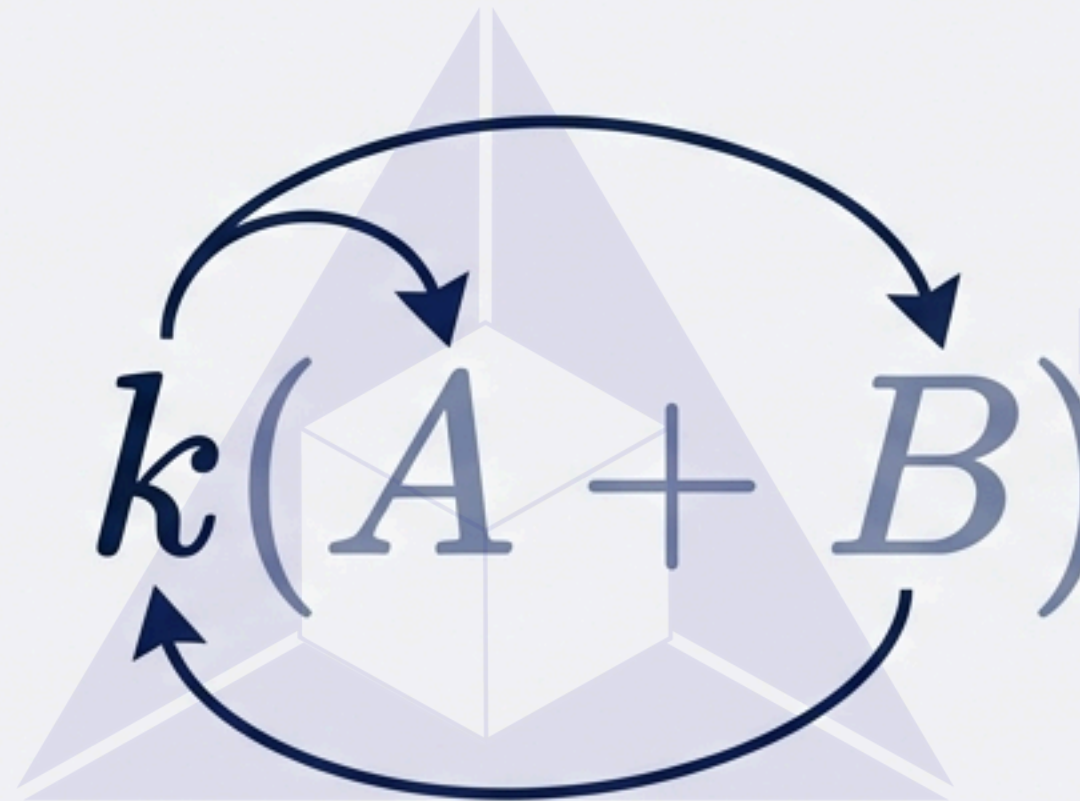


Mastering Matrix Algebra for JEE

Scalar Multiplication Rules

Essential properties, equation structures, and common traps.

Property 1: Distributing a Scalar


$$k(A + B) = kA + kB$$

A scalar multiplies into every element of every matrix within the bracket.

Property 2: Distributing a Matrix


$$(k + l)A = kA + lA$$

A matrix multiplies into every scalar within the bracket.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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Key Highlights

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- » Get Clear Explanations, Not Just Marks
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Solving Matrix Equations

Treat matrices like variables, but respect their rules.

$$2A + 3X = 5B$$



! Matrix addition is commutative, so algebraic shifting works perfectly.

$$3X = 5B - 2A$$



Isolate the unknown matrix (X) by moving known matrices to the other side.

Isolating the Unknown

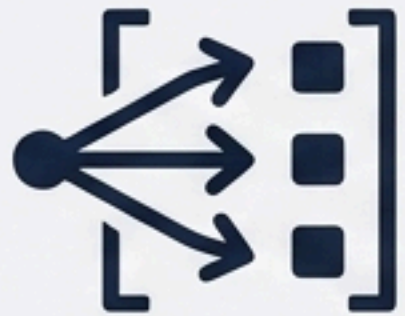
$$X = \frac{1}{3} (5B - 2A)$$

Notice how we multiply by the reciprocal scalar instead of “dividing.”

Error Trap Card

**NEVER divide by a matrix. You can only divide by a scalar.
Multiply by fractions instead.**

Key Takeaways



Distribute Scalar. Always push scalars through to every element inside the matrix bracket.



Rearrange Before Expanding. Do all algebraic shifting with A, B, and X before plugging in the actual matrix numbers.



Divide ONLY by Scalars. Matrices do not have a division operation. Multiply by fractions instead.



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