(t) = otg(t) = g(t)ll(g+f)(t) = g(t) + f(t) = g(t)

So if f(t) = 0 then (ftg) (t) = (gtf)(t) = g(t)

8) Additive Inverse:

9 9 9

Let g(t) = -f(t); then g(-t) = -f(-t) = $-f(t) = g(t) \Rightarrow g(t) = F(t)$

Thus for $g \in V$: e + g(t) = f(t) + g(t) = f(t) - g(t) = 0 g + f(t) = g(t) + f(t) = -f(t) + f(t) = 0 $s \cdot V$ has an additive Inverse

- (2) Multiplicative Toverse: In bish 1/3 Clearly, 1-f=f holds is since 1 is the multiplicative identity in R& Cas well
- Associative of Scology Multiplication =Since (C is associative & f & (C thus
 (C(2)) = c(((2)) holds
- Distributivity of Scalars over vectors:

 As (is distributive => ((ftg) = cftcg hold)
- (g) Distributive => (Ci+co)f = cift(c)f holds

	//_ (6)
()	we can say, in Vaith the givenoperations
	is a vector field. (1)(1)
(Do = &)	1) + S = (+) (+) = (+) + (+)) + (+)) + (+) = (+)
(b)	# a function in which isn't real Valued
3	is f(t)=it.
	POST SUNINE SUITIBLE CO
The state of the	Oloino, it G.V.
= ()) Prog :
) + (-E) = (E) => + (U) = (E) = (E) == (E) => + (E) == (E)
V21	Claim: it is not real valued
0 = (+	Consider; fcn; fcn = i/cn = e
)=(+)	TOVAL SYITUDD UD SON V. "
Aus 3)	RTP: - A non-empty subset W of Vedor Space Y is a subspace
	of vifand only if for each pair of vectors & Bew
200	and each scalar Clettil the vector catil ew.
1/2000	CO TO & A OF Atthorn Solic Stilling & CO
100	Proof:
	= infly is a Subspace then CX+B EW
1168,6	SUIT DE SUITINGS IN ST & BEW F CEF
	for any X,1BEW land CEF (O)
	As wis subspace;
- 5	entrovi 1218 EWING to privibuliste (E)
Usion s	CABW Soutudintail i D &6
	BCW
	= 3 eroling = Princatte GW: printy dante (1) (8)
1.150	(S) 11) = + (s) +10) (= S) (10) (5) 11 a/b & D (3)

←: If CX+BEW & Y,BEW & CEF then Wis a Subspace.

(Reference : LA by Hoffan and Kunze Page - 42)

To show Wis a subspace we need to show three conditions: - (1) Zero Vector

e) Closed under addition

(3) Additive Inverse

(4) closed under Addition

if x, BEN

> c = + B ∈ W

-

-

-3

3

3

3

a +BEW closed under addition 2

if QEW & C=-1

C1)2+2 EW

0° Ew Zero Vector 1/

=> cato Eu => caeu Closed unda Meet you

C=-1=> - \(\varphi \) = \(\varphi \) Additione low 3 \(\varphi \)

w is subspace of y

Here Prooned