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**1i).**  Linear transformation T: U V is a function that carries element of the vector space U(domain) to vector space V(co-domain) and which has 2 properties:

Additive property: T(U1 + U2) = T(U1) + T(U2)

Multiplicative property: T(αU) = αT(U)

**ii).** Rank of a matrix is the dimension of the vector space generated by it’s columns. It is also the maximum number of linearly independent column vectors in the matrix.

**2).** X = 1 2 8

4 7 6

9 5 3

/X/ = 1 2 8

4 7 6

9 5 3

/X/ = 1 7 6 - 2 4 6 + 8 4 7

5 3 9 3 9 5

/X/ = 1(21 – 30) – 2 (12 – 54) + 8(20 – 63)

/X/ = - 9 + 84 – 344

/X/ = - 269

/X/≠ 0 , therefore, X is a non-singular matrix

**3). T: X Y**

**X Y**

**e . . 2**

**f . . 4**

**g . . 6**

**h . . 8**

**i . . 10**

**j .**

**k.**

**Domain Co-domain**

**T(e) = 4**

**T(f) = 2**

**T(g) = 6**

**T(h) = 10**

**T(j) = 8**