IQRA NATIONAL UNIVERSITY

NAME: HAMMAD RAJ

ID: 16654

SUBJ: LINEAR ALGEBRA.

Q4) Let $M\begin{pmatrix} a & b \\ c & d \end{pmatrix}$

inverse ad-bc

$m^{-1} = 1/\text{Letm} = \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = da-(b).$

enteries and d for Matrix. M among d in term of put resurce in front of

(b) $\begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$ $9-8 = 1$

(c) $\begin{bmatrix} 2 & 3 \\ 3 & 3 \end{bmatrix}$ $6-6 = 0$

(d) $A = \begin{vmatrix} 1 & 1 & 1 \\ 2 & 3 & 2 \\ 4 & 1 & 3 \end{vmatrix} = 3$

$1.3.5 + 1.3.4 + 1.2.1 - 1.3.4$

1.3

$15 + 8 + \cancel{2} - 12 - 10 - \cancel{2}$

21

Q3) A.

(a) The set V of all Matrices of the form $\begin{pmatrix} 1 & 0 \\ b & 1 \end{pmatrix}$ where $a, b \in R$ over R with standard

addition & scaler Multiplication

Note that V is not closed under tion for $a,b,c,d \in R$ we have $\begin{pmatrix} 1 & a \\ b & 1 \end{pmatrix}$ &

$\ldots \begin{pmatrix} 1 & a \\ \ldots \end{pmatrix} + \begin{pmatrix} 1 & c \\ \ldots \end{pmatrix} = \begin{pmatrix} \ldots & a+c \\ \ldots \end{pmatrix} \notin V.$

(b) Polynomials of degree n does not form a vector space bcz they don't form a set closed under

for instance

$x^n - x^n = 0$

which is not of Degree n

so Don't get confused with the set of polynomials of Degree or equal than n+1

n+1 we often work with this space

polynomial of degree n is a set which is not closed under addition.

e.g if n=3 Then $x^3 + x^3$ and $-x^3$ are both 3rd degree polynomial but their sum is not

$x^3 + x^2 - x^3 = x^2$

which is not a 3rd degree polynomial.

(Q2) $T(U+V) = T(U) + T(V)$

$T(cU) = cT(V)$

Example, Determine whether

$T: R^3 \rightarrow R^3$ defined by

$T([x, y, z]) = [x+y, x-y, z]$

is a linear transformation ③

1. Let U $[x_1, y_1, z_1)$ & $U = [x^2, y^2, z^2]$

Then we want to prove $(U+V) = T$

$T(U+V) = T([x_1, y_1, z_1] + (x_2, y_2, z_2]))$

$= T([x_1 + x_2, y_1 + y_2, z_1 + z_2]))$

$= [x_1 + x_2 + y_1 + y_2 + x_1 + x_2 (y_1 + y_2)$

Therefore $T(U+V) = T(U) + T(V)$

we want to prove $T(V)$

$= CT(U)$

$T(CU) = T(C | x_1, y_1, z_1 |$

$= T(| c x_1, y_1, z_1 |$

$= | C x_1 + c y_1, (x_1) y_1, c z_1]$

and

$CT(V) = CT[x_1, y_1, z_1 |$

$= C | x_1 + y_1, x_1 - y_1, z_1 |$

$= | c(x_1 + y_1) c(x_1 - y_1) c z_1 |$

$= | c x_1 + c y_1, (x_1 - c y, c z_1)$

So $T(CV) = CT(U)$.

Q1. consider the following vectors in R3 $V_1 = (1, -1, 0)$ $U_2 = (3.2.-1)$ $V_3 = (3, 5, -2)$ (a) verify that the General vector $U = (x, y, z)$ can be written as a linear combination of $V_1 = V_2$ and U_3