LESSON MAKER PRO

Matrix Moves

Add, scale, and multiply matrices in context.

HIGH SCHOOL · HSN-VM.C

CCSS.Math.Content.HSN-VM.C "Perform operations on matrices and use matrices in applications."

NAME _____ DATE _____

MATRIX OPERATION RULES

To add or subtract matrices, combine entries that are in the same position. To multiply a matrix by a number, multiply every entry by that number. To multiply AB, the number of columns in A must equal the number of rows in B, and each product entry uses one row of A and one column of B.

WORKED EXAMPLE

Let A = [[8, -6], [11, 13]]. Find 7A.

1. Multiply each entry of A by 7.
2. 7A = [[7(8), 7(-6)], [7(11), 7(13)]].
3. 7A = [[56, -42], [77, 91]].

Answer: [[56, -42], [77, 91]]

PRACTICE 6 problems

1 Let A = [[1, 4], [-2, 3]] and B = [[3, -1], [2, 1]]. Find A + B.

ANSWER _____

2 Let A = [[5, 1], [4, -3]] and B = [[2, -2], [1, 2]]. Find A - B.

ANSWER _____

3 Find 5[[2, -1], [4, 3]].

ANSWER _____

4 Let A = [[1, 2], [2, 1]] and B = [[2, -1], [1, 3]]. Find AB.

ANSWER _____

5 Let A = [[1, 0, 2], [3, 1, 1]] and B = [[1, 1], [1, 1], [0, 1]]. Find AB.

ANSWER _____

6 Find X if [[2, -1], [3, 4]] + X = [[5, 2], [1, 0]].

ANSWER _____

APPLY IT Show your work

1 At two school concerts, the drama club sells hoodies and stickers. The quantity matrix Q = [[3, 4], [5, 1]] has rows for the first and second concerts and columns for hoodies and stickers. A hoodie costs $9 and a sticker costs $2, so the price matrix is P = [[9], [2]]. Find QP. What does each entry mean?

WORK SPACE

ANSWER _____

2 A robotics club needs materials for two types of display boards. For one set of boards, the material matrix is M = [[2, 1], [3, 2]], where rows represent the two board types and columns represent sheets of foam and paint cups. The club needs 4 identical sets. Find 4M and explain what the matrix represents.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Let A = [[1, 2], [0, 1]] and B = [[3, 1], [2, 1]]. Compute AB and BA. Are they equal? Explain your reasoning in one sentence.

WORK SPACE AND ANSWER

ANSWER KEY # Matrix Moves

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Let A = [[1, 4], [-2, 3]] and B = [[3, -1], [2, 1]]. Find A + B.	**[[4, 3], [0, 4]]**
2	Let A = [[5, 1], [4, -3]] and B = [[2, -2], [1, 2]]. Find A - B.	**[[3, 3], [3, -5]]**
3	Find 5[[2, -1], [4, 3]].	**[[10, -5], [20, 15]]**
4	Let A = [[1, 2], [2, 1]] and B = [[2, -1], [1, 3]]. Find AB.	**[[4, 5], [5, 1]]**
5	Let A = [[1, 0, 2], [3, 1, 1]] and B = [[1, 1], [1, 1], [0, 1]]. Find AB.	**[[1, 3], [4, 5]]**
6	Find X if [[2, -1], [3, 4]] + X = [[5, 2], [1, 0]].	**X = [[3, 3], [-2, -4]]**

PART 2 · APPLY IT

1. **QP = [[35], [47]].** The club earns $35 at the first concert and $47 at the second concert. Multiply each row of quantities by the price column. Each resulting entry is the total revenue for one concert.
2. **4M = [[8, 4], [12, 8]].** The club needs 8 foam sheets and 4 paint cups for board type 1, and 12 foam sheets and 8 paint cups for board type 2. Multiply every entry in M by 4. Each entry gives the total amount of one material needed for one board type.

CHALLENGE

AB = [[7, 3], [2, 1]] and BA = [[3, 7], [2, 5]]. They are not equal because corresponding entries differ, such as the top-left entries.

Accept standard matrix brackets, parentheses, or clearly arranged rows and columns. For the word problems, accept equivalent descriptions that correctly connect each matrix entry to its context.