

Matrix Worksheet 01

Exercise 01: Find the order of the following matrices.

$$A = \begin{pmatrix} -1 & 0 & 3 \\ 5 & -2 & 4 \end{pmatrix} \quad B = \begin{pmatrix} -2 & 5 \\ 1 & 0 \end{pmatrix} \quad C = \begin{pmatrix} 2 \\ 4 \\ -6 \end{pmatrix} \quad E = \begin{pmatrix} 1 & 3 & 4 \\ 3 & -1 & 2 \\ 4 & 2 & 5 \end{pmatrix}$$
$$D = (2 \quad -3 \quad 3)$$

Exercise 02: Find the transpose of the following matrices.

$$A = \begin{pmatrix} -1 & 0 & 3 \\ 5 & -2 & 4 \end{pmatrix} \quad B = \begin{pmatrix} 2 \\ 4 \\ -6 \end{pmatrix} \quad C = \begin{pmatrix} 1 & 3 & 4 \\ 3 & -1 & 2 \\ 4 & 2 & 5 \end{pmatrix} \quad D = (2 \quad -3 \quad 3)$$

Exercise 03: Let the matrices A , B , C , and D as follows:

$$A = \begin{pmatrix} -1 & 4 & 3 \\ 1 & -2 & 0 \end{pmatrix} \quad B = \begin{pmatrix} 2 & -2 \\ 0 & 1 \\ 3 & -6 \end{pmatrix} \quad C = \begin{pmatrix} 2 & -3 & 3 \\ 4 & -2 & 1 \end{pmatrix}$$

Determine the Sums: $A + B$, $A + C$, $A - C$ and $3A - 2C$

Exercise 03: Let be x and y a real, and the matrices :

$$A = \begin{pmatrix} -2x + 1 & 5 \\ 1 & 2y \end{pmatrix} \quad B = \begin{pmatrix} 3 + x & 1 \\ -2 & 4 + y \end{pmatrix} \quad \text{and} \quad C = \begin{pmatrix} -5 & 7 \\ 8 & 10 \end{pmatrix}$$

Find the values of x and y such as $2A - 3B = C$.

Exercise 04: In each case, compute AB and BA the following matrix products:

$$1) \quad A = \begin{pmatrix} 3 & 4 \\ 1 & 9 \end{pmatrix} \quad B = \begin{pmatrix} 5 & 2 & -1 \\ 3 & -3 & 0 \end{pmatrix} .$$

$$2) \quad A = \begin{pmatrix} 0 & 2 \\ 3 & -5 \\ -2 & 3 \end{pmatrix} \quad B = \begin{pmatrix} -1 & 2 & -3 \\ 4 & -5 & 6 \end{pmatrix} .$$

Exercise 05: For the following matrices, compute the determinant using an appropriate rule.

$$A = \begin{pmatrix} -5 & 7 \\ 8 & 10 \end{pmatrix} \quad B = \begin{pmatrix} 2 & -2 \\ 0 & 1 \\ 3 & -6 \end{pmatrix} \quad C = \begin{pmatrix} -1 & -4 \\ 1 & -2 \end{pmatrix} \quad D = \begin{pmatrix} 3 & 4 \\ 1 & 9 \end{pmatrix} \quad N = \begin{pmatrix} 2 & 4 \\ 1 & 2 \end{pmatrix}$$

$$E = \begin{pmatrix} 0 & 0 & 2 \\ 3 & 1 & -1 \\ 2 & 2 & 4 \end{pmatrix} \quad F = \begin{pmatrix} -1 & -1 & 2 \\ 0 & 2 & 2 \\ -3 & 2 & 5 \end{pmatrix} \quad M = \begin{pmatrix} 3 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 4 \end{pmatrix} \quad G = \begin{pmatrix} 4 & 2 & 5 \\ 0 & 2 & 1 \\ 0 & 0 & 0 \end{pmatrix}$$

Exercise 06: For the following matrices, perform a test for invertability and, if possible, compute the inverse matrix.

$$A = \begin{pmatrix} -5 & 7 \\ 8 & 10 \end{pmatrix} \quad B = \begin{pmatrix} 2 & -2 \\ 0 & 1 \\ 3 & -6 \end{pmatrix} \quad C = \begin{pmatrix} -1 & -4 \\ 1 & -2 \end{pmatrix} \quad D = \begin{pmatrix} 3 & 4 \\ 1 & 9 \end{pmatrix} \quad N = \begin{pmatrix} 2 & 4 \\ 1 & 2 \end{pmatrix}$$

$$E = \begin{pmatrix} 0 & 0 & 2 \\ 3 & 1 & -1 \\ 2 & 2 & 4 \end{pmatrix} \quad F = \begin{pmatrix} -1 & -1 & 2 \\ 0 & 2 & 2 \\ -3 & 2 & 5 \end{pmatrix} \quad M = \begin{pmatrix} 3 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 4 \end{pmatrix} \quad G = \begin{pmatrix} 4 & 2 & 5 \\ 0 & 2 & 1 \\ 0 & 0 & 0 \end{pmatrix}$$

Exercise 07: let a be a non nul real and N a matrix

$$N = \begin{pmatrix} 2 + a & 4 \\ 1 + a & 3 \end{pmatrix}$$

Give the values of a real a such as N must be an inversible