

### QUESTION 1

- (i) **Linear Transformation:** A linear transformation  $T:U \rightarrow V$  (transform) it is a function that carries element of a vector space  $U$ (Domain) to vector space  $V$ (Co-Domain).
- (ii) **Rank of a Matrix:** This is the dimension of the vector space generated by its columns. This corresponds to the maximal number of linearly independent columns of. This in turn, is identical to the dimension of the vector space spanned by its rows.

### QUESTION 2

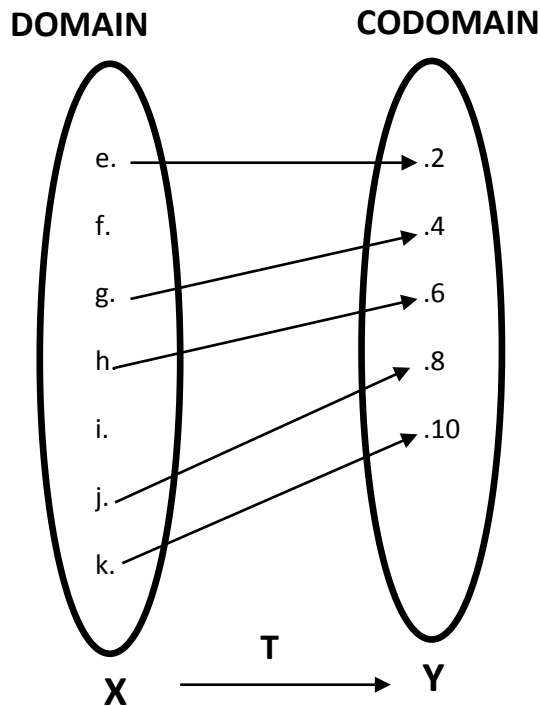
$$|A| = \begin{vmatrix} 1 & 2 & 8 \\ 4 & 7 & 6 \\ 9 & 5 & 3 \end{vmatrix}$$

$$|A| = 1(21 - 30) - 2(12 - 54) + 8(20 - 63)$$

$$|A| = -9 + 84 - 344 = -269$$

$|A| \neq 0$  Therefore, Matrix A is a Non-Singular matrix

### QUESTION 3



$$T(e) = 2$$

$$T(g) = 4$$

$$T(h) = 6$$

$$T(j) = 8$$

$$T(k) = 10$$