

## Matrices Worksheet-3 Mathematics

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### Question

We have four Matrices P, Q, R and S given below

$$P = \begin{bmatrix} 1 & 2 & -1 \\ 8 & 4 & 7 \end{bmatrix}$$

$$Q = \begin{bmatrix} 1 & 8 \\ 2 & 4 \\ -1 & 7 \end{bmatrix}$$

$$R = \begin{bmatrix} 1 & -1 & -11 \\ 2 & -2 & -8 \\ 3 & -6 & 0 \end{bmatrix}$$

$$S = \begin{bmatrix} 1 & 3 \\ -1 & 1 \end{bmatrix}$$

- i) Find the multiplication of matrices and if it is not possible, please give the suitable reason to support your answer  
ii) Write the order of each of these multiplication?

- a) PQ
- b) PR
- c) PS
- d)  $S^2$
- e) QP
- f) QS
- g)  $R^2$
- h) RP
- i)  $P^2$
- j) PQR
- k) RQ
- l)  $Q^2$
- m) SP
- n) QRS
- o) RQP

**Question**

If a matrix has 28 elements, what are the possible orders it can have? What if it has 13 elements?

**Answer**

$28 \times 1$ ,  $1 \times 28$ ,  $4 \times 7$ ,  $7 \times 4$ ,  $14 \times 2$ ,  $2 \times 14$ . If matrix has 13 elements, then its order will be either  $13 \times 1$  or  $1 \times 13$ .

**Question**

If  $A$  is an  $n \times m$  matrix, find the order of  $AA^T$  and  $A^T A$