NAME: AJAKAYE JADESOLA STELLA

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**Linear Transformation** :

LT { T: U-V} is a function that carries elements of the vector space U (domain) to vector space (co-domain) .

i) **Examples on Linear Transformation:**

INPUT U OUTPUT V

(Domain) (Co-domain)

T

U V

Here in the first example, 4 elements in domain U transforms 4 elements in co-domain V

T(d) = z

T(c) = x = y

T(a) = T(b) = w

ii) **More examples on Linear Transformation:**

INPUT A OUTPUT B

(Domain) (Co-domain)

T

A B

Here 4 elements in domain A transform 3 elements in co-domain B.

1. A = { 1, 9, 3 } { 2, 6 ,70} { 0 ,1 ,3}

X = 1

4

-8

i) T(x) = Ax

T(x) = 1 9 3 1

2 6 7 4

0 -1 3 -8

1 1 + 4 9 -8 3

2 6 7

0 -1 3

=

1+ 36 -24 13

2+ 24 -56 = -30

0 - 4 – 24 -28

Hence , 13 transforms 1

-30 4

-28 -8

A = 1 2 3 B = 2 1 3 C = 1 -1 3

0 4 -1 1 2 3 2 4 2

3 2 1 0 -1 4 3 0 1

D = 1 2 0

2 1 3

0 3 1

X = 1

3

5

1. LINEAR TRANSFORMATION OF A:

A = 1 2 3 1

0 4 -1 3 =

3 2 1 5

1 2 3 1 + 6 + 15 22

1 0 + 3 4 + 5 -1 = 0 + 12 -5 = 7

3 2 1 3 + 6 + 5 14

22 1

7 Transforms 3

14 5

1. LINEAR TRANSFORMATION OF B:

A = 2 1 3 1

1 2 3 3 =

0 -1 4 5

2 1 3 2 + 3 + 15 20

1 1 + 3 2 + 5 3 = 1 + 6 + 15 = 22

0 -1 4 0 + -3 + 20 17

20 1

22 Transforms 3

17 5

1. LINEAR TRANSFORMATION OF C:

A = 1 -1 3 1

2 4 2 3 =

3 0 1 5

1 -1 3 1 + -3 + 15 13

1 2 + 3 4 + 5 2 = 2 + 12 +10 = 24

3 0 1 3 + 0 + 5 8

13 1

24 Transforms 3

8 5

1. LINEAR TRANSFORMATION OF D:

A = 1 2 0 1

2 1 3 3 =

0 3 1 5

1 2 0 1 + 6 + 0 7

1 2 + 3 1 + 5 3 = 2 + 3 +15 = 20

0 3 1 0 + 9 + 5 14

7 1

20 Transforms 3

14 5