

AP Precalculus
Matrix Operations and Multiplication

Matrix Operations and Multiplication | APPC-U04-P14

96 problems · Four activity formats

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Topic focus

Across 96 tasks this topic asks for constraint comparison and verdict, numeric and label judgments, constraint and uniqueness conclusion, compatibility verdict and repair, valid and invalid labels with reason and intermediate and final sizes.

8 PDFs and a README; 66 buyer pages.

AP Precalculus

Matrix Operations and Multiplication

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

State the dimensions of A and give a_{23} .

matrix =

4	0	7
-2	5	-1

Bank label: _____

Compute Ax and confirm the result's dimensions. A : see the labelled matrix A ; domain: matrix-vector multiplication; x : $[4, 5]$.

A =

2	-1
0	3

Bank label: _____

Recover x and y from both product entries and explain why neither condition is redundant. B : see the labelled matrix B ; domain: row vector times invertible-looking coefficient matrix; product: $[5, 1]$; row: $[x, y]$.

B =

1	2
1	-1

Bank label: _____

Use a row-column product to find the meal's total calories. calories per serving: $[80, 120, 50]$; domain: meal calorie total; foods: [fruit, grain, milk]; servings: $[2, 1, 3]$.

Bank label: _____

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Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Compute AB and BA and identify the entry that disproves commutativity. A : see the labelled matrix A ; B : see the labelled matrix B ; domain: diagonal matrix and shear.

$A =$

2	0
0	1

$B =$

1	3
0	1

Determine all possible x and y . Explain why the two output entries do not give two independent constraints. B : see the labelled matrix B ; domain: row vector product with repeated columns; product: $[5, 5]$; row: $[x, y]$.

$B =$

1	1
1	1

Compute AB and state its dimensions. A : see the labelled matrix A ; B : see the labelled matrix B ; domain: row by rectangular matrix.

$A =$

2	-1
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$B =$

3	0	4
5	2	-2

Is uv defined, and what size matrix results? domain: column times row vectors; u size: 4×1 ; v size: 1×2 .

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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Compute both orders and use them to assess the scalar-style claim that a zero product forces one matrix factor to be zero.

A =

1	−1
1	−1

B =

1	1
1	1

The inner labels match and the numeric dimensions conform. Does quantity-in-kilograms times dollars-per-item yield a valid total cost? State a minimal unit repair.

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Full Worked Solutions - excerpt

Worked example

Problem. Compute the row-by-column matrix product. column: $[7, -2, 5]$; domain: zero row times a column; row: $[0, 0, 0]$.

Answer. The product is (0) .

Explanation and check.

All three row-column contributions are zero.

Worked example

Problem. Find $(AB)_{12}$. A row 1: $[5, 0]$; B column 2: $[-2, 3]$; domain: selected entry with one zero coordinate; target: $(AB)_1 2$.

Answer. $(AB)_{12} = -10$.

Explanation and check.

The dot product is $5(-2) + 0 \cdot 3$, so only the first contribution remains.