# O Level Maths

## Topic: Matrix Addition, Subtraction, and Multiplication

**Instructions**

Answer all questions. Show all necessary steps. Use matrix laws to simplify where required.

## Practice Problems

**Matrix Addition and Subtraction:**

1. Given $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 6 & 2 \end{bmatrix}$, find:

   (a) $A + B$

   (b) $A - B$

2. Let $C = \begin{bmatrix} -2 & 5 \\ 0 & 7 \end{bmatrix}$ and $D = \begin{bmatrix} 3 & -1 \\ 4 & 6 \end{bmatrix}$, compute:

   (a) $C + D$

   (b) $D - C$

**Matrix Multiplication:**

3. If $A = \begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$, find $AB$.

4. Let $P = \begin{bmatrix} 2 & 0 & 1 \end{bmatrix}$ and $Q = \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix}$. Compute $PQ$.

5. Given $M = \begin{bmatrix} 1 & 2 \\ -1 & 0 \\ 3 & 1 \end{bmatrix}$ and $N = \begin{bmatrix} 2 & 1 \\ 0 & 3 \end{bmatrix}$, find the product $MN$.

# Multiple-Choice Questions

1. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$, what is $A + B$?

   A. $\begin{bmatrix} 5 & 5 \\ 5 & 5 \end{bmatrix}$

   B. $\begin{bmatrix} 3 & 5 \\ 5 & 3 \end{bmatrix}$

   C. $\begin{bmatrix} 2 & 5 \\ 6 & 5 \end{bmatrix}$

   D. $\begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}$

2. Which matrix multiplication is possible?

   A. $2 \times 3$ multiplied by $3 \times 2$

   B. $3 \times 2$ multiplied by $3 \times 2$

   C. $2 \times 2$ multiplied by $3 \times 1$

   D. $1 \times 3$ multiplied by $1 \times 3$

3. Which of the following is the result of:

   $$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

   A. Zero matrix

   B. Identity matrix

   C. The second matrix unchanged

   D. Transpose of second matrix